Final Environmental Impact Statement
and Section 4(f) Evaluation

ANGOON AIRPORT

SEPTEMBER 2016

Federal Aviation
Administration

ANGOON AIRPORT

Environmental Impact Statement and Section 4(f) Evaluation

September 2016

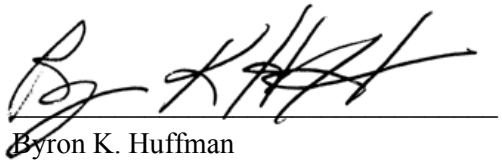
The U.S. Department of Transportation, Federal Aviation Administration has prepared an environmental impact statement for the construction of a land-based airport at Angoon, Hoonah-Angoon Census Area, Alaska.

Lead Agency: Federal Aviation Administration
Cooperating Agencies: U.S. Forest Service, U.S. Army Corps of Engineers

The Federal Aviation Administration presents this environmental impact statement for review pursuant to the following public law requirements: the National Environmental Policy Act of 1969 (Public Law [PL] 91-190), as amended, focused on Section 102(2)(C); Executive Order (EO) 11990, Protection of Wetlands; EO 11998, Floodplain Management; the Federal Aviation Act of 1958, recodified at 49 United States Code (USC) Section 40101 et seq.; the Airport and Airway Improvement Act of 1982, as amended, recodified at 49 USC 47101 et seq.; Section 4(f) of the Department of Transportation Act of 1966, recodified at 49 USC 303, as amended; Wilderness Act of 1964 (PL 88-577); Sections 401 and 404 of the Clean Water Act of 1972 (PL 107-303); Section 7(c) of the Endangered Species Act of 1973 (16 USC 1531 et seq.), as amended; the Fish and Wildlife Coordination Act of 1934 (16 USC 661-667e) as amended; the Migratory Bird Treaty Act of 1918 (16 USC 703–712), as amended; the Clean Air Act of 1970 (PL 91-604), as amended; the National Historic Preservation Act of 1966 (PL 102-575), as amended; the Marine Mammal Protection Act of 1972 (16 USC 31); essential fish habitat requirements of the Magnuson-Stevens Fishery Conservation and Management Act (PL 94-265), as amended by the Sustainable Fisheries Act (PL 109-479); Titles VIII and XI of the Alaska National Interest Lands Conservation Act of 1980 (PL 96-487), as amended; the Alaska Native Claims Settlement Act (ANCSA) of 1971 (43 USC 1601 et seq.); and other laws as applicable.

After careful and thorough consideration of the information contained herein and following consideration of the views of those Federal agencies having jurisdiction by law or special expertise with respect to the environmental impacts described, the undersigned finds that the proposed Federal action is consistent with existing national environmental policies and objectives as set forth in Section 101(a) of the National Environmental Policy Act of 1969

Federal Aviation Administration Official:
Leslie Grey, Lead Environmental Program Manager, AAL-611 / Federal Aviation Administration, Alaskan Region, Airports Division
222 West 7th Avenue, #14 / Anchorage, Alaska 99513-7587 / Telephone: (907) 271-5453 / Email: leslie.grey@faa.gov



Byron K. Huffman
Manager, Airports Division
Alaskan Region

READER'S GUIDE

Welcome to the Angoon Airport Environmental Impact Statement (EIS). The EIS was prepared by the Federal Aviation Administration (FAA) and addresses the possible construction and operation of a land-based airport for the community of Angoon in Southeast Alaska.

This guide is intended to help the reader understand the structure of the EIS and make it easier to find information. The EIS is available in two formats: as a hyperlinked, interactive Adobe Systems Portable Document Format (PDF) and as a printed and bound book. The two formats have identical content and organization.

What is the best way to view the electronic version of the document?

This PDF is best viewed using Adobe Reader with the "Fit one full page to window" button clicked on (in the center of the Adobe Reader user interface at the top).

Please note that if this document is viewed on a non-Windows tablet, the "Back to Last Location" button will not function. In such cases, the best method by which to navigate this document is to open it with a PDF reader and use the built-in bookmarks.

The Section 508 amendment of the Rehabilitation Act of 1973 requires that the information in federal documents be accessible to individuals with disabilities. The FAA has made every effort to ensure that the information in the *Angoon Airport Environmental Impact Statement* is accessible. If you have any problems accessing information, please contact Leslie Grey at Leslie.Grey@faa.gov or (907) 271-5453.

What is the origin of the Angoon Airport EIS logo?

The Angoon Airport EIS logo was developed specifically for the Angoon Airport EIS and symbolizes a bird looking over its shoulder. The imagery of the bird was chosen to represent flight. The color scheme and overall style of the logo were selected to honor the Alaska Native Tlingit culture of the people of Angoon. The FAA developed this logo in consultation with Angoon community representatives, being careful not to simply copy Alaska Native clan symbols or totems and in the process inadvertently devalue the importance of those symbols and totems for individual clan members.

How is the EIS organized?

The Angoon Airport EIS contains the following components:

- Chapter 1: Project Background – Planning for a Land-Based Airport at Angoon. This chapter explains the EIS process, describes the proposed airport project, and introduces the Angoon area.
- Chapter 2: Purpose of and Need for a Land-Based Airport at Angoon. This chapter explains why the Angoon Airport has been proposed, how the proposed action was developed, and some of the steps the Federal Aviation Administration (FAA) must follow throughout the EIS process.
- Chapter 3: Alternatives. This chapter describes and compares the ***alternatives*** analyzed in this EIS and summarizes the effects from each alternative as detailed in Chapter 4: Existing Conditions and Project Effects.
- Chapter 4: Existing Conditions and Project Effects. This chapter, the longest in the EIS, is organized into sections based on the ***resources*** and issues analyzed. Each section introduces the resource or issue, describes the current condition or situation, and explains the ***analysis*** of the anticipated ***effects*** from each alternative and whether those effects would be significant.
- Chapter 5: Requirements of the Alaska National Interest Lands Conservation Act (ANILCA). This chapter introduces the law and explains its role in the Angoon Airport EIS process.
- Chapter 6: Construction Effects. This chapter discusses effects that would be temporary and that would occur only during actual construction.
- Chapter 7: Mitigation. This chapter explains measures that would be used to ***mitigate*** the potential effects of the proposed Angoon Airport.

Terms to know

Alternative: A term used in the National Environmental Policy Act (NEPA) of 1969 (Public Law [PL] 91-190) that refers to a required option for a project. Alternatives must meet the goals of the project while providing different possibilities for how the project would affect the environment.

Analysis: Used here, an assessment or study of something to answer a question. EIS analyses identify similarities or differences among the various alternatives' effects on the environment. This allows comparison of the alternatives to each other and to the no action alternative.

Effects: In the context of an EIS, effects are potential changes to the environment from alternatives.

Mitigate: To reduce or offset an effect on the environment.

Resource: A natural, cultural, or social feature that is valued for its role in the human environment, economy, or society. Examples include archaeological sites, vegetation and wildlife, visual resources (how the land appears), and water bodies such as streams and wetlands.

- Chapter 8: Cumulative Effects. This chapter builds on the descriptions of the existing conditions and project effects for each resource analyzed in Chapter 4. It describes any additional effects that could result from the implementation of other actions or projects when combined with the Angoon Airport project.

- Chapter 9: Coordination and Consultation. This chapter explains how the FAA coordinated and consulted with local, state, and federal agencies; stakeholders; tribal organizations; and the public during the preparation of the EIS.

- Chapter 10: List of Preparers. This chapter lists the individuals responsible for preparing this EIS.

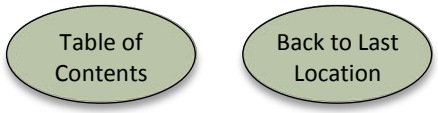
- Appendices: Numerous appendices are provided. Many report the technical or field studies conducted to establish the baseline conditions presented in Chapter 4. Others demonstrate the FAA's compliance with certain requirements.

Figure RG-1. A view of Angoon from Favorite Bay.

How can the reader find certain information?

This EIS provides several tools to help the reader find information. The tools have been designed to make them equally useful to readers of either the interactive PDF format or the hard copy format:

- A table of contents.
- Heading numbers: Each chapter and section has a unique number as part of its heading.
- Colored sidebar boxes: Throughout the EIS colored boxes appear at the right side of some pages.
    - Green boxes provide subsection numbers.
    - Tan boxes define "terms to know," usually scientific or legal terms that may be unfamiliar to some readers.
    - Blue boxes provide supplementary information to enhance the reader's general understanding.
- In-text references to sections, tables, and figures: When a reader is directed to a section of the EIS or to a figure, table, or other section, that reference is provided as a clear and unique identifier, for example, "see section 7.3 in Chapter 7: Mitigation."
- Hyperlinks: Throughout the interactive PDF format, locational information for any section, table, or figure is hyperlinked so readers of that format can jump directly there without scrolling or paging up and down. These hyperlinks appear in many places, including the table of contents, sidebar boxes, and in-text references.
- Navigation buttons: At the bottom of each page is a set of navigation buttons:



In the interactive PDF format, a single click of the "Table of Contents" button takes the reader to the table of contents. From there one can navigate to another chapter or section. A single click of the "Back to Last Location" button takes the reader back one step to the previous location. This button is especially helpful in retracing one's steps through the document.

What is discussed in this section?

Green boxes are for navigation. These boxes list the subsections in a given section and, in the interactive PDF, provide hyperlinks to the specified locations.

Terms to know

Tan boxes contain the definitions of terms used in the text. The definitions will appear on the same page where the term is first used in a given chapter or section. The term will be in bold, italicized font. Unless formally cited, definitions are stated in simplest terms for the purposes of this EIS.

Additional information

Blue boxes contain general or additional information that illuminates a specific topic. Technical information critical to the decision-making process is never presented in these information boxes. The blue boxes are only for supplementary information.

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ES-1. Executive Summary

ES-1.1. What information is provided in the executive summary?[1]

This summary is a concise account of the analysis contained in the *Angoon Airport Final Environmental Impact Statement* (EIS). It explains why the Federal Aviation Administration (FAA) is considering the construction of a land-based airport at Angoon, which alternatives would satisfy the project purpose and need, and the potential social and environmental effects associated with construction and operation of the proposed airport.

ES-1.2. What is the proposed action, and who is proposing it?

The small community of Angoon in Southeast Alaska is currently accessible only by seaplane and ferry. It is the only permanent settlement on Admiralty Island and is located about 55 miles south of Alaska's capital, Juneau, and about 700 miles east-southeast of Anchorage, Alaska's largest city and the location of many state government offices. (Figure ES-1 shows the location of Angoon.) The community is located on a peninsula surrounded on the west by Chatham Strait and on the north and east by Favorite Bay. Just beyond Favorite Bay to the north, east, and south is the nearly 1-million-acre Admiralty Island National Monument and Kootznoowoo Wilderness Area, referred to throughout the EIS as the "Monument–Wilderness Area."

What is discussed in the executive summary?

[1] This executive summary does not contain "Terms to Know" boxes to provide definitions for terms related to things such as aviation, regulations, and resources. Instead, the reader is referred to the glossary or related chapters and sections for definitions.

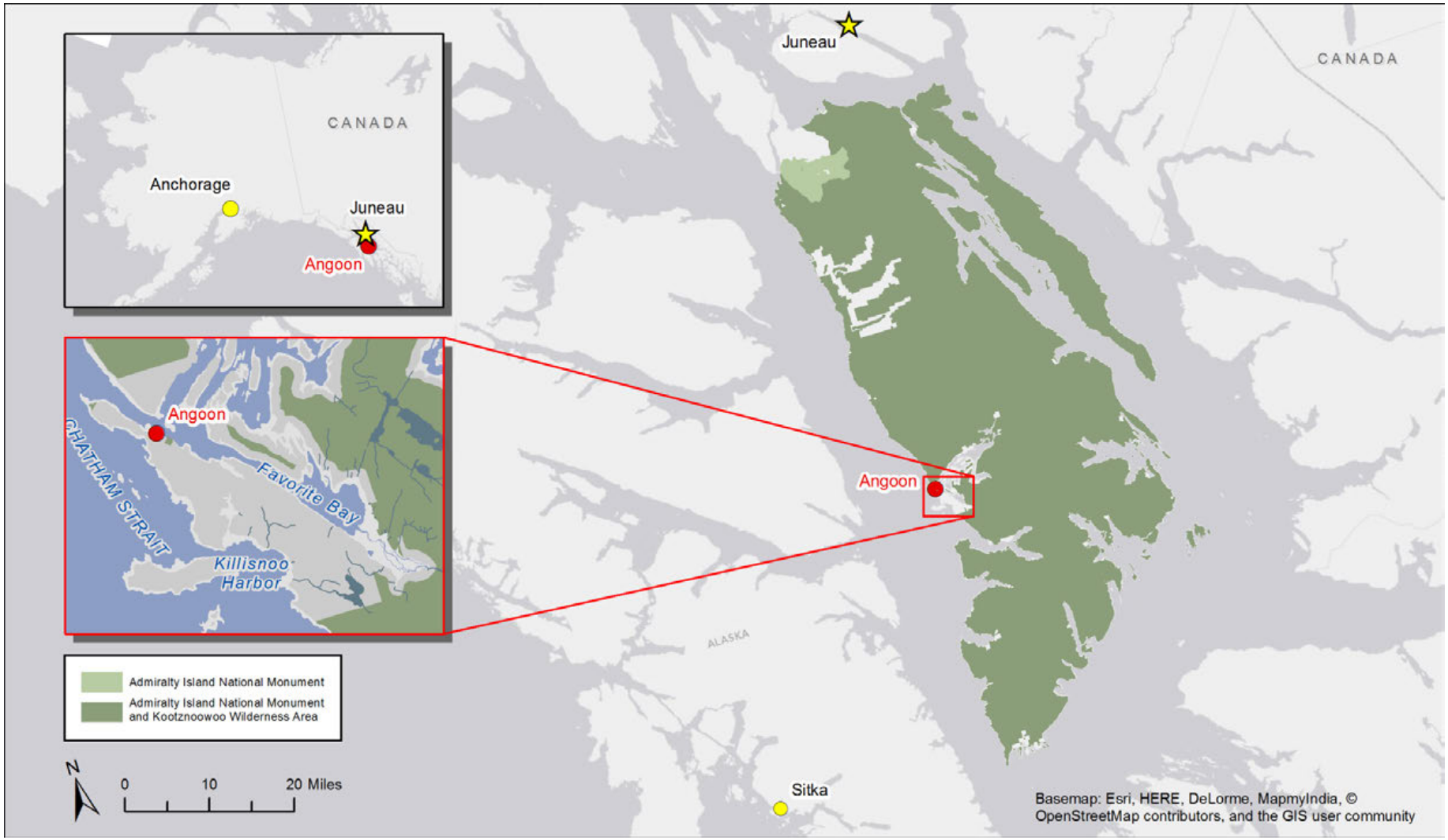

Figure ES-1. Location of Angoon and the Admiralty Island National Monument and Kootznoowoo Wilderness Area in Southeast Alaska.

The Alaska Department of Transportation and Public Facilities (DOT&PF) is the project sponsor and has requested funding and approval from the FAA for the new airport and an associated access road. The DOT&PF would maintain and operate the airport if it is built. The FAA is responsible for the requirements of public use airports and is the lead federal agency responsible for the preparation of this EIS.

The land-based airport would accommodate small, wheeled aircraft, and would include a single runway with an apron comparable to other non-certificated rural airports in Southeast Alaska. The location proposed by the DOT&PF is referred to as Airport 3a. The components of the proposed action are summarized in Table ES-1.

Airport 3a would be in the Monument–Wilderness Area, which is managed by the U.S. Forest Service. Alternative locations for the airport and an access road are also being considered, and one of these alternatives involves lands outside the Monument–Wilderness Area. These lands are privately owned or are owned and managed by the City of Angoon or Kootznoowoo, Inc., the local Alaska Native corporation.

Table ES-1. Components of the proposed action

• Runway: Paved; 3,300 feet long and 75 feet wide, with future expansion to 4,000 feet long* • Runway safety areas: 150 feet wide, centered on runway centerline, extending 300 feet beyond each runway end • Object free area: 500 feet wide, centered on runway centerline, extending 300 feet beyond each runway end • Runway protection zone: Standard visual approach dimensions of 500 × 1,000 × 700 feet • Single, perpendicular taxiway: Paved • Aircraft apron: Paved • Navigational aid: Rotating beacon • Visual approach aid: Precision approach path indicator	• Runway lights: Pilot-controlled, medium-intensity lights • Terminal space: Sufficient area for a future terminal or passenger shelter • Lease lots: 62,500 square feet available for leasing • Electrical control building and generator: Near future terminal site • Perimeter fence: For security and wildlife control • Passenger parking lot: Paved, near future terminal site • Support facilities: Future weather station, weather cameras, communication, wind cones, etc. • Access road: Two, paved, 9-foot-wide lanes and 1-foot shoulders with right-of-way sized for future expansion to two 10-foot lanes and 5-foot shoulders* • Overhead utility lines: Power and telephone lines located within the access road corridor**

*Future expansion would be subject to additional environmental review when proposed for construction.
**Utility lines would only be installed if it is determined to be cost-effective (see section 4.10 Energy Supply, Natural Resources, and Sustainable Design for more information).

Before the FAA can decide whether to provide the requested funding or approval for the airport layout plan, they are required by the National Environmental Policy Act (NEPA) to evaluate and publicly disclose the potential social and environmental effects of building and operating the proposed airport. The FAA is also responsible for ensuring that airport development projects provide for the protection and enhancement of natural resources and the quality of the environment (49 United States Code [USC] 47101(a)(6)). The FAA is required to prepare this EIS in accordance with two FAA orders: *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) and *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b). The FAA released an update to 1050.1E, Chg 1 in July 2015 titled *1050.1F Policies and Procedures for Considering Environmental Impacts*. As stated in Order 1050.1F, because the updated order was released after publication of the draft EIS, this final EIS doesn't show changes that would be caused by the updated order because the updated order does not apply to ongoing environmental reviews where substantial revisions to ongoing environmental documents would be required.

ES-1.3. What is the purpose and need for the airport project?

For this EIS, the purpose and need is as follows:

> Current transportation service to and from Angoon is solely by seaplane and ferry. These options do not provide sufficient availability and reliability in transportation to and from Angoon. A land-based airport will improve the availability and reliability of aviation transportation services to and from Angoon.

Like most communities in Southeast Alaska, Angoon has no road connections outside the local area because the ocean and terrain surrounding Angoon make construction and maintenance of roads and bridges to other communities impractical and prohibitively expensive. Seaplane service to and from Angoon is available approximately 44% of the hours in any given year. This percentage of time is determined by weather, lighting conditions, and water conditions in Favorite Bay. The ferry service provides a relatively low-cost travel option that can usually accommodate passenger demand but is unlikely to improve the availability and reliability of transportation to and from Angoon due to infrequent schedules and travel time.

A land-based airport with runway lights, an instrument approach procedure, and a fixed threshold would improve the availability of aviation service to Angoon, allowing flights to occur 89%–94% of the total hours in a given year. This more than doubles the 44% of hours per year that seaplane service is currently available.

ES-1.4. How did the FAA identify the resources and issues analyzed in the EIS?

The FAA determined which resources and issues would need to be analyzed in the EIS by considering the requirements of NEPA, the Council on Environmental Quality's regulations for implementing NEPA, FAA Orders 1050.1E and 5050.4B, and the results of public and agency scoping. These resources and issues are discussed in detail in Chapter 4: Existing Conditions and Project Effects. Other federal laws—for example, the Endangered Species Act of 1973, as amended (USC 1531 et seq.) and the National Historic Preservation Act of 1966 (36 Code of Federal Regulations [CFR] 800, as amended)—also provide direction about the consideration of certain resources during the planning of federal actions.

As part of public and agency scoping, the FAA asked the public, regulatory agencies, and key groups such as the Angoon Community Association (the local federally recognized tribe) and Kootznoowoo, Inc. for input about what issues should be considered in the EIS. During the scoping period, the FAA held meetings, sent out informational mailers and direct mailings, advertised in local newspapers and other media, and conducted other outreach efforts. A notice of intent to prepare the EIS and details about the scoping period were published in the *Federal Register* on September 24, 2008. The scoping period was open for 99 days, closing December 31, 2008.

Many comments were received during scoping, including some the FAA determined to be outside the scope of this EIS and outside the potential range of alternatives. Other comments the FAA considered directly relevant, and these were used in the development of alternatives and environmental analyses.

A complete list of all comments received during the scoping period are provided in the *Public and Agency Scoping Report* (SWCA 2009, included as Appendix A).

The EIS process has included extensive public and agency coordination. A notice of availability for the draft EIS and details about the public comment period were published in the Federal Register on January 9, 2015. The official comment period closed on March 11; however, because the public hearings were scheduled later in the comment period, and per FAA Order 5050.4b, the FAA accepted comments through March 20, 2015. Comments have been documented and incorporated into the analysis and decision-making process. A complete list of all comments received during the public comment period and responses to these comments are provided in the Response to Comments on the Draft EIS in Appendix T.

ES-1.5. Are there issues to be resolved?

The action alternatives are located on three general types of surface lands—public lands under the management of the U.S. Forest Service, lands that are owned by the City of Angoon, and lands that are privately owned or owned and managed by Kootznoowoo, Inc. For any action alternative, the DOT&PF will need to follow certain processes to make the land available for construction and operation of the airport and access road. Section ES-1.5.1 explains these issues.

The FAA has identified a preferred alternative (Airport 12a with Access 12a), which is different from the DOT&PF's proposed action (Airport 3a with Access 2). Section ES-1.5.2.1 explains how the FAA selected their preferred alternative, and which steps must be taken as a result of this difference.

ES-1.5.1. Issues related to landownership/ management

1.5.1.1. Building an airport in wilderness

Despite the strict protections generally given to wilderness areas, in Alaska it is possible to build an airport in a wilderness area under certain circumstances. Management of federal lands in Alaska is distinctive in that uses that would be prohibited on certain federal lands in other states are allowed under Alaska-specific laws, specifically, the Alaska National Interest Lands Conservation Act (ANILCA). When Congress passed ANILCA, more than 100 million acres of Alaska lands were transferred into conservation system units. Congress recognized that Alaskans, particularly those living in remote areas, depend on utilities and means of transportation that must often extend across great distances. Air travel is often the only option. To meet the socioeconomic and public safety needs unique to Alaska, Congress included some exceptions in ANILCA for the

ways Alaskans can use federal lands. One such use is the placement of transportation and utility systems on lands considered a conservation system unit—in this case, the Monument–Wilderness Area.

The required steps before a transportation and utility system can be placed in a wilderness area in Alaska include the following:

- An evaluation of effects (this EIS)
- Public hearings in local Alaska areas and in Washington, D.C.
- An independent evaluation by each involved federal agency
- Approval by Congress and the President of the United States

These steps are known as the ANILCA Title XI process. On January 9, 2015, the DOT&PF submitted an application for the proposed action under the ANILCA Title XI process. Section ES-1.5.2.2 provides a summary of the current status of the application and further information about the ANILCA process can be found in Chapter 5.

1.5.1.2. Building an airport on non-public lands

If Airport 12a with Access 12a is approved at all stages, the DOT&PF would need to acquire private lands and lands owned and managed by Kootznoowoo, Inc. using federal funding. Acquisition of private residential properties would be done in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (PL 91-646), which covers any private lands, including those conveyed under the Alaska Native Claims Settlement Act (ANCSA). Although no formal discussions with private landowners about this potential acquisition have occurred, all contacted landowners have allowed the FAA access to their lands for field studies. Acquisition of Kootznoowoo, Inc. lands would likely take the form of a land purchase, long-term lease, or perpetual easement. The general manager of Kootznoowoo, Inc. has verbally indicated that, at the discretion and final approval of their board of directors, the corporation would consider transferring lands to the airport sponsor if Airport 12a with Access 12a is approved at all stages (Naoroz 2014). Lands owned by the City of Angoon would not need to be acquired. The DOT&PF would negotiate a right-of-way agreement for long-term access to those lands to clear obstacles, but there would be no change in landownership.

ES-1.5.2. Issues related to identification of a preferred alternative that is different from the proposed action

1.5.2.1. How the FAA chose the preferred alternative

Among the three airport alternatives, there are small aviation differences based on instrument approach capability, minimums for visibility, and year-round availability. However, the FAA went through an extensive alternatives development process to ensure that any analyzed alternative would improve the availability and reliability of aviation service to and from Angoon. All action alternatives would double the current availability of air travel in and out of Angoon, and would meet or exceed FAA standards for the type of aircraft that would use the proposed airport. Given that the aviation differences among all airport alternatives are so small, the FAA identified Airport 12a with Access 12a as the preferred alternative based on the following three criteria:

1. Social and environmental effects
2. Section 4(f) regulations
3. The effects on natural resources as outlined in 49 United States Code (USC) 47106(c)(1)(B)

Social and environmental effects: The social and environmental analyses are summarized below in section ES-1.10 and provided in full in Chapter 4. Based on these analyses, Airport 12a with Access 12a has the fewest significant adverse effects.

Section 4(f) regulations: The FAA is required to also evaluate effects to certain types of lands and resources referred to in the EIS as "Section 4(f) resources" or "Section 4(f) properties." Under Section 4(f) of the Department of Transportation Act of 1966, as amended by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (Public Law [PL] 109-59), the FAA cannot affect Section 4(f) resources or properties unless

- there is no feasible and prudent alternative to avoid such effects and the action in question includes all possible planning to minimize harm to the property in question *or*
- the use of that property will have a *de minimis* impact on it.

Airport 3a with Access 2 (the proposed action), Airport 3a with Access 3, Airport 4 with Access 2, and Airport 4 with Access 3 would result in Section 4(f) physical use of the Monument–Wilderness Area. Airport 12a with Access 12a would result in *de minimis* impacts to two Section 4(f) resources. The no action alternative would avoid physical use of Section 4(f) resources, but it does not meet the purpose and need. See section 4.4 U.S. Department of Transportation Act Section 4(f) Evaluation Summary for further information.

The effect on natural resources as outlined in 49 USC 47106(c)(1)(B): The FAA cannot approve funding of a proposed airport development project that has significant adverse effects if a determination can be made that there is a possible and prudent alternative to the project, and that every reasonable step has been taken to minimize the adverse effects.

FAA *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b) states that a "prudent" alternative refers to rational judgment, and that an alternative "may be possible, but not prudent when one considers its safety, policy, environmental, social, or economic consequences." The FAA utilized this guidance in developing findings and a determination that the preferred alternative is a possible and prudent alternative to the significant adverse impacts that would be caused by the DOT&PF's proposed action. Details regarding the FAA's findings can be found in Chapter 3: Alternatives, section 3.8.

1.5.2.2. Steps to be taken

Section 801 of FAA Order 5050.4B states that when the preferred alternative is different from a sponsor's proposed action, the FAA must notify the sponsor and work with them to try to reach consensus. Because it is up to the sponsor (in this case, the DOT&PF) whether to carry out the project, the DOT&PF would need to make one of the following choices:

- Concur with the FAA's preferred alternative
- Reject the FAA's preferred alternative
- Propose an alternative not previously presented
- Take no action to address the purpose and need

However, on this project the sponsor is in a unique position should they choose to reject the FAA's preferred alternative and move forward with the proposed action. As discussed in Chapter 5: Requirements of the Alaska National Interest Lands Conservation Act (ANILCA), the State of Alaska is authorized by ANILCA Title XI to apply for a right-of-way for

the airport and access road in the Admiralty Island National Monument and Kootznoowoo Wilderness Area. The DOT&PF submitted the ANILCA Title XI application for Airport 3a with Access 2 (the DOT&PF's proposed action) on January 9, 2015, using the draft EIS and other documents as the supporting information. Because this application has been submitted, all involved federal agencies must comply with the requirements in ANILCA.

As long as an ANILCA application is being considered, the involved federal agencies are not the only decision makers for this project. The President and Congress would provide the final approval of the application, which would determine whether it would be possible for Airport 3a with Access 2 to be built within the Monument–Wilderness Area.

The federal agencies have drafted findings and a notification of tentative disapproval of the application to the President of the United States. At this time, no notification will be sent to the President pending discussions with the sponsor and the cooperating agencies on next steps.

ES-1.6. What other agencies and entities are involved in the proposed Angoon Airport project?

Because the U.S. Forest Service manages the land on which the DOT&PF's proposed action and one of the other airport alternatives are located, that agency must issue a decision under NEPA whether to approve or disapprove the Angoon Airport project if an alternative in the Monument–Wilderness Area is selected.

Because wetlands or other waters of the U.S. would be affected by the selected airport or access alternative—regardless of alternative—the U.S. Army Corps of Engineers must also issue a decision under NEPA whether to approve or disapprove the Angoon Airport project. This agency would also issue any necessary permits to authorize the dredging or filling of wetlands or other waters of the U.S.

Title XI of ANILCA would also require the U.S. Forest Service and the U.S. Army Corps of Engineers to issue tentative decisions to approve or disapprove the Angoon Airport project for alternatives in the Monument–Wilderness area if the DOT&PF continues with the ANILCA application.

In addition to the U. S. Forest Service and U.S. Army Corps of Engineers (as cooperating agencies) and the DOT&PF (as the project sponsor), other local, state, and federal entities must also formally and directly consult with the FAA. These agencies have specific expertise or regulatory authority for the actions being considered during preparation of this EIS; they have reviewed a preliminary draft of the EIS and provided comments, which have been incorporated into this EIS as appropriate. Consultation with these agencies will continue throughout the EIS process and will not be complete until after the record of decision has been issued.

ES-1.7. Which alternatives are analyzed in the EIS?

The FAA identified five alternatives, including the proposed action that would meet the purpose and need. These are called the "action" alternatives. Along with the required "no action" alternative, the action alternatives represent the range of reasonable alternatives evaluated for environmental effects.

ES-1.7.1. No action alternative

Key aspects of the no action alternative are as follows:

- No land-based airport or access road would be built.
- Air transportation options would remain as they exist today, meaning that
  - the Angoon Seaplane Base would continue to operate under visual flight rules (VFR) only, and
  - no instrument flight rules (IFR) procedures would be developed.

Under the no action alternative, current transportation services would continue.

ES-1.7.2. Action alternatives

The five action alternatives evaluated in this EIS are as follows:

- Airport 3a with Access 2 (the proposed action)
- Airport 3a with Access 3
- Airport 4 with Access 2
- Airport 4 with Access 3
- Airport 12a with Access 12a (the preferred alternative)

All action alternatives have in common certain components of the proposed action (see section ES-2, above, for the details of the proposed action). These include runway length, size of lease lots, and design features of the access road. All would require construction activities.

The differences between the alternatives are the result of each alternative's location, the terrain of that location, and access requirements specific to each location. For example, the exact area where aircraft would park would vary depending on the location of the runway ends or the access road, both of which are influenced by the terrain.

The location and general layout of each alternative is shown in Figure ES-2. The general characteristics and requirements are summarized and compared in Table ES-2; aviation performance characteristics are described in Table ALT2 and Table ALT3 in Chapter 3: Alternatives.

1.7.2.1. Airport 3a with Access 2 (proposed action)

Airport 3a with Access 2 would be located on lands owned or managed by the U.S. Forest Service; Kootznoowoo, Inc.; and the City of Angoon. The airport would be located on the north side of Favorite Bay within the boundaries of the Monument–Wilderness Area. Access 2 would begin at the existing Bureau of Indian Affairs (BIA) Road, and travel around the southeastern end of Favorite Bay within 1,000 feet of the shoreline. This access road would be 20 feet wide, consisting of two 9-foot lanes with 1-foot shoulders, and would have a right-of-way sized for future expansion to two 10-foot lanes with 5-foot shoulders. It would require the construction of a bridge across Favorite Creek and would require access to the avigation easements on the Angoon peninsula for vegetation removal. Because this alternative would be located in the Monument–Wilderness Area, it would require a permit under Title XI of ANILCA.

1.7.2.2. Airport 3a with Access 3

The route of the access road would be the only difference between this alternative and Airport 3a with Access 2; the location and details for the airport would be the same. As with Access 2, Access 3 would begin at the existing BIA Road, but it would stay farther inland from the Favorite Bay shoreline. This access road would be 20 feet wide, consisting of two 9-foot lanes with 1-foot shoulders, and would have a right-of-way sized for future expansion to two 10-foot lanes with 5-foot shoulders. The bridge crossing at Favorite Creek would be located farther upstream than the bridge crossing for Access 2. Because this alternative would be located in the Monument–Wilderness Area, it would require a permit under Title XI of ANILCA.

1.7.2.3. Airport 4 with Access 2

Airport 4 with Access 2 would be located on lands owned or managed by the U.S. Forest Service; Kootznoowoo, Inc.; and the City of Angoon. The airport would be located on the east side of Favorite Bay. Access 2 would begin at the existing BIA Road and travel around the eastern end of Favorite Bay within 1,000 feet of the shoreline. This access road would be 20 feet wide, consisting of two 9-foot lanes with 1-foot shoulders, and would have a right-of-way sized for future expansion to two 10-foot lanes with 5-foot shoulders. A bridge crossing at Favorite Creek—the same bridge location as for Airport 3a with Access 2—would be required. Because this alternative would be located in the Monument–Wilderness Area, it would require a permit under Title XI of ANILCA.

1.7.2.4. Airport 4 with Access 3

The route of the access road would be the only difference between this alternative and Airport 4 with Access 2. The location and details for the airport would be the same. As with Access 2, Access 3 would also begin at the existing BIA Road, but it would stay farther inland from the Favorite Bay shoreline. This access road would be 20 feet wide, consisting of two 9-foot lanes with 1-foot shoulders, and would have a right-of-way sized for future expansion to two 10-foot lanes with 5-foot shoulders. The bridge crossing at Favorite Creek would be located farther upstream than the bridge crossing for Access 2, and the road would then go northwest to the proposed Airport 4 location. Because this alternative would be located within the Monument–Wilderness Area, it would require an ANILCA Title XI permit.

1.7.2.5. Airport 12a with Access 12a (preferred alternative)

Airport 12a with Access 12a would be located on lands owned or managed by private landowners; Kootznoowoo, Inc.; and the City of Angoon. Both the airport and access road would be on the Angoon peninsula southeast of the community of Angoon; no part of this alternative would be located on Monument–Wilderness Area lands. Access 12a would begin at the existing BIA Road and travel directly to the proposed airport location. Unlike the access roads to Airport 3a or Airport 4, this road would be built with two 10-foot lanes with 5-foot shoulders, and would require no bridge.

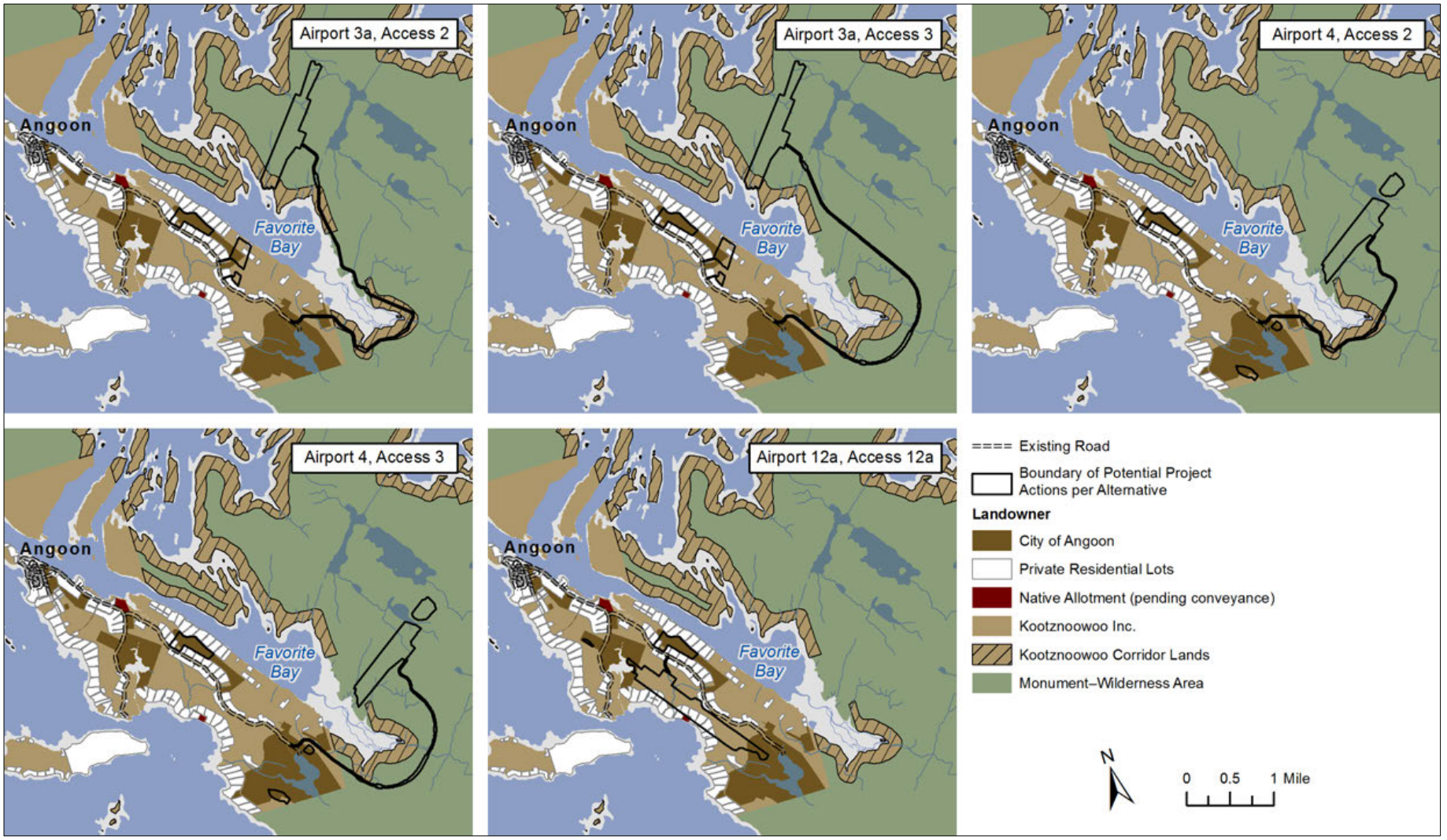

Figure ES-2. Location and general layout of the action alternatives.

Table ES-2. Comparison of characteristics and construction requirements for the action alternatives

	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Landownership	• Federal public lands (Monument–Wilderness Area) • Kootznoowoo, Inc. • City of Angoon	• Federal public lands (Monument–Wilderness Area) • Kootznoowoo, Inc. • City of Angoon	• Federal public lands (Monument–Wilderness Area) • Kootznoowoo, Inc. • City of Angoon	• Federal public lands (Monument–Wilderness Area) • Kootznoowoo, Inc. • City of Angoon	• Private • Kootznoowoo, Inc. • City of Angoon
Airport property	213 acres	213 acres	218 acres	218 acres	253 acres
Airport perimeter fence (acres inside fence)	98 acres	98 acres	100 acres	100 acres	96 acres
Impervious surface	29 acres	30 acres	26 acres	27 acres	20 acres
Terrain disturbance	109 acres	114 acres	93 acres	99 acres	78 acres
Terrain disturbance from Kootznoowoo, Inc. proposed material source	41 acres	41 acres	41 acres	41 acres	41 acres
Cut needed for construction	471,200 cubic yards	1,176,500 cubic yards	650,700 cubic yards	1,286,100 cubic yards	342,300 cubic yards
Fill needed for construction	409,000 cubic yards	379,000 cubic yards	553,400 cubic yards	554,600 cubic yards	291,700 cubic yards
Vegetation removal	136 acres	136 acres	62 acres	63 acres	117 acres
Avigation easement with tree felling	0 acres	0 acres	47 acres	47 acres	3 acres
Temporary use area	8 acres	5 acres	8 acres	5 acres	None required
Access road right-of-way	82 acres	90 acres	55 acres	62 acres	4 acres
Width of access road right-of-way	150–250 feet wide	150–225 feet wide	150–200 feet wide	150–225 feet wide	150 feet wide
Length of access road	4.4 miles	4.7 miles	2.9 miles	3.2 miles	0.2 miles
Bridge span at Favorite Creek	650 feet	450 feet	650 feet	450 feet	No bridge required
Number of culverts and stream reroutes	28	30	18	19	3
Truck trips	33,400	56,000	43,600	64,900	23,600
Barge trips	45	45	40	40	30
Construction duration	Up to three seasons	Up to three seasons	Up to three seasons	Up to three seasons	Up to two seasons

*Numbers presented for each action alternative are preliminary. Further refinements and a final design would follow if an action alternative is approved at all stages in the ANILCA Title XI and NEPA processes.

ES-1.8. Were any other alternatives considered?

The scoping process (see Appendix A) and many studies identified a broad spectrum of alternatives, including 15 different airport locations and five access road routes, other modes of airport access, different transportation systems, improvements to existing air service, and the possible use of existing nearby airports (in Kake, Hoonah, or Petersburg, for example) instead of constructing a new airport in Angoon (see *Alternatives Eliminated from Detailed Analysis* [SWCA 2014a, included as Appendix B]). After compiling this list of potential alternatives, the FAA screened each according to the following criteria:

1) Does it meet the purpose of and need for the project? If a possible alternative did not meet the purpose and need, it was eliminated from further consideration.

2) Are the alternatives that do address purpose and need reasonable from a NEPA perspective? In other words, would they be practical or feasible from an engineering perspective and an economic perspective? If a possible alternative was determined to not be practical or feasible, it was considered not reasonable and was eliminated from further consideration.

For an alternative to be considered reasonable, it must meet established aviation design and safety standards. Airports are designed in accordance with the airport reference code standards outlined in the FAA Advisory Circular *AC 150/5300-13A, Airport Design* (FAA 2012a). Any alternative carried through for detailed analysis in the EIS must meet the minimum FAA standards for the following:

- Wind coverage
- Safe approaches and departures
- Obstacle and obstruction clearance
- Other factors relating to air navigation

Alternatives that passed the FAA screening were carried forward for detailed analysis in this EIS, whereas alternatives that did not meet all screening criteria were dismissed from further consideration.

ES-1.9. What other actions may be related to the Angoon Airport project?

No similar actions were identified at the time of this EIS. The FAA did identify several cumulative actions in and around Angoon. Cumulative effects are disclosed in section ES-14. No connected actions were identified.

One potential action that is already part of the proposed action, and therefore evaluated in the EIS would be issuance of an ANILCA Title XI permit.

A second potential NEPA action evaluated in this EIS is the acquisition of private and Kootznoowoo, Inc. land using federal funding. Lands owned by the City of Angoon would not need to be acquired. The DOT&PF would negotiate a right-of-way agreement for long-term access to those lands to clear obstacles, but there would be no change in landownership.

ES-1.10. Summary of environmental effects

The following summaries of environmental effects are necessarily brief and do not include full explanations of context or descriptions of existing conditions. Chapter 4: Existing Conditions and Project Effects details the effects under each alternative, discusses which effects would be significant, and presents potential mitigation measures.

The FAA does not have established thresholds for five resource categories (stream geomorphology–hydrology, subsistence resources and uses, wilderness character, the national monument, and climate change–greenhouse gas emissions), and this EIS does not establish FAA thresholds for those resources. However, because Airport 3a and Airport 4 with either access road would be located on lands managed by the U.S. Forest Service, the FAA uses other guidance to make determinations of significance for three of these resources—subsistence resources and uses and wilderness character, and the national monument.

In the case of subsistence resources and uses, ANILCA Title VIII (810(a)) requires a determination whether withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands would significantly restrict subsistence uses. The U.S. Forest Service commonly uses the thresholds of significance established for ANILCA Section 810 evaluations in the Kunaknana v. Clark case to make determinations of significance (see section 4.13.3.2 in Subsistence Resources and Uses for further information). In the case of wilderness character and the national monument, the FAA consulted with the U.S. Forest Service and used their guidance to make determinations of significance specifically for this EIS to satisfy that agency's NEPA requirements (see section 4.16.3.5 in Wilderness Character and section 4.19.3.4 in Admiralty Island National Monument).

ES-1.10.1. Air quality

See section 4.2 Air Quality for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

Any of the action alternatives would temporarily increase construction-related emissions for carbon monoxide, nitrogen oxides and non-methane hydrocarbons, and particulate matter. However, construction emissions from any action alternative would be temporary, and minimization measures would be employed during the construction period to reduce emissions.

For each of the action alternatives, operation of a land-based airport would roughly double carbon monoxide emissions and roughly triple volatile organic compound emissions from existing conditions, whereas emissions of the other criteria pollutants (nitrogen oxides, sulfur oxide, and particulate matter) would decrease by approximately 50%–75%.

Significance

Construction-related emissions would be temporary and would be minimized through best management practices (BMPs). All operations-related emissions would be below de minimis thresholds established by Environmental Protection Agency regulations. Therefore, no significant air quality effects are expected if the project is implemented.

ES-1.10.2. Compatible land use

See section 4.3 Compatible Land Use for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

No noise-sensitive areas would be affected by noise levels at or above a day-night average sound level (DNL) of 65 A-weighted decibels (dBA) for Airport 12a. For Airports 3a and 4, approximately 3–4 acres of Monument–Wilderness Area would be exposed to noise levels at or above DNL 65 dBA during airport operation. Although wilderness areas are generally considered noise sensitive, affected Monument–Wilderness Area lands would fall within the airport property, which, through the ANILCA process, would become a transportation and utility system and would therefore not be considered noise sensitive. This does not mean that there are no noise effects to wilderness qualities outside of the airport property. Those effects are discussed throughout section 4.16.3 of Wilderness Character.

Alternatives would differ based on their compatibility with existing plans and policies and land use and ownership changes associated with project-related land acquisition, rights-of-way, permits, and/or leases. Because ANILCA Title XI provides a process through which an airport could be allowed in the Monument–Wilderness Area and no land use plan amendment would be required, Airport 3a and Airport 4 are considered by the FAA to be a compatible land use. These alternatives would require land acquisition, rights-of-way, permits, and/or leases on predominantly U.S. Forest Service lands, and would convert recreation and subsistence land uses to transportation uses. In comparison, the City of Angoon would need to rezone some lands acquired by the DOT&PF for Airport 12a with Access 12a, because permitted uses for these lands do not include an airport. This alternative would convert commercial and residential land uses to transportation uses.

Significance

There would be no noise-sensitive areas within the DNL 65 dBA contour for any action alternative, and all alternatives would be compatible because the airport and access road could be allowed through the ANILCA process or through re-zoning. For these reasons, per the significance thresholds in the FAA orders, no significant compatible land use effects are expected if the project is implemented.

ES-1.10.3. U.S. Department of Transportation Act Section 4(f) Evaluation summary

See section 4.4 U.S. Department of Transportation Act Section 4(f) Evaluation Summary for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

The Monument–Wilderness Area is a Section 4(f) property that qualifies for Section 4(f) protection.

Airport 3a with Access 2 (the proposed action), Airport 3a with Access 3, Airport 4 with Access 2, and Airport 4 with Access 3 would result in Section 4(f) physical use of the Monument–Wilderness Area. Each of these action alternatives would incorporate Monument–Wilderness Area lands into a transportation and utility system under ANILCA. Airport 12a with Access 12a would result in *de minimis* impacts to two Section 4(f) resources. The no action alternative would avoid physical use of Section 4(f) resources, but it does not meet the purpose and need.

Significance

Section 4(f) does not use the wording "significant;" rather, it makes a determination of whether there would be use of historic properties or recreation properties. Because Airport 3a and Airport 4 with either access would result in more than a minimal physical use of a Section 4(f) property, this use would be considered significant under FAA thresholds. The *de minimis* impacts to Section 4(f) resources under Airport 12a with Access 12a would not be considered significant under these same thresholds.

ES-1.10.4. Biological resources

1.10.4.1. Terrestrial habitats and associated species

See section 4.5.1 Terrestrial Habitats and Associated Species for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

Under all action alternatives, terrain disturbance, vegetation clearing, and other construction actions would remove or alter terrestrial habitats. The presence of an airport and new access road would disconnect habitat areas and change their quality. Noise and light from construction and operation of the airport could disturb animals, and increased traffic and improved human access could increase the potential for disturbance, injury, or mortality of animals.

The same types of habitats would be affected. Although the number of acres removed or altered and the number of miles of new road would differ between action alternatives, the effects to terrestrial habitats and species do not differ significantly.

Significance

The effects from any of the action alternatives would not be significant because their magnitude and extent would not reach the significance thresholds identified for terrestrial habitats and associated species. Habitats would not be removed or altered to the extent that the population dynamics, sustainability, reproduction, mortality, or minimum population size needed to sustain a species would be adversely affected. The effects would not reduce the habitat supporting species below that needed to maintain self-sustaining populations. Maintenance of natural systems would not be adversely affected. The action would be consistent with applicable state natural resources management strategies.

1.10.4.2. Aquatic habitats and associated species

See section 4.5.2 Aquatic Habitats and Associated Species for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

Under all action alternatives, terrain disturbance, vegetation clearing, and other construction actions—especially rerouting, culverting, or filling of streams—would remove or alter stream habitats; remove portions of riparian management areas; and could cause behavioral change, injury, or mortality to aquatic species. Improved human access could increase fishing and harvest of aquatic resources. Airport 3a and Airport 4 with either access would result in behavioral change, injury, or mortality from actions associated with bridge construction, and could result in increased fishing or harvest as a result of improved human access.

Significance

Because affected areas would be small compared to the aquatic study area and similar areas in Southeast Alaska, effects to aquatic habitats and species, and therefore non-wetland waters of the U.S., would not be significant. Development of any of the airport and access alternatives would remove or alter some stream habitats. However, as with the significance determination for terrestrial habitats and associated species, the magnitude and extent of activities under the action alternatives would not reach the significance thresholds identified for aquatic habitats and associated species. The removal or alteration of habitats would not adversely affect population dynamics, sustainability, reproduction, mortality, or minimum population size. Self-sustaining populations and natural systems would be maintained, and the action would be consistent with applicable state natural resource management strategies.

None of the action alternatives would cause unacceptable adverse effects to non-wetland waters of the U.S. per Clean Water Act Section 404(b)(1) guidelines. None of the action alternatives would have a significant effect on essential fish habitat.

1.10.4.3. Special status species

See section 4.5.3 Special Status Species for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

Under any of the action alternatives, there would be no long-term direct effects to federally listed species, candidate species, or species protected under the Marine Mammal Protection Act. However, development of any airport alternative would permanently remove or alter terrestrial and stream habitats used by U.S. Forest Service sensitive species, management indicator species, and migratory birds.

The same types of habitats would be affected during construction, operation, and maintenance of any action alternative, but the amount of habitat that would be removed or altered differs among the action alternatives.

Significance

There would be no long-term direct effects to federally listed species, candidate species, or species protected under the Marine Mammal Protection Act. None of the action alternatives would "jeopardize a species' continued existence or destroy or modify a species' critical habitat." None of the effects from the action alternatives would be significant because the total habitat affected would be such a small proportion of the available habitat in the study area that no species would be jeopardized at the population level. None of the significance thresholds identified for terrestrial and aquatic habitats and associated species would be reached.

During transport of construction materials via barge to and from Angoon, the potential for collisions between barges and marine mammals would be reduced or avoided by adhering to a general marine mammal "Code of Conduct," including vigilantly scanning the water's surface and remaining at least 100 yards from any sighted marine mammals (Neilson et al. 2012). The potential for collisions between barges and marine mammals is a temporary effect that would cease at the end of construction. The number of ship strikes to marine mammals as a result of the airport project would be very low and is not expected to affect marine mammal populations in Southeast Alaska.

ES-1.10.5. Floodplains, stream geomorphology, and hydrology

See section 4.6 Floodplains, Stream Geomorphology, and Hydrology for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

Airport 3a would have some level of hydrologic effect in the most streams. Both Airports 3a and 4 would result in less than a 10% increase in the 2-year peak discharge in three streams. Airport 3a would have the highest magnitude of change in a single stream, with an approximately 33% increase in the 2-year peak discharge in Stream 6.

Under Airport 12a, geomorphic stream effects would be more concentrated than under the other action alternatives, with 1.2 acres of stream channel area culverted or rerouted. This is 79% of the Stream 10 channel area, whereas the other action alternatives would affect less than 39% of any single stream's channel area and would affect more streams. Airport 3a with Access 3 would cause the fewest effects to stream geomorphology.

Under Airport 3a and Airport 4, both of which require a bridge over Favorite Creek regardless of access alternative, effects to Favorite Creek floodplains would be caused by construction and bridge infrastructure in the floodplains. Construction activities would reduce the filtration function of the floodplains in the short term until vegetation and soils were reclaimed. Access 2 to either Airport 3a or Airport 4 would cause the greater effects to floodplains. There would be no effects to floodplains under Airport 12a with Access 12a.

Significance

The FAA does not have established significance thresholds for stream geomorphology and hydrology and does not set them in this EIS. Airport 12a would result in the greatest effects to hydrology and stream geomorphology. Because approximately 79% of the Stream 10 channel area would be culverted or rerouted, all natural stream function would presumably be lost within the Airport 12a footprint. Changes in channel width, depth, or form would likely extend noticeably downstream due to changes in water velocity or sediment size as well as the volume of water coming from disturbed channels. This area (and a large percentage) of rerouted or culverted channel would be difficult to design in a way that would maintain its ability to support wildlife and fish habitat and natural geomorphic processes of sediment and water movement.

The other alternatives would also result in effects to hydrology or stream geomorphology but not at the same magnitude as under Airport 12a. The affected streams would likely maintain their ability to support wildlife and fish habitat in non-affected sections and support natural sediment and water movement. This is based on the smaller percentages of stream affected, the occurrence of effects on tributary channels, and more easily mitigated effects.

None of the alternatives would result in significant long-term encroachment effects to floodplains. Airport 3a and Airport 4 with either Access 2 or 3 would change the floodplains only in the locations of bridge piers, causing limited and localized effects to the floodplains' natural and beneficial functions, such as flood storage and filtration. The limited area of the piers would not endanger human lives or reduce floodplain capacity enough to measurably increase flood risk.

ES-1.10.6. Hazardous materials, pollution prevention, and solid waste

See section 4.7 Hazardous Materials, Pollution Prevention, and Solid Waste for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

None of the alternatives would disturb or alter any known hazardous material or solid waste sites, nor any properties on the Environmental Protection Agency's National Priority List. Solid and hazardous wastes generated during construction would be barged out of the Angoon area to off-site certified landfills of appropriate type and capacity. The barges would use existing landing and transfer facilities at Angoon and at their final destination.

Comparing the anticipated use and generation of hazardous materials and solid waste during construction, the risk of encountering buried hazardous materials, and the risk of potential spills due to longer exposure of hazardous materials during transit times, Airport 3a with Access 3 and Airport 3a with Access 2 rank highest and second-highest, respectively, for greatest risk and greatest use and generation of waste materials. Airport 12a with Access 12a ranks lowest on all counts, although the likelihood of encountering buried hazardous materials during construction may ultimately be comparable to that of Airport 3a and Airport 4 with either access due to the more intensive modern and historical human use of the land that may have left behind waste materials at the proposed location for Airport 12a.

Significance

None of the action alternatives would have significant effects associated with hazardous materials.

ES-1.10.7. Cultural resources

See section 4.8 Cultural Resources for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

Based on what is known through field studies, interviews, and research, none of the action alternatives would directly affect known historic properties (cultural resources that have been listed on or determined eligible for the National Register of Historic Places). However, all action alternatives have the potential to directly affect buried or hidden cultural resources. Direct effects to historic properties or hidden cultural resources would be a result of direct disturbance from modifications to the landscape as part of construction.

The action alternatives may also indirectly affect historic properties and buried or hidden cultural resources by introducing vibration, noise intrusions, or visual intrusions, or by creating new or improved human access to areas previously difficult to access, thereby introducing the potential for intentional or inadvertent harm to cultural resources.

None of the alternatives would directly affect any known historic properties. The largest total acreage of landscape disturbance in areas with a high probability for cultural resources would occur under Airport 12a with Access 12a. The smallest total acreage of landscape disturbance in high-probability areas would occur under Airport 3a with Access 3.

Airports 3a and 4 with their respective access alternatives pose increased risk to five known historic properties from indirect effects from new or improved access. For Airport 12a with Access 12a, four known historic properties would be located in the visual area of potential effect (APE) and in areas that could experience construction-related vibration.

In all cases, the FAA has concluded that anticipated new or improved access, changes to the viewshed, or construction related vibration from the alternatives would result in no adverse effects to the site characteristics that make the sites eligible for the National Register.

Significance

For cultural resources, no significant effects were identified for any action alternative. Significant effects could occur if cultural resources are discovered during construction; however, cultural resource monitors would be used during construction to watch for the exposure of buried cultural resources hidden by dense vegetation. Standard protocols for reporting the discovery to the proper agencies, and consulting with agencies and other consulting parties about the best way to address the discovery would be followed.

For historic properties, in applying the criteria of adverse effect under the implementing regulations of Section 106 (see 36 CFR 800.5(a)(1)), the FAA finds that none of the action alternatives would have an adverse effect on any known historic properties.

Airport 3a and Airport 4 with either Access 2 or Access 3 would result in a finding of no adverse effects for five historic properties located in areas of new or improved access, where they may experience limited effects from increased human activity. No known historic properties are located in the direct effects portions of the APEs for these alternatives. Airport 12a with Access 12a would also result in a finding of no adverse effects for historic properties in its APE. No known historic properties are located in the direct effects APE for this alternative. Three known historic properties are located in the visual APE, and one is located in an area where construction-related vibration may occur.

ES-1.10.8. Light emissions and visual resources

See section 4.9 Light Emissions and Visual Resources for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

1.10.8.1. Effects from light emissions

Effects findings

Under all of the action alternatives, there would be long-term effects related to skyglow from navigation lights used during airport operations. This skyglow would be intermittent and brief, occurring only when the pilot-controlled lights are turned on for low-light daytime and nighttime approaches and landings. Construction of any alternative would involve lighting of the construction areas and some equipment during nighttime or low-light daytime conditions; these temporary skyglow effects would also be visible from all viewpoints.

Significance

Light emissions effects from any of the action alternatives would not be considered significant because use of the runway lights would be intermittent and of short duration.

1.10.8.2. Effects to visual resources

Effects findings

Vegetation clearing for Airport 3a would be visible from one of the viewpoints—Viewpoint 2, located in Favorite Bay—causing long-term effects to visual resources. Airport 4 would not be visible from any

viewpoint and would therefore cause no long-term effects to visual resources. Vegetation clearing for Airport 12a would be visible from Viewpoint 5 (Whaler's Cove Lodge), causing long-term effects to visual resources. None of the access roads would cause long-term effects that would be visible from any of the viewpoints during construction or operation. Temporary effects would be similar across all alternatives, consisting of the visibility of barge traffic, construction vehicles, and equipment traffic along the Kootznahoo and BIA Roads, and activity in the construction work areas, at the quarry site, and at the bridge construction site.

Significance

Two thresholds of significance are applied to analyses for this EIS: the U.S. Forest Service threshold and that of the FAA. The U.S. Forest Service is a cooperating agency and is assisting the FAA with visual resources guidance and methodology. The U.S. Forest Service also has land management jurisdiction over federally administered lands in the Tongass National Forest, where Airports 3a and 4 are proposed. In locations where no other local, state, or federal criteria apply, the FAA establishes the significance threshold for visual effects because it has jurisdiction over the construction and operation of airports. FAA jurisdiction applies to Airport 12a because it would not be located on land that the U.S. Forest Service has jurisdiction over.

Vegetation clearing for Airport 3a would create clearly observable deviations from the designated "High" scenic integrity in the U.S. Forest Service–administered Monument–Wilderness Area. The contrasts created would not repeat the surrounding form, line, color, and texture, and would exceed the planning objectives for the area. Mitigation of visual contrasts within the airport site would not sufficiently reduce the contrasts to below the significance threshold. Therefore, Airport 3a would have a significant adverse effect to visual resources. Airport 4 with either access would not have a significant adverse effect to visual resources because the locations of the airport and access road under either alternative would be screened by forest and not visible. Although Airport 12a has visual effects, these effects are not found to be significant. For Airport 12a with Access 12a, no significance thresholds would be exceeded unless the public, tribes, or appropriate agencies demonstrate that the effects are visually significant.

1.10.8.3. Visual or light effects to wilderness character

Effects findings

Airport 3a with either access road and Airport 4 with either access road are the action alternatives located within the boundaries of the Monument–Wilderness Area, and they would cause effects to wilderness qualities, especially opportunities for solitude, through construction-related and operations-related skyglow and through visibility of developments and motorized equipment. Although not located in the wilderness area, Airport 12a would cause effects to opportunities for solitude in the Monument–Wilderness Area by creating temporary construction-related skyglow and long-term intermittent skyglow, and long-term intermittent and brief sky glow from pilot-controlled lights on low-light approaches and landings.

Significance

For a summary of significance to wilderness, see section ES-10.15 below.

ES-1.10.9. Energy supply, natural resources, and sustainable design

See section 4.10 Energy Supply, Natural Resources, and Sustainable Design for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

Consumption of energy supplies and natural resources for airport construction varies between the alternatives due to the quantity of cut and fill needed at each alternative location, the differences in the length of the access road, and the differences in commitment of land. The largest use of energy supplies and natural resources would occur under Airport 3a with Access 3. The smallest use of energy supplies and natural resources would occur under Airport 12a with Access 12a.

Significance

Given the FAA threshold for effects to energy supplies and natural resources, none of the alternatives is expected to have significant effects. None would create demands for energy and natural resources that would exceed available or future natural resources or energy supplies in the Angoon area. The materials that would be barged in for this project are in sufficient supply in other locations in Southeast Alaska.

ES-1.10.10. Noise

See section 4.11 Noise for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

Operation of a new land-based airport in Angoon would change the type and number of aircraft arriving and departing the area, and would create a new runway location in addition to the seaplane base. It would also reduce operations at the seaplane base by approximately 75%. These actions would generate a long-term change in the location, frequency, and magnitude of aviation-based daytime noise, as well as add limited, new nighttime noise associated with flight takeoffs and landings. For noise from airport operation, the action alternatives would differ by the extent and location of changes in noise exposure. In general, Airport 3a and Airport 4 would cause greater noise increases in the Monument–Wilderness Area, whereas Airport 12a would cause noise increases mostly across the Angoon peninsula and Chatham Strait. Of all action alternatives, Airport 4 would expose the most land to increases in noise exposure and duration for the supplemental metrics Lmax (maximum sound level), Leq (equivalent noise level), and TAA (time above ambient).

Construction activities would generate temporary increases in daytime and nighttime noise levels due to the operation of equipment and vehicles, blasting activity, and bridge construction. Noise levels from airport construction would be identical under all action alternatives, with a maximum level of 95 dBA at 50 feet from an operating bulldozer.

Significance

Findings of significance are based on the DNL metric. Even with the added penalty for nighttime flights, there would be no noise-sensitive areas within the DNL 65 dBA contour for any action alternative. Therefore, per significance thresholds in the FAA orders, there would be no significant effects from noise within the airport property boundary for any action alternative. However, it should be noted that the significance of noise effects in wilderness is not fully captured by established FAA thresholds. The discussion of noise as it pertains to wilderness qualities can be found in section 4.16.3 of Wilderness Character.

ES-1.10.11. Socioeconomic conditions

See section 4.12 Socioeconomic Conditions for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

Resident and business relocation: Airport 12a with Access 12a is the only alternative that would require long-term residential property acquisition for road and airport construction. None of the alternatives would require business relocation.

Traffic patterns: All action alternatives would increase average daily traffic by 2%–5% during airport operation, and average daily traffic would increase by 12% during construction. During construction, Airport 4 with Access 3 would result in the greatest temporary increase in daily truck traffic.

Tax base: All action alternatives would result in a short-term increase in sales tax revenue for Angoon during construction. Airport 4 with Access 3 would provide the greatest increase in sales tax during construction because the alternative would require a longer construction period and more construction staff, and would therefore result in more spending and tax revenue.

Business activity and economic revenue: Airport 4 with Access 3 would generate the most employment and revenue during construction, whereas Airport 12a with Access 12a would generate the fewest jobs and least amount of revenue for Angoon residents during construction. All action alternatives would generate fewer than two full-time jobs related to airport and access road maintenance and operations.

Population movement and growth: All action alternatives could result in a long-term decrease in outmigration and/or population increase from new primary or second homeownership.

Public service demand: All action alternatives would temporarily increase demand for public services during construction. Electricity to support airport lighting and navigation aids during operation of the airport would come from an on-site generator stationed at the airport, and, therefore, these alternatives would not have an appreciable effect on the demand for city services during operation.

Transportation costs: All action alternatives would require 1.0 gallon of fuel or less for a round-trip drive to the airport, which cost approximately $5.00 in January 2012. All action alternatives could reduce airfare and shipping costs through improved flight availability and competition among carriers.

Subsistence: Airport 3a and Airport 4 would each yield a net gain in improved and new access to subsistence use areas, whereas Airport 12a with Access 12a would result in a loss of access to subsistence use areas. For more information on effects to subsistence resources and uses, see section ES-10.12.

Commercial land use: Airport 12a with Access 12a would convert the most acres of available commercial land in the long term.

Significance

Direct effects related to business relocation, traffic patterns, and tax base would not be significant because they would fall under the FAA's significance thresholds. Airport 12a with Access 12a would require long-term property acquisition for 37 parcels, which represents 6% of

total zoned home sites on the Angoon peninsula. These effects would not be significant because of 1) the low number of affected parcels, 2) the availability of vacant homes in the town core, and 3) the FAA's adherence to the Uniform Relocation Assistance and Real Property Acquisition Act of 1970. The law was enacted to ensure fair and equitable treatment as well as moving assistance to all people whose property will be acquired.

For indirect effects, construction of the proposed airport and access road would result in short-term positive economic and employment effects for the Angoon community. No other indirect effects—including changes in transportation costs, public service demand, subsistence, and population movement and growth—would be significant.

ES-1.10.12. Subsistence resources and uses

See section 4.13 Subsistence Resources and Uses for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects. Effects findings

Abundance and availability: For direct effects to abundance and availability, the primary differences between the alternatives consist of variations in acres of vegetation clearing. Although Airport 3a with Access 3 would have the largest construction footprint that would remove vegetation and potentially displace wildlife during construction, Airport 3a with Access 2 would generate the largest loss of land mammal and upland bird use areas and the largest potential decrease in harvest of terrestrial subsistence resources during operation.

Access: During construction, access to subsistence use areas for all airport and access road alternatives would be temporarily reduced because of increased heavy equipment traffic and human use in the area. During operation, Airport 12a with Access 12a is the only alternative that would reduce overall access to existing subsistence use areas. All four of the other action alternatives would provide easier long-term access to areas that are currently unavailable or difficult to access for Angoon residents who do not own a boat or who cannot traverse difficult terrain.

Competition: Changes to competition under the Airport 3a alternatives and under the Airport 4 alternatives would be identical, regardless of which access road would be used. The changes in competition from these four alternatives would differ from the changes to competition caused by Airport 12a. This is because a new road to either Airport 3a or Airport 4 would improve long-term access to areas that were formerly more difficult to reach, potentially causing more competition in some locations while overall dispersing subsistence users within the newly expanded access area. In contrast, access to Airport 12a would not substantially improve access to the general area it would occupy. Combined with the long-term decreased access to use areas caused by perimeter fencing around Airport 12a, the increase in competition for land-based subsistence resources near the proposed location of Airport 12a would be more pronounced.

Significance

The FAA does not have established significance threshold criteria for subsistence, and does not set established thresholds in this EIS. However, ANILCA Title VIII (810(a)) requires a determination as to whether withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands would significantly restrict subsistence uses. The U.S. Forest Service commonly uses the thresholds of significance established for ANILCA Section 810 evaluations in the *Kunaknana v. Clark* case.

Based on those thresholds, none of the airport and access road alternatives would significantly affect subsistence uses in the Angoon area. There would be no major reductions in abundance or availability of subsistence resources because less than 8% of land mammal and upland bird use areas would be affected by any airport and access road combination. In addition, there would be no substantial interference in access of subsistence use sites, and, in the cases of the access roads to Airport 3a or Airport 4, access to surrounding use areas would increase. Finally, although there would be some increase in nonlocal use of the Angoon area, predominantly for sport fishing and marine invertebrate harvest, reported visitor levels are low and are not likely to substantially increase above existing nonlocal use levels.

ES-1.10.13. Water quality

See section 4.14 Water Quality for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

During construction, all of the action alternatives would increase turbidity by up to 5 nephelometric turbidity units (NTUs) for some freshwater bodies. Airport 3a with either access alternative would require the most construction because it has the longest access road; for this reason, Airport 3a with either access would also have the greatest and most widespread effects to water quality. The types, extent, and location of effects under Airport 4 with either access road would be almost identical, although Airport 4 with Access 3 would have fewer streams affected by paved surfaces and fewer temporary Favorite Creek bridge support piers during construction. Airport 12a with Access 12a would affect the fewest freshwater bodies but would still require that construction BMPs be 80% effective. No long-term effects from paved surfaces are anticipated because of the large areas of those streams and watersheds that would remain unpaved, and because spill prevention measures would be used during construction of any action alternative.

Significance

None of the alternatives would threaten a public drinking water supply, sole source aquifer, or waters of national significance, and no difficulty is expected in obtaining a Storm Water Construction General Permit if an action alternative is selected. In this EIS, the significance of water quality effects is therefore based on the State of Alaska's standards and beneficial uses of the surface water affected. BMPs would be implemented to avoid exceeding turbidity impairment thresholds for beneficial uses. Through proper application of stormwater BMPs and spill prevention during construction and operation, there would be no significant effects to water quality from any alternatives. Because turbidity increases would not exceed 5 NTUs, construction effects would not be significant and would cease once areas with soil disturbance were allowed to revegetate.

ES-1.10.14. Wetlands

See section 4.15 Wetlands for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

Airport 3a with Access 2 would result in the most acres of wetlands filled, whereas Airport 4 with Access 3 would result the fewest acres of wetlands filled. Airport 12a with Access 12a would result in the most acres of wetlands altered (vegetation clearing and tree felling), whereas Airport 4 with Access 2 would result in the fewest acres of wetlands altered. All action alternatives would result in changes to wetland hydrology. Both Airport 3a and Airport 4 with either access would increase the area

available for subsistence use, and potentially increase the use of wetlands for subsistence harvest; Access 3 would create access to a broader area than would Access 2. Airport 12a would not increase access to subsistence resources, including wetlands, because there is currently access to these resources from the existing road system.

Significance

Development of any airport and access alternative would convert wetlands to uplands and result in the loss of all wetland functions in areas where wetlands were filled. Reductions in wetland functions and services would result from wetland alteration due to vegetation clearing and tree felling. Wetland functions and services would be reduced where the loss of a portion of a wetland or adjacent wetlands caused modifications to wetland hydrology. The magnitude and extent of activities under all action alternatives would be considered significant.

Because undisturbed, high-quality wetlands are abundant in the landscape surrounding the analysis area, none of the action alternatives is likely to adversely affect the maintenance of natural systems that support fish and wildlife habitat or economically important resources in the indirectly affected or surrounding wetlands.

Regulating services for water storage and water temperature would not be affected because none of the action alternatives would cause flooding or discharge temperature-modified water in downstream populated areas. The water storage and purification services would not be affected because the community of Angoon receives its water from Auk'Tah Lake; the wetlands that exist in the vicinity of all action alternatives have no surface flow into Auk'Tah Lake, nor are they located in a recharge area for the lake.

ES-1.10.15. Wilderness character

See section 4.16 Wilderness Character for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

Airport 3a and Airport 4 with either access would cause degradation of all wilderness qualities and public purposes to varying degrees and in varying acreages in the immediate vicinity of Airport 3a and Airport 4 with either access. Airport 12a with Access 12a would not occupy any part of the Kootznoowoo Wilderness Area, and would not, therefore, affect its untrammeled, natural, undeveloped, or primitive recreation qualities. However, light emissions, encounters with aircraft overflights, aircraft noise, and construction noise from Airport 12a would affect opportunities for solitude in the Kootznoowoo Wilderness Area.

Significance

Neither the FAA nor the U.S. Forest Service has established significance thresholds for effects to wilderness qualities or public purposes. Because the U.S. Forest Service is a cooperating agency assisting the FAA with this assessment of potential effects to wilderness character, and because the U.S. Forest Service has management jurisdiction over the federal lands of the Tongass National Forest, the FAA consulted with the U.S. Forest Service and used their guidance to make determinations of significance of project effects to wilderness qualities and public purposes. Significance is evaluated relative to the following two factors:

- The compatibility of the project effects with the desired conditions of the wilderness qualities and the public purposes, as outlined in the U.S. Forest Service's land management plan (2008a)

- The compatibility of the project effects with the provisions and desired conditions outlined in the Wilderness Act, as modified by ANILCA

Incompatibility with either the desired conditions of land management plan or the desired conditions of the Wilderness Act constitutes significance.

For Airport 3a or Airport 4 with either access road, effects to all four wilderness qualities would be incompatible with the desired conditions set forth in the Wilderness Act and the land management plan (U.S. Forest Service 2008a). By extension, the FAA therefore finds that the effects from any of the wilderness alternatives to wilderness qualities and public purposes would be significant.

Airport 12a with Access 12a would be compatible with the desired conditions of the Kootznoowoo Wilderness Area and therefore would have no significant effect on wilderness qualities and public purposes.

ES-1.10.16. Climate change and greenhouse gas emissions

See section 4.17 Climate Change for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

Under all action alternatives, use of fuel-burning construction machinery and vehicles would generate new carbon dioxide equivalent (CO_2e) emissions for the duration of the two- or three-season construction period. These emissions would be temporary and negligible in quantity compared to U.S. and world greenhouse gas emissions.

Based on emission inventory results for air quality, during operation and maintenance of any action alternative, airplane takeoffs and landings would reduce related CO_2e emissions by almost 50% as compared to continued seaplane operations under the no action alternative. The greater distance traveled on land by residents using personal vehicles, and the increased number of trips to and from a land-based airport by car or truck would result in a negligible increase in CO_2e emissions under any of the action alternatives.

However, as a net effect, total CO_2e emissions for Angoon would decrease as a result of the airport's operation, assuming decreases in seaplane operations and all other emissions sources remaining the same.

Significance

The FAA does not have established significance thresholds for climate change and greenhouse gas emissions, and does not set them in this EIS. However, it should be noted that greenhouse gas emissions would be temporary and negligible in quantity during construction. Operation and maintenance of a land-based airport would reduce greenhouse gas emissions by approximately 50%, as compared to continued seaplane operations under the no action alternative.

ES-1.10.17. Environmental justice and children's health and safety

See section 4.18 Environmental Justice and Children's Health and Safety for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

1.10.17.1. Environmental justice

Effects findings

Cultural resources: Given that there is a limited potential for significant effects to historical or cultural sites that are valued by the Alaska Native population, there would be no disproportionate effect to environmental justice populations.

Light emissions and visual resources: Airport 3a construction and operation would cause long-term visual effects from one viewpoint in Favorite Bay. Airport 12a construction and operation would also be visible from Whaler's Cove Lodge, and would cause long-term adverse effects from that viewpoint. The FAA could reduce these visual effects by selecting colors and designs to blend into the surroundings, and by revegetating cleared areas where possible. Because 1) the view of Airport 12a has not been identified as significant, and 2) the view of Airport 3a is not visible from the primary population center for low-income and minority residents in Angoon's city core, there would be no disproportionate effect to environmental justice populations.

Subsistence resources and uses: The Angoon community would not experience a disproportionate adverse effect related to subsistence resources and uses. Reductions in access to subsistence use areas would be limited; reductions in the abundance and availability of subsistence resources and increases in competition would not be noticeable; and low-income and minority residents could use alternative subsistence areas located along the road on the Angoon peninsula or in Monument–Wilderness Area lands to meet their subsistence needs. Additionally, Airport 3a and Airport 4 would provide benefits to the community through improved and new subsistence access.

Wetlands: The effects to wetlands under all action alternatives would be considered significant and adverse. However, the Angoon community would not experience a disproportionate effect due to the limited extent of wetlands filled compared to the total acreage of wetlands in the area analyzed for effects to wetlands. This limited loss of acreage would not significantly affect the presence and abundance of wildlife species that use these habitats, and low-income and minority residents could use other wetland areas for subsistence activities. Long-term wetland effects would be offset through compensatory wetland mitigation.

Wilderness: Airport 3a and Airport 4 with either access would result in the degradation of the wilderness qualities and public purposes on Kootznoowoo Wilderness Area lands. Airport 12a would degrade opportunities for solitude in the wilderness area as a result of light emissions during construction and operation, overhead aircraft noise, and temporary construction noise. Because Airport 12a with Access 12a would not be located within the wilderness area boundaries, it would have no other effect on wilderness qualities or public purposes. It would not be possible to fully mitigate effects to wilderness qualities and public purposes for Airport 3a or Airport 4, and therefore the effects would be significant and adverse. This would not result in disproportionate effects to the environmental justice population, however, because effects would be localized to the immediate vicinity of the airport and access road locations. Therefore, low-income and minority residents could seek out alternative locations for these qualities and purposes in the Kootznoowoo Wilderness Area.

Significance

There would be no disproportionate adverse effects to low-income or minority residents as a result of the proposed project. For this reason, none of the action alternatives would have a significant effect on the environmental justice population.

1.10.17.2. Children's health and safety

Effects findings

None of the action alternatives would increase the likelihood of residents (including children) coming into direct or indirect contact with hazardous materials that could adversely affect health. None of the action alternatives would disturb any known hazardous materials or solid waste sites, and wastes would be barged out of Angoon and disposed of in certified landfills. Any of the action alternatives could result in inadvertent hazardous material discovery or spill during construction. However, the actual risk of exposure to significant hazardous materials from discovery or spills would be low given

- the lack of development in the proposed locations of the alternatives,
- the small volume of hazardous materials that would be used in operations and maintenance, and
- the pollution prevention and spill response measures required for all facilities approved by the FAA and operated by the DOT&PF.

All action alternatives would increase air pollutant emissions and in-water turbidity and sediment compared to the no action alternative, but these increases would remain within federal air quality standards and state water quality standards.

The noise analysis shows that schools and other areas where children congregate would not experience a change in aircraft noise exposure of more than DNL 1.5 dBA at or above 65 dBA; that is, none of the action alternatives would result in significant noise effects on noise-sensitive areas occupied by children.

Significance

None of the action alternatives would result in a disproportionate risk to children's health and safety.

1.10.17.3. Admiralty Island National Monument

See section 4.19 Admiralty Island National Monument for background information, the existing conditions in the Angoon area, and the methods used to analyze potential effects.

Effects findings

For Airports 3a and 4, with either access, effects to cultural and subsistence resources range between 109 and 635 acres. Additionally for these alternatives, unspoiled coastal island ecosystem resources, such as watershed and downstream actions, isolation values, and scenery, ranging from 288 to 1,477 acres, depending on the location.

All action alternatives would result in night and low-light skyglow during three seasons of construction and during approach and takeoff. Additionally, headlights from vehicle traffic would also be visible. This is the only effect applicable to Airport 12a with Access 12a. Chapter 3: Alternatives provides a summary of effects and significance in table ALT28a.

Significance

The FAA does not have established significance thresholds for monument purposes and does not set them in this EIS. Because two of the action alternatives would be located on lands managed by the U.S. Forest Service, the FAA consulted with them and used their guidance to make determinations of significance.

Airport 3a and Airport 4, with either access, would be incompatible with the desired conditions set forth in the enabling legislation and the land management plan (U.S. Forest Service 2008s). By extension, the FAA therefore, finds that the effects from any of the monument alternatives to monument purposes would be significant. Airport 12a with Access 12a would be compatible with the desired conditions with Kootznoowoo Corridor Lands, and would have no significant effect on monument purposes.

ES-1.11. Requirements of the Alaska National Interest Lands Conservation Act

Under either Airport 3a or Airport 4, the location of the airport and access road (considered under ANILCA to be a transportation and utility system) would be in the Monument–Wilderness Area (considered under ANILCA to be a conservation system unit). The airport would improve transportation accessibility and reliability for Angoon residents, whose current transportation options are limited to the ferry and seaplane. For this reason, the Angoon Airport project conforms to the underlying purpose of ANILCA Title XI to address critical transportation needs of Alaska residents.

The process for placing a transportation and utility system in a conservation system unit, including the application process, is outlined in ANILCA Title XI Sections 1104, 1106, and 1107, and clarified in U.S. Department of the Interior regulations at 43 CFR 36.

The State of Alaska is authorized by ANILCA Title XI to submit an application to build and operate an airport and access road in the Monument–Wilderness Area. The DOT&PF, the project sponsor, submitted an ANILCA application to the FAA, the U.S. Forest Service, and the U.S. Army Corps of Engineers on January 9, 2015, for their proposed action, Airport 3a with Access 2. The DOT&PF, who would be the owner and operator of the airport, is considered the applicant in the Title XI process.

Because this application has been submitted, all involved federal agencies must comply with the requirements in ANILCA and go through the Title XI process. ANILCA Section 1103 states that other applicable laws shall continue to apply during the ANILCA Title XI process. These applicable laws can be superseded only by action from the President and Congress under ANILCA Title XI.

ANILCA Section 1106(b) outlines the process for approving or disapproving an application for a transportation and utility system in a conservation system unit, as follows:

- Within 4 months after the issuance of this final EIS, all federal agencies forward their tentative approval or disapproval with all supporting information to the President of the United States.
- Within 4 months of receiving this tentative approval or disapproval, the President decides whether to approve or deny the application.
- If the President approves, the ANILCA application is forwarded to Congress with a recommendation for approval.

- If Congress issues a joint resolution approving the application, the federal agencies are required to issue appropriate authorizations in accordance with applicable law.
- If the President denies the application, the ANILCA application process terminates. However, the DOT&PF would have the option of challenging the President's denial by filing a lawsuit with the judicial branch.

ANILCA Section 1107(a) outlines the terms and conditions federal agencies with permitting authority can impose on an approved transportation and utility system to minimize effects to resources and uses. The federal agencies for this EIS have provided initial draft terms and conditions that would be imposed on the project should the President and Congress approve the ANILCA application. The agencies' terms and conditions can be found in section 5.6.

ES-1.11.1. ANILCA Findings

Under ANILCA Title XI, the involved federal agencies are required to consider and make detailed findings supported by substantial evidence with respect to ANILCA Section 1104(g)(2). The FAA's findings under these criteria are detailed in Chapter 5 of this final EIS and briefly summarized below.

(A) The need for, and economic feasibility of, the transportation or utility system

The FAA finds that Airport 3a with Access 2 would meet the Angoon Airport project's stated purpose and need by allowing flights during approximately 94% of the total hours in a given year. This more than doubles the 44% of hours per year that current seaplane service is available. Funding sources for Access 2 to Airport 3a remain uncertain. Due to the high cost of the access road relative to the cost of airport construction, and due to limited funding available in the FAA's Airport Improvement Program, the FAA has determined that it cannot fund the construction of this access road. The DOT&PF would be responsible for providing the funding necessary to construct the access road under this alternative. If the DOT&PF could secure funding for the access road, the FAA finds that Airport 3a with Access 2 could be economically feasible.

(B) Alternative routes and modes of access, including a determination with respect to whether there is any economically feasible and prudent alternative to the routing of the system through or within a conservation system unit, national recreation area, or national conservation area and, if not, whether there are alternative routes or modes which would result in fewer or less severe adverse impacts upon the conservation system unit

The FAA finds that Airport 12a with Access 12a, which is not located in the Monument–Wilderness Area, is an economically feasible and prudent alternative to Airport 3a with Access 2. Airport 12a with Access 12a would cost approximately $22 million dollars less to construct than would Airport 3a with Access 2, and $15,000 to $19,000 less per year to operate and maintain, depending on which maintenance option is chosen. The FAA finds that Airport 12a with Access 12a is a prudent alternative to Airport 3a with Access 2 based on FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (Table ES-3).

Table ES-3. Findings of Feasibility and Prudence for Airport 12a with Access 12a

FAA Order 5050.4B	FAA Finding
Does the alternative meet the project's purpose and need?	Airport 12a with Access 12a would meet the purpose and need for improving aviation availability and reliability. Airport 12a would improve the availability of aviation service to Angoon by allowing flights during approximately 89% of the total hours in a given year. In comparison, Airport 3a with Access 2 would increase the availability of aviation service to Angoon by allowing flights during approximately 94% of the total hours in a given year.
Does the alterative cause extraordinary safety or operational problems?	Airport 12a with Access 12a would not cause extraordinary safety or operational problems, nor would any of the other action alternatives.
Are there unique problems or truly unusual factors present with the alternative?	There are no unique problems or unusual factors present at Airport 12a with Access 12a. In comparison, Airport 3a with Access 2 would require the placement of an airport and access road within the Monument–Wilderness Area. Although this placement is allowed under ANILCA Title XI, the process has never been used for a wilderness area. The Angoon Airport would be the first if an alternative to build in the Monument–Wilderness Area is approved at all steps in the ANILCA Title XI and NEPA processes. The impacts to the Monument–Wilderness Area could not be avoided or entirely mitigated, and would be incompatible with the desired conditions for the area, as detailed in section 4.16 Wilderness Character and section 4.19 Admiralty Island National Monument in this final EIS.
Does the alternative cause unacceptable and severe adverse social, economic, or other environmental impacts?	The only impacts identified as significant at Airport 12a with Access 12a is to wetlands, but these impacts can be fully mitigated as described in Chapter 7: Mitigation. Therefore, Airport 12a with Access 12a would not cause unacceptable and severe adverse social, economic, or other environmental impacts. In comparison, Airport 3a with Access 2 would have significant impacts to the Monument–Wilderness Area, to Section 4(f) resources (see section 4.4 U.S. Department of Transportation Act Section 4(f) Evaluation Summary in this final EIS), and to visual resources (see section 4.9 Light Emissions and Visual Resources in this final EIS). These significant effects could not be completely mitigated and would therefore cause unacceptable environmental impacts.
Does the alternative cause extraordinary community disruption?	Airport 12a with Access 12a would require acquisition of 37 (6%) of the area's available home sites, and, therefore, its effects would be too small to result in large-scale shifts in population or to influence the pattern of growth (see evaluation of these effects in section 4.12.3.3.6 Socioeconomics in this final EIS). Therefore, this alternative would not cause extraordinary community disruption. Airport 3a with Access 2 is not close to the town core and would not cause extraordinary community disruption.
Does the alternative result in additional construction, maintenance, or operational costs of an extraordinary magnitude?	Airport 12a with Access 12a is the most cost-effective alternative, costing approximately $22 million dollars less to construct that Airport 3a with Access 2 and $19,000 less (under Option 1) or $15,000 less (under Option 2) to operate and maintain per year. (Discussion of the operations options are in section 3.5.3.2 of Chapter 3: Alternatives in this final EIS.)
Does the alternative result in an accumulation of factors that collectively, rather than individually, have adverse impacts that present unique problems or reach extraordinary magnitudes?	None of the alternatives would result in an accumulation of factors that collectively have unique adverse impacts or reach extraordinary magnitudes.

(C) The feasibility and impacts of including different transportation or utility systems in the same area

The FAA finds that there are no other transportation or utility systems that could be located in area of Airport 3a with Access 2 at this time. The FAA knows of two possible improvements in the area: a new water source for the community of Angoon and a new power line that would be fed by a hydroelectric system. The new water source would be considered a utility system under ANILCA, but there is insufficient information to assess the feasibility and effects of including a water facility in the same location as Airport 3a with Access 2 at this time. With respect to a hydroelectric system, should such a system be established, the DOT&PF reserves the right to connect to that electrical grid via an above-ground transmission line located in the access road right-of-way.

(D) Short- and long-term social, economic, and environmental impacts of national, state, or local significance, including impacts on fish and wildlife and their habitat, and on rural, traditional lifestyles

This final EIS details the potential social, economic, and environmental effects from Airport 3a with Access 2 in the "project effects" subsection of each resource section in Chapter 4. The following is a summary of significant impact determinations. (A summary of effects and significance is found in Section ES-1.10)

The FAA has determined that construction and operation of Airport 3a with Access 2 would not result in significant impacts to the following resources:

- Air quality
- Compatible land use
- Aquatic and terrestrial habitats, associated species, and special status species
- Floodplains, stream geomorphology, and hydrology
- Hazardous materials, pollution prevention, and solid waste
- Cultural resources
- Energy supply, natural resources, and sustainable design
- Noise
- Socioeconomic conditions
- Subsistence resources and uses
- Water quality
- Climate change and greenhouse gas emissions
- Environmental justice and children's health and safety

The FAA has determined that construction and operation of Airport 3a with Access 2 would result in significant impacts to the following resources:

- U.S. Department of Transportation Act Section 4(f) properties
- Light emissions and visual resources
- Wetlands
- Wilderness character
- Admiralty Island National Monument

Section ES-1.10 summarizes the reasons for significance determinations for these resources. The effects to each resource are analyzed fully in Chapter 4 of this final EIS.

(E) The impacts, if any, on the national security interests of the United States that may result from approval or denial of the application for a transportation or utility system

The FAA finds that the national security interests of the United States would not be affected by the approval or denial of the application for Airport 3a with Access 2 for the following reasons:

- The project would not introduce new or unsecured means of foreign access into the country nor would it provide new or unsecured access to sensitive military or economic establishments of national interest.
- The project would not weaken the political stability or the international standing of the United States, nor would it result in environmental degradation or contamination that could threaten the existence of the United States.
- The project would not provide or limit access to energy sources or natural resources such as water, land, or minerals that are important to national defense or political or economic power.

(F) Any impacts that would affect the purposes for which the federal unit or area concerned was established

Two overlapping but distinct federal units are involved: the Kootznoowoo Wilderness Area and the Admiralty Island National Monument. Additionally, Section 506(a)(3)(C) of ANILCA conveyed the rights, title, and interest in lands in parts of the national monument from mean high tide to approximately 660 feet inland to Kootznoowoo, Inc. Known as the Kootznoowoo Corridor Lands, these lands are still also considered part of the national monument, and the federal government has reserved certain rights to these lands. The following are the FAA's findings regarding the compatibility of Airport 3a with Access 2 with these three land units.

- **Kootznoowoo Wilderness Area**
  - The FAA finds that effects to wilderness qualities would be incompatible with the desired condition of the Kootznoowoo Wilderness Area as set forth by the Wilderness Act and the 2008 *Tongass National Forest Land and Resource Management Plan*. All effects to public purposes would be incompatible with desired conditions for brown bear and eagle habitat, natural ecological processes as they relate to hydrology and stream function, visual (scenic) resources, and subsistence resources and uses. No specific effects on known cultural sites were identified for Airport 3a with Access 2; therefore, effects would be compatible with desired conditions for cultural resources. This alternative would, however, increase the challenge of managing Tlingit cultural sites and other historical sites.
- **Admiralty Island National Monument and Kootznoowoo Corridor Lands**
  - The FAA finds that Airport 3a with Access 2 would be incompatible with the desired conditions set forth in the enabling legislation and the U.S. Forest Service's land management plan based on the following:

- While the effects of Airport 3a with Access 2 would be compatible with the desired conditions of the Admiralty Island National Monument, the challenges and difficulty in managing Tlingit cultural sites and other historical sites would be increased.
- While the construction and operation of Airport 3a with Access 2 would not limit the general ability of subsistence users to access subsistence resources, or reduce the overall abundance of subsistence resources, some subsistence use areas would be adversely affected.
- With respect to the unspoiled coastal island ecosystem and its contributions to all national monument purposes, all effects from Airport 3a with Access 2 would be incompatible with the desired conditions.

o By extension, the FAA finds that all effects from Airport 3a with Access 2 would be incompatible with the desired conditions for the federal reserved rights of the Kootznoowoo Corridor Lands.

(G) Measures that should be instituted to avoid or minimize negative impacts

The FAA finds that mitigation measures would need to be developed for impacts to visual resources, wilderness character, and the national monument's purposes and federal reserved rights if the application for Airport 3a with Access 2 is approved at all steps in the ANILCA Title XI and NEPA processes.

(H) The short- and long-term public values which may be adversely affected by approval of the transportation or utility system versus the short- and long-term public benefits which may accrue from such approval.

The FAA finds that public benefits would result from Airport 3a with Access 2. The project would provide a long-term public benefit by meeting the needs of the residents of Angoon for improved availability and reliability of transportation services to and from Angoon. Other public benefits would include improved and new access to subsistence resources and additional revenue and jobs for the community of Angoon.

Under Airport 3a with Access 2, access would be improved to 2,021 acres of subsistence use areas, and new access would be opened to as many as 725 acres of subsistence use areas. Airport 3a with Access 2 would generate $1,382,780 in economic benefit, $23,403 in sales taxes, and approximately 15 new jobs during airport construction and operation.

In the event that the application is approved by the President and Congress, the FAA and other federal agencies with permitting authority can impose terms and conditions on the transportation and utility system as outlined in ANILCA Section 1107(a). The FAA and cooperating agencies have developed a preliminary set of terms and conditions that would be imposed if the application is approved at all steps in the ANILCA Title XI and NEPA processes. Additional terms and conditions will be required if the Airport 3a with Access 2 application is approved.

- Field surveys for cultural resources will be completed and concurrence on determinations of effect will be received from the state historic preservation officer as required by 36 Code of Federal Regulations (CFR) 800.

- Information regarding proposed avoidance, minimization, and compensatory mitigation will be developed per 33 CFR 325.1(d)(7).
- To satisfy the Endangered Species Act of 1973, the biological assessment conducted for Airport 12a with Access 12a will be supplemented with information about Airport 3a with Access 2 before the U.S. Forest Service issues the special use authorization.
- To comply with the Magnuson-Stevens Fishery Conservation and Management Act, an essential fish habitat assessment will be completed for all affected anadromous streams before the U.S. Forest Service issues the special use authorization.
- Mitigation measures must be developed for impacts to wetlands, floodplains, visual resources, wilderness character, and the national monument's purposes and federal reserved rights.
- A wetlands delineation and identification of waters of the U.S. will be completed and jurisdictional determinations will be received from the U.S. Army Corps of Engineers before the U.S. Forest Service issues the special use authorization. Information regarding proposed avoidance, minimization, and compensatory mitigation will be developed per 33 CFR 325.1(d)(7).
- In addition to the best management practices identified in the EIS to control, detect, and monitor for invasive species, an invasive plant management plan will be developed and control measures will be implemented to comply with Executive Order 13112.
- All best management practices listed in Chapter 7 of this final EIS relevant to Airport 3a with Access 2 will be included as terms and conditions to comply with Executive Order 11988; Executive Order 11990; the Bald and Golden Eagle Protection Act of 1940 (as amended); Executive Order 12962; Clean Water Act Sections 319(b)(2)(f), 319(k), and 313; and Executive Order 12088.
- Substantial changes to the proposed action would be subject to additional NEPA review.
- If major steps toward implementation of the proposed action have not commenced within 3 years of approval of this final EIS, a written reevaluation must be prepared in accordance with Paragraph 9-2 of FAA Order 1050.1F unless a decision has been made to prepare a new or supplemental EIS.
- The DOT&PF will be required to meet conditions to receive grant-in-aid funding from the FAA's Airport Improvement Program for a new runway, including but not limited to, an Airport Layout Plan, cost benefit analysis, and land acquisitions, as necessary.

ES-1.12. Construction effects

Construction effects would be temporary and cease as soon as construction was complete. These effects are anticipated to occur over two or three construction seasons, depending on the alternative. The longest construction time would be for Airport 3a and Airport 4 due to the length of either access road. The following resources and issues would have temporary construction effects.

Air quality: For each of the action alternatives, construction activities would require fuel-burning construction machinery, an increase in construction-related traffic, and two or three seasons of construction. This use of fuel would increase emissions of criteria and other air pollutants due to fuel combustion. Fugitive dust would be created by construction equipment and the vehicles of construction crews traveling along unpaved roads.

Terrestrial habitats and associated species: All alternatives would result in an increase in human presence and traffic volume. Terrestrial wildlife would be disturbed and displaced by this increased human presence for two or three construction seasons, depending on the alternative. There could be an increase in the number of animals injured or killed by vehicles as a result of the additional access road and increased traffic on existing roads.

Aquatic habitats and associated species: Under the Access 2 or Access 3 alternatives, pile driving during the installation of bridge piers in Favorite Creek would generate sound in the water. Pile driving may produce harmful sound levels that could disrupt, displace, injure, or kill fish. The magnitude of the sound effects from pile driving to aquatic species is evaluated using the number of piers that would be installed. Access 2 would require two in-stream piers for the permanent bridge, and from three to 10 in-stream piers for the temporary bridge. Access 3 would require no in-stream piers for the permanent bridge, and from two to five in-stream piers for the temporary bridge. There would be temporary habitat removal within the entire in-stream temporary use area at Favorite Creek because the exact quantity and locations of piers would not be determined until the design phase of the project. Through coordination with the Alaska Department of Fish and Game, in-stream construction activities would not be conducted during the typical salmon migratory or spawning periods, approximately May 15 to September 15 (U.S. Forest Service 2001b). The temporary stream habitat removal that would occur in Favorite Creek would be a direct temporary effect for up to three construction seasons, depending on the length of construction, because the habitat would return to its existing condition once construction ceased. During bridge construction at Favorite Creek, individual fish could be injured by in-stream equipment, especially with the illuminated active work area potentially attracting prey insects and aquatic species to this area during dark hours.

Special status species: Barging of construction materials and equipment to Angoon could affect individual marine mammals through increased barge traffic and the resulting increase in potential for ship strikes. The number of ship strikes to marine mammals as a result of the airport project would be very low and is not expected to affect marine mammal populations in Southeast Alaska. There would be an increased human presence during construction in areas where individual special status species are generally unaccustomed to humans. Individual special status species would be disturbed and displaced by this increased human presence for two or three construction seasons, depending on the alternative. Disturbance or displacement of individuals would also occur from noise from vehicles, construction equipment, blasting, and installation of bridge piers.

Floodplains, stream geomorphology, and hydrology: The movement of large wood (woody vegetation such as branches and fallen trees) would likely be restricted by in-stream bridge piers from the temporary bridge. These effects to Favorite Creek stream geomorphology would end once the temporary bridge was removed.

Hazardous materials, pollution prevention, and solid waste: Solid waste in the form of construction debris, sewage, and general trash would be generated, and hazardous waste (such as from leaking gasoline) could be generated. Hazardous materials would be barged into Angoon, offloaded at a barge landing in Killisnoo Harbor, and stored for use. Batching of asphalt on-site would be a temporary occurrence during construction. Solid waste and used hazardous materials (including hazardous waste) would be handled according to applicable laws and guidelines until they are removed from the island by barge. All construction activities associated with the airport and access road would be subject to the conditions of a Storm Water Pollution Prevention Plan, a spill prevention and response plan, and other BMPs to minimize the risk of spills and the potential for hazardous materials to enter the environment directly or indirectly.

Light emissions and visual resources: Construction of any alternative would involve lighting of construction areas and some equipment during nighttime or low-light daytime conditions. Skyglow created from these actions would be visible from all viewpoints. Temporary effects to visual resources would be caused by 1) the movement of heavy equipment and construction vehicles along roads; 2) the presence of construction activity and equipment in work areas, including bridge construction equipment that may be taller than the surrounding trees; 3) the barging of construction materials to the island; and 4) the unloading of barged materials at the ferry terminal.

Energy supply, natural resources, and sustainable design: Energy supply and natural resources that would be used for this project include asphalt and concrete, building supplies, construction aggregate, electricity, fill, fuel for aircraft and vehicles, the land and its resources, and water. The use or removal of these things represents a permanent effect because once used, they would no longer be available. The exception to this is temporary stream habitat removal; such habitat would restore itself as soon as construction ceased.

Socioeconomic conditions: Construction of any action alternative would cause a temporary 12% increase in average daily traffic from truck trips during construction. Airport 4 with Access 3 would result in the greatest temporary increase in daily truck traffic.

Subsistence resources and uses: Construction effects to subsistence resources and uses would come from increased noise, increased vehicle traffic, and increased human presence in the area. Because wildlife would be displaced during construction, the availability of wildlife as a subsistence resource would be diminished in the immediate area of construction, and subsistence users would have to seek these resources elsewhere.

Water quality: Construction of bridges and culverts in streams could result in temporary turbidity increases. Although there would be an increase in sedimentation and turbidity during construction, BMPs required by the Alaska Department of Environmental Conservation and incorporated into the Storm Water Pollution Prevention Plan would be designed to prevent and reduce water quality violations and impairment to waters, including sedimentation and turbidity. These BMPs include, for example, silt fences, silt bags, straw bale filters, coffer dams, or other barriers or filters, if necessary.

Wilderness character: Construction of any action alternative would generate measurable temporary increases in noise in localized areas. This construction noise would be audible in the vicinity of the construction area but not throughout the greater Kootznoowoo

Wilderness Area. This is because noise decreases as distance increases and because hills and vegetation block it. Construction of Airport 3a or Airport 4 with either access road would have greater temporary noise effects than would construction of Airport 12a with Access 12a by virtue of those alternatives being located directly in the wilderness area. Construction areas and some equipment would be illuminated at night and during low-light daytime conditions with high-intensity lighting, creating visible skyglow in parts of the wilderness area for up to three construction seasons. The skyglow would be intensified by any local low-lying clouds, fog, rain, and high humidity.

Climate change and greenhouse gas emissions: Under all action alternatives, use of fuel-burning construction machinery and vehicles would generate new CO_2e emissions for the duration of the two- or three-season construction period. These emissions would be temporary, however, and negligible in quantity compared to U.S. and world greenhouse gas emissions.

Admiralty Island National Monument/Kootznoowoo Corridor Lands: Construction of any action alternative would generate measurable temporary increases in noise in localized areas. This construction noise would be audible in the vicinity of the construction area but not throughout the greater Monument or Kootznoowoo Corridor lands. This is because noise decreases as distance increases, and because hills and vegetation block it. Construction of Airport 3a or Airport 4 with either access road would have greater temporary noise effects than would construction of Airport 12a with Access 12a by virtue of those alternatives being located directly in the Monument or on Corridor lands.

For all action alternatives, construction areas and some equipment would be illuminated at night and during low-light daytime conditions with high-intensity lighting, creating visible skyglow in parts of the Monument and Corridor lands for up to three construction seasons. The skyglow would be intensified by any local low-lying clouds, fog, rain, and high humidity.

ES-1.13. Mitigation

Under the National Environmental Policy Act (NEPA) of 1969 (Public Law [PL] 91-190), the FAA is required to identify and disclose appropriate mitigation measures for significant adverse effects (40 Code of Federal Regulations [CFR] 1502.14(f) and 1502.16(h)). Other federal and state agencies involved in consultation and coordination for this EIS will have input on the mitigation measures that are adopted in the FAA's record of decision as well as in permits allowing implementation of the selected alternative.

The FAA and other federal agencies use a sequential approach in assessing possible ways to mitigate for adverse effects. The Council on Environmental Quality's regulations for implementing NEPA (at 40 CFR 1508.20) have defined mitigation to include the following steps, considered in this order:

- Avoiding the effects by not taking a certain action or parts of an action; for example, routing a road to avoid wetlands.
- Minimizing effects by limiting the degree or magnitude of the action; for example, varying the right-of-way width to minimize use of lands and clearing of vegetation.

- Remedying the effects by repairing, rehabilitating, or restoring the affected environment; for example, replanting vegetation or reestablishing the flow pattern of a stream.
- Reducing or eliminating the effects over time through preservation and maintenance operations during the life of the action; for example, conducting weed treatments along roads to minimize the spread of invasive or non-native species.
- Compensating for the effects by replacing or substituting resources or environments; for example, investing in the cost of reconstructing, preserving, or rehabilitating wetlands elsewhere to offset the loss of wetlands in a given project area.

A number of potential mitigation measures are identified in Chapter 7: Mitigation, but their adoption into any of the alternatives would be dependent on a more refined analysis conducted during development of designs for the permitting process. Any such analysis would include further examination of the benefit of each mitigation measure relative to the cost and effort of implementing it.

A compensatory mitigation plan was specifically developed for Airport 12a with Access 12a, though mitigation described in this plan could be applicable to any of the action alternatives.

The objectives for the mitigation for wetland and waters of the U.S. impacts include the following:

- Developing mitigation that complies with the Final Compensatory Mitigation Rules
- Design the stream at 12a (Stream 10) to maintain fish passage and minimize and avoid additional impacts to the surrounding wetlands and upland habitat in the vicinity of the airport footprint Replacement of wetland functions and values that would be lost as a result of the project
- Finding mitigation that would benefit the community of Angoon
- Finding mitigation that is in close proximity to where the impacts would occur, ideally on Admiralty Island

Compensatory mitigation would consist of three components:

1. Providing the U.S. Forest Service with adequate funding to acquire an equal number of acres of wetlands and/or waters of the U.S. and ***associated buffer*** that w be impacted by the project to be incorporated into the Tongass National Forest
2. Design the stream at 12a (Stream 10) to maintain fish passage and minimize and avoid additional impacts to the surrounding wetlands and upland habitat in the vicinity of the airport footprint.
3. Provide $60,000 toward the removal of abandoned boats in Favorite Bay

In developing the mitigation plan, the FAA has carefully considered all relevant comments, including specific mitigation suggestions, provided by the agencies and the public during the comment period and public hearings on the draft EIS. A discussion of these suggestions, and a detailed description of the selected mitigation components can be found in Chapter 7.

ES-1.14. Cumulative effects

The FAA identified all past, present, and reasonably foreseeable future actions within seven defined assessment areas. Past actions have included logging, mining, and other resource extraction; installation of temporary wind monitors; trails (both formal and informal); subsistence use; and development of high-use areas. Reasonably foreseeable future actions include projects such as the Kanalku fish passage barrier modification; the Greens Creek Mine proposed tailings expansion; the Greens Creek Mine surface exploration project, the Angoon barge landing area; the Angoon Hydroelectric Project, and others. Effects from the reasonably foreseeable future actions would not result in additional significant effects on any of the resources or issues evaluated in the EIS.

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1. Project Background – Planning for a Land-Based Airport at Angoon

1.1. What information is provided in Chapter 1?

This chapter provides a general overview of the proposed Angoon Airport project. It describes the area around Angoon and the issues and processes that must be considered if an airport is to be placed in a federally designated wilderness area. The chapter summarizes local land management and the Federal Aviation Administration's (FAA's) and other agencies' roles in the project. It also lists the previous studies that led to this environmental impact statement (EIS).

1.2. What is an EIS, and why is one written?

An EIS is a document containing an analysis of the anticipated effects on the natural and human environment from a proposed project, decision, or action. A typical EIS also includes an explanation of why a project or action is needed and what other ***alternatives*** were considered to meet that need. EISs are prepared to comply with the National Environmental Policy Act (NEPA) of 1969 (Public Law [PL] 91-190), which requires federal agencies to publicly disclose the potential effects of their decisions and other actions on the environment. Central to NEPA is the commitment to public involvement and to providing individuals with opportunities to comment on the decisions and actions of federal agencies and the anticipated effects on the environment. NEPA requirements must be met if a project is proposed by a federal agency or involves federal funding or land.

In preparing an EIS, federal agencies evaluate a proposed project, identify alternatives (including no action), evaluate the effects of all alternatives equally, and identify a preferred alternative. At the end of this process, the federal agency selects an alternative for implementation and documents this selection in a ***record***

What is discussed in Chapter 1?

Terms to know

Alternatives: A NEPA term that refers to a required option for a project. Alternatives must meet the goals of the project while providing different possibilities for how the project would affect the environment.

Record of decision: A concise document that states an agency's final decision for a proposed project; identifies the alternatives considered, including the environmentally preferred alternative; and discusses mitigation plans, including any enforcement and monitoring commitments.

of decision. The agency is also required to identify an environmentally preferred alternative, but it is not required to select this alternative for implementation. The federal agency could select any of the alternatives, including the no action alternative.

1.3. What is the proposed Angoon Airport project, and who is proposing it?

The small community of Angoon in Southeast Alaska is currently accessible only by seaplane and ferry. The proposed project is the construction of a new land-based airport for this community. The Alaska Department of Transportation and Public Facilities (DOT&PF) is the party proposing the project—the project sponsor. The DOT&PF would maintain and operate the airport if it is built. The FAA is responsible for the requirements of public use airports and is the lead federal agency responsible for the preparation of this EIS. See section 1.7 for more information about the FAA's role in this project.

The DOT&PF has requested funding and approval from the FAA for the new airport and an access road on U.S. Forest Service lands managed as a wilderness area and known as the Admiralty Island ***National Monument*** and Kootznoowoo ***Wilderness Area***. Alternative locations for the airport and access road are also being considered. One of these alternatives involves lands outside the Admiralty Island National Monument and Kootznoowoo Wilderness Area boundary that are privately owned or that are owned and managed by the City of Angoon or one of two Alaska Native corporations. Section 1.6 provides more detail on these two categories of land.

Terms to know

Wilderness area: To paraphrase the Wilderness Act of 1964 (PL 88-577), which was enacted specifically to protect wilderness, a wilderness area (in contrast with areas where people dominate the landscape) is an area where the earth and community of life are unrestricted by humans, where humans are visitors who do not remain. A wilderness area is further defined as an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation.

National monument: Federal lands that contain historic landmarks, historic and prehistoric structures, or other objects of historic or scientific interest. The Antiquities Act of 1906 authorizes the President to create national monuments on federal lands. Congress can also pass legislation to establish national monuments.

1.4. What makes it possible to propose a wilderness area as the location for a new airport?

Despite the strict protections generally given to wilderness areas, it may be possible to build an airport in a wilderness area in Alaska after public and agency involvement, and if approval is attained at the highest levels of federal government. Management of federal lands in Alaska is distinctive in that uses that would be prohibited on certain federal lands in other states are allowed under Alaska-specific laws. When Congress passed the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 (Public Law [PL] 96-487), more than 100 million acres of Alaska lands were transferred into ***conservation system units***. Congress recognized that Alaskans, particularly those living in remote areas, depend on utilities and means of transportation that must often extend across great distances. Air travel is often the only option. To meet the socioeconomic and public safety needs unique to Alaska, Congress included some exceptions in ANILCA for the ways Alaskans can use federal lands. One such use is the placement of ***transportation and utility systems*** on lands such considered a conservation system unit, in this case, the Admiralty Island National Monument and Kootznoowoo Wilderness Area.

The DOT&PF submitted an ANILCA application on January 9, 2015, concurrent with the release of the public draft EIS.

Terms to know

Conservation system unit: Per ANILCA (Section 102(4)), "any unit in Alaska of the National Park System, National Wildlife Refuge System, National Wild and Scenic Rivers System, National Trails System, National Wilderness Preservation System, or a National Forest Monument."

Transportation and utility system: As defined in ANILCA Section 1102(4)(A), the term "transportation or utility system" is any system—such as roads, transmission lines, or airports, as defined in ANILCA 1102(4)(B)—where any portion of that system is located in a conservation system unit.

ANILCA Title XI

Title XI of ANILCA is entitled *Transportation and Utility Systems in and Across, and Access into, Conservation System Units.* Congress created this title of ANILCA to acknowledge the following situations:

1) A high percentage of land in Alaska is federal public land managed by different federal agencies. Those agencies may approve or disapprove applications for transportation and utility systems in different ways, or they may have no clear-cut procedures for considering such applications.
2) Much of the public land in Alaska has been given special designations such as wilderness areas, national monuments, and national refuges. These types of designations are collectively referred to in ANILCA as conservation system units.
3) Many of Alaska's potential transportation and utility systems have not yet been developed because of the remote nature of many communities and the relatively young age of Alaska as a state. Sections 1104 and 1106 of Title XI outline the specific steps and standards for granting approval to develop such projects as airports, roads, ferry terminals, and transmission or communication lines in conservation system units. ANILCA supersedes the Wilderness Act regarding allowable uses of designated wilderness in Alaska.

The required steps that must be followed before a transportation and utility system can be placed in a wilderness area in Alaska include the following:

- An evaluation of effects (that is, an EIS)
- Public hearings in Alaska and in Washington, D.C.
- An independent evaluation by each involved federal agency
- Review and approval by the President of the United States and recommendation to Congress
- House of Representatives and Senate approval by joint resolution of President's recommendation
- Issuance of proper authorizations by federal agencies

These steps are known as the ANILCA Title XI process. See the sidebar titled ANILCA Title XI for more information. Since the passage of ANILCA on December 2, 1980, Title XI has never been used to build an airport in wilderness. The Angoon Airport would be the first if an alternative to build in wilderness is selected and approved at all stages in the ANILCA Title XI and NEPA processes.

1.5. Where is Angoon, and what is it like?

Angoon is the only permanent settlement on Admiralty Island and is located about 55 miles south of Alaska's capital, Juneau, and about 700 miles east-southeast of Anchorage, Alaska's largest city and the location of many state government offices. (See Figure PB3 for the location of Angoon and Figures PB2, PB4, and PB5 for images of Angoon.) The community is located on a peninsula surrounded on the west by Chatham Strait and on the north and east by Favorite Bay. Just beyond Favorite Bay to the north, east, and south is the nearly 1-million-acre Admiralty Island National Monument and Kootznoowoo Wilderness Area.

Angoon's environment is characterized as a temperate rain forest (Figure PB1), which for this area means high rainfall (60 inches per year on average) and large populations of relatively few species of trees, such as Sitka spruce and hemlock.

Angoon is an incorporated city with a democratically elected city government. It has no land-based airport, nor any roads to any other communities. Residents and travelers reach Angoon only by seaplane, by private or charter boat, or by the Alaska State Marine Highway ferry system.

Figure PB1. An example of the temperate rain forest near Angoon.

Figure PB2. Angoon, Alaska.

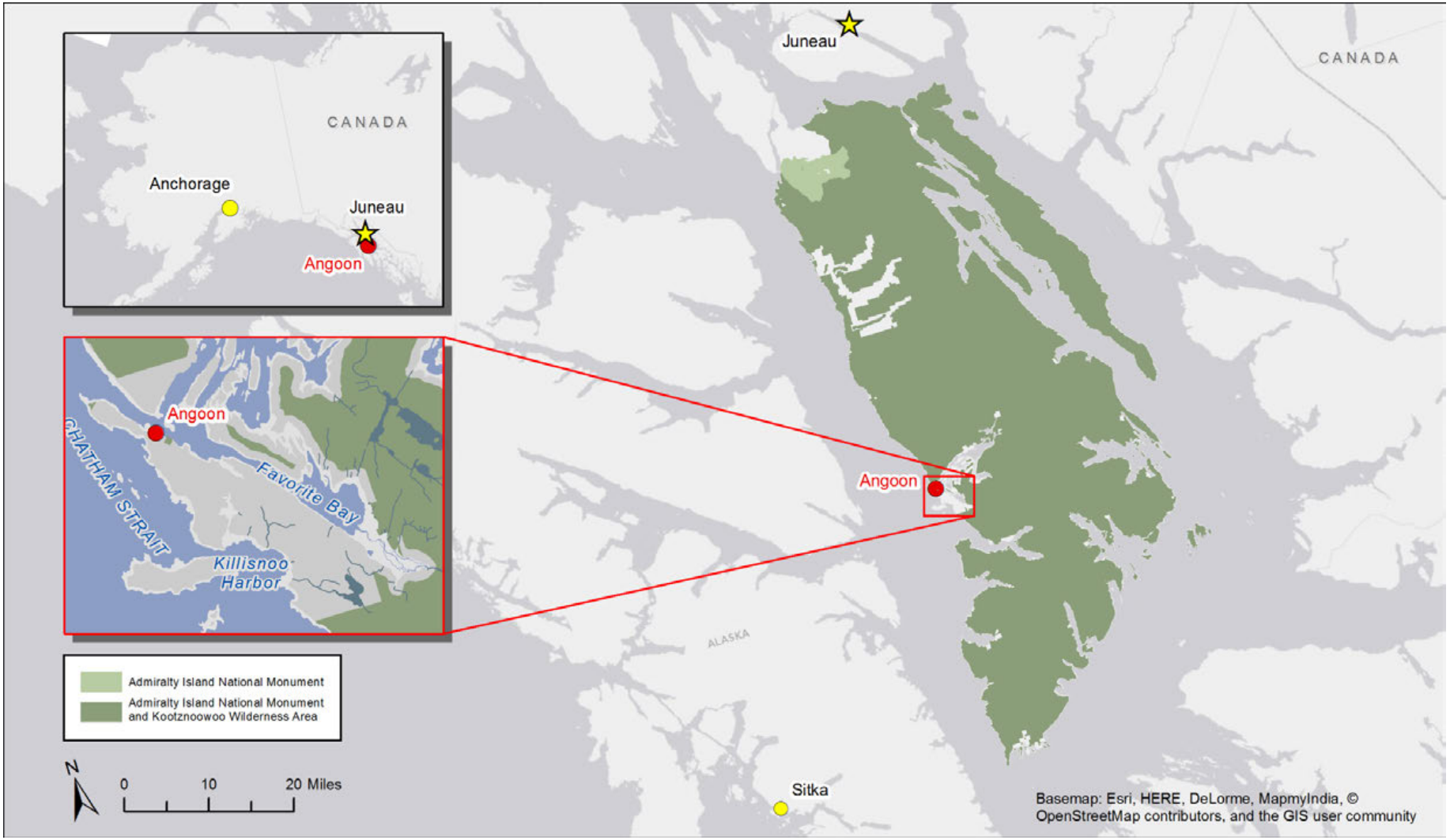


Figure PB3. Location of Angoon and the Admiralty Island National Monument and Kootznoowoo Wilderness Area in Southeast Alaska.

The community of Angoon has two schools (an elementary school and a junior/senior high school) that accommodate kindergarten through twelfth grade. Public safety is addressed by a single village public safety officer in Angoon, and the community supports a volunteer fire department.

The community has a health clinic staffed by a full-time health practitioner (generally a nurse practitioner or a physician's assistant); it is suitable for minor illnesses and injuries. Emergency medical care and routine medical procedures that require advanced medical skills or equipment require evacuation from the community, often a challenge given that Angoon is remote and isolated. Major medical facilities serving Southeast Alaska residents are located in Juneau and Sitka, where most emergency patients are taken. The primary hospital for Alaska Natives is located in Sitka, where the non-profit tribal Southeast Alaska Regional Health Consortium operates Mt. Edgecumbe Hospital. Emergency medical evacuation (commonly referred to as "medevac") by ferry is not usually preferable, often because the ferry is not available when needed (it may only dock at Angoon two to four times a week) but also because it takes much longer than flying.

The community has an Alaska Native Brotherhood hall, a community center, a senior center, a post office, and four churches; there are no banks or restaurants. Private commercial enterprise is limited to a few small hotels and several fishing and hunting lodges, a small grocery store, and a gas station. The economy is based on commercial fishing and hunting as well as local government employment. Angoon's store provides groceries and some general hardware and dry goods that are shipped to Angoon; other goods may be mail-ordered. Residents travel to larger regional communities such as Juneau and Sitka to do most of their shopping.

Medical evacuations (medevac) in Angoon

It is difficult to determine the exact number of medevac operations from Angoon each year because of the way such data are tracked by the different medevac providers and the clinic in Angoon. Of the operations that occur, a portion can only be served by the U.S. Coast Guard helicopters because of weather, visibility conditions, or the availability of other evacuation aircraft. In most cases of poor weather and darkness, the medevac could take place as soon as the conditions became more favorable, but seaplane evacuation delays of 5–12 hours are common.

Figure PB4. Salmon and shark totems at the Angoon Totem Park in foreground with Angoon Elementary School in the middleground. Chatham Strait and Baranof Island are in the background.

The 2010 U.S. Census population estimate for Angoon was 459; most residents are of Alaska Native, particularly Tlingit, heritage. The Tlingit, who know Admiralty Island as *Kootznoowoo*, which means the "Fortress of Bears," have resided on the island for thousands of years. Translated from the Tlingit language, the word "Angoon" means "Town on the Portage" or "Isthmus Town." Angoon's strong ***indigenous*** heritage is evident in the painted fronts of the village's three clan houses (Figure PB5).

Most Angoon residents engage in a subsistence lifestyle. ***Subsistence use*** in the form of hunting, fishing, and gathering has been the heart of the local economy and culture throughout Angoon's history, and it remains so today. Subsistence activities play a social as well as economic role in the community. The sharing of subsistence resources among families, with elders, and with those unable to harvest their own is at the core of the community's identity. In some remote Alaska communities, residents obtain 80% or more of their food from subsistence hunting, fishing, and gathering.

Terms to know

Indigenous: Originating in and characteristic of a particular region or country; native.

Subsistence use: According to Section 803 of ANILCA, "the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade." See section 4.13 Subsistence Resources and Uses for more information.

Figure PB5. One of Angoon's clan houses.

1.6. How are lands near Angoon managed?

In general, land management in the Angoon area can be divided into two categories: 1) management of the federally designated Admiralty Island National Monument and Kootznoowoo Wilderness Area (see Figure PB6, for example) and 2) management of lands conveyed to Alaska Native corporations under the Alaska Native Claims Settlement Act (ANCSA) of 1971 (43 United States Code [USC] 1601 et seq.). Tidelands owned by the State of Alaska and private lands not owned by parties under ANCSA are also present, but these make up a negligible percentage of lands in the area. Because these lands are of such limited quantity, they are not discussed further in this section but are discussed in section 4.3 Compatible Land Use.

1.6.1. Management of the Admiralty Island National Monument and the Kootznoowoo Wilderness Area

The Admiralty Island National Monument was formed in 1978, encompassing nearly 1 million acres—almost the entirety of Admiralty Island. Two years later, with the passage of ANILCA (see section 1.4 above), the U.S. Congress designated nearly all of the lands in the national monument as a wilderness area—the Kootznoowoo Wilderness Area. Some small portions of the national monument were not designated as a wilderness area. For the purposes of this EIS, the area is generally referred to as the combined "Monument–Wilderness Area."

The Monument–Wilderness Area is managed by the U.S. Forest Service according to the purposes and provisions outlined in the Wilderness Act, ANILCA, and the *Tongass Land and Resource Management Plan* (as amended by the U.S. Forest Service in 2008). These purposes of the Wilderness are described in more detail in section 4.16 Wilderness Character. The purposes of the Monument are discussed in section 4.19 Admiralty Island National Monument.

Figure PB6. The million-acre Monument–Wilderness Area is home to forests like this, as well as alpine tundra and rugged coastline.

1.6.2. Management of lands conveyed under the Alaska Native Claims Settlement Act

Most of the non-federal lands in the Angoon area were distributed by the federal government under ANCSA. ANCSA established a process by which Alaska Natives could select lands and resources instead of being assigned lands under the traditional reservation system used in the rest of the United States. Historically, Alaska had many small reservations, but the passage of ANCSA dissolved all but one. ANCSA established a series of Alaska Native corporations at the regional and village levels, and these corporations were permitted to select land in regions and near village locations that form part of their cultural affiliation and heritage. Individual Alaska Natives became shareholders in these corporations, and the corporations were required by ANCSA to deed some of the lands they selected to the associated village governments and the corporations' shareholders. The remaining lands were to be managed by the corporations for the benefit of their shareholders. In short, ANCSA established ways for Alaska Natives to have access to lands and resources to meet their economic and social needs. Once the Alaska Native corporations had exercised their rights to select land, the acreage of that land was set and no more land could be obtained through the ANCSA process.

Figure PB7. Sign at the Kootznoowoo, Inc. office.

The relevant Alaska Native corporations for the Angoon area are Kootznoowoo, Inc. and Sealaska Corporation, which are the village and regional corporations, respectively (Figure PB7 shows the Kootznoowoo, Inc. sign). Kootznoowoo, Inc. owns the surface rights to the ANCSA conveyed lands and the subsurface rights on the Angoon peninsula east of Kootznahoo Road (Naoroz 2014); Sealaska Corporation maintains other subsurface rights. Lands known as the Kootznoowoo Corridor Lands, located around the shoreline of Favorite Bay and other local bays, were deeded to Kootznoowoo, Inc. under Title V of ANILCA, not under ANCSA. Although Kootznoowoo, Inc. is an ANCSA corporation, the permissible uses of those lands are more compatible with the management guidelines of the U.S. Forest Service in the *Tongass Land and Resource Management Plan* (U.S. Forest Service 2008a) because of the limitations placed on the land transfer.

For more information about existing land management and land uses in the Angoon area, see section 4.3 Compatible Land Use.

1.7. What is the Federal Aviation Administration's role in considering this project?

The FAA is the lead federal agency with statutory authority over airports and airways in the United States. The FAA administers the ***Airport Improvement Program,*** through which the DOT&PF will apply for approval of an ***airport layout plan*** for the proposed Angoon Airport and a grant to fund design and construction. Before the FAA can decide whether to provide the requested funding or approval for the airport layout plan, they are required by NEPA to evaluate and publicly disclose the potential social and environmental effects of building and operating the proposed airport. The FAA is also responsible for ensuring that airport development projects provide for the protection and enhancement of natural resources and the quality of the environment (49 USC 47101(a)(6)). The FAA is required to prepare this EIS in accordance with two FAA orders: *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) and *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b). The FAA released an update to 1050.1E, Chg 1 in July 2015 titled *1050.1F Policies and Procedures for Considering Environmental Impacts*. As stated in Order 1050.1F, because the updated order was released after publication of the draft EIS, this final EIS doesn't show changes that would be caused by the updated order because the updated order does not apply to ongoing environmental reviews where substantial revisions to ongoing environmental documents would be required. Providing safe and reliable air transportation is the FAA's fundamental mission, and providing funding for airports that meet that mission is consistent with FAA policy. Additionally, the U.S. Department of Transportation, of which the FAA is a key agency, established the ***Essential Air Service*** program. The Essential Air Service program was developed after passage of the Airline Deregulation Act to ensure that smaller communities such as Angoon would retain a link to the national air transportation system, with a federal subsidy where necessary. Finally, the FAA's Strategic Initiative for Rural Airport Improvement, as outlined in the agency's *Airports Fiscal Year 2010 Business Plan* (FAA 2009:3), specifically calls for improvements to rural airport systems to provide for 24-hour ***visual flight rules*** access and to increase access to such airports by essential medical aircraft. This is particularly important in Alaska because, for many communities, air service is the only year-round transportation option.

Terms to know

Airport Improvement Program: An FAA program that provides grants to public and private organizations for the planning, development, and improvement of public use airports. To qualify, an existing or proposed airport must be included in the National Plan of Integrated Airport Systems, which identifies airports considered significant to national air transportation.

Airport layout plan: A planning document for airports that describes existing airport facilities or proposed developments, or both. A current airport layout plan is a requirement for any airport that is receiving federal funding under the Airport Improvement Program.

Essential Air Service: Government-subsidized air service to rural communities that guarantees those communities access to the national air transportation system. Roughly 45 communities in Alaska are currently served through the program. Alaska communities make up nearly one-third of all communities in the program.

Visual flight rules: Rules that govern flight procedures when visibility and weather conditions are clear enough for a pilot to navigate the airplane by sight instead of by using the instrument panel.

1.8. What other agencies or entities are involved in the proposed Angoon Airport project?

The U.S. Forest Service manages the land—the Monument–Wilderness Area—on which the DOT&PF's ***proposed action*** and one of the other airport alternatives are located. For this reason, the U.S. Forest Service must issue a decision under NEPA whether to approve or disapprove the Angoon Airport project if an alternative in the Monument–Wilderness Area is selected.

The U.S. Army Corps of Engineers has authority over any potential dredging or filling of wetlands and other ***waters of the U.S***. Because wetlands or waters of the U.S. would be affected by the selected airport or access alternative, the U.S. Army Corps of Engineers must also issue a decision under NEPA whether to approve or disapprove the Angoon Airport project. This agency would also issue any necessary permits to authorize the dredging or filling of wetlands or waters of the U.S. For more information about wetlands and other waters of the U.S., see section 4.5.2 Aquatic Habitats and Associated Species and section 4.15 Wetlands.

Title XI of ANILCA would also require the U.S. Forest Service and the U.S. Army Corps of Engineers to issue tentative decisions whether to approve or disapprove the Angoon Airport project for alternatives in the Monument–Wilderness area. Many other determinations, findings, and actions from other agencies are necessary before an airport can be constructed; a list of these permits and approvals is provided in section 2.7 of Chapter 2: Purpose of and Need for a Land-Based Airport at Angoon.

In addition to the U. S. Forest Service and U.S. Army Corps of Engineers (as cooperating agencies) and the DOT&PF (as the project sponsor), other local, state, and federal entities must also formally and directly consult with the FAA. These agencies have specific expertise or regulatory authority for the actions being considered during preparation of this EIS; they have reviewed a preliminary draft of the EIS and provided comments, which were incorporated into the draft EIS as appropriate. These same agencies also provided comments on the draft EIS released in January 2015. Those comments have been incorporated into this final EIS as appropriate or addressed in Appendix T, FAA Responses to Comments Received on Draft Environmental Impact Statement. Consultation with these agencies will continue throughout the EIS process and will not be complete until after the record of decision has been issued.

Terms to know

Proposed action: A NEPA term referring to the project or action as put forth by the project sponsor and for which federal funding or approval is requested.

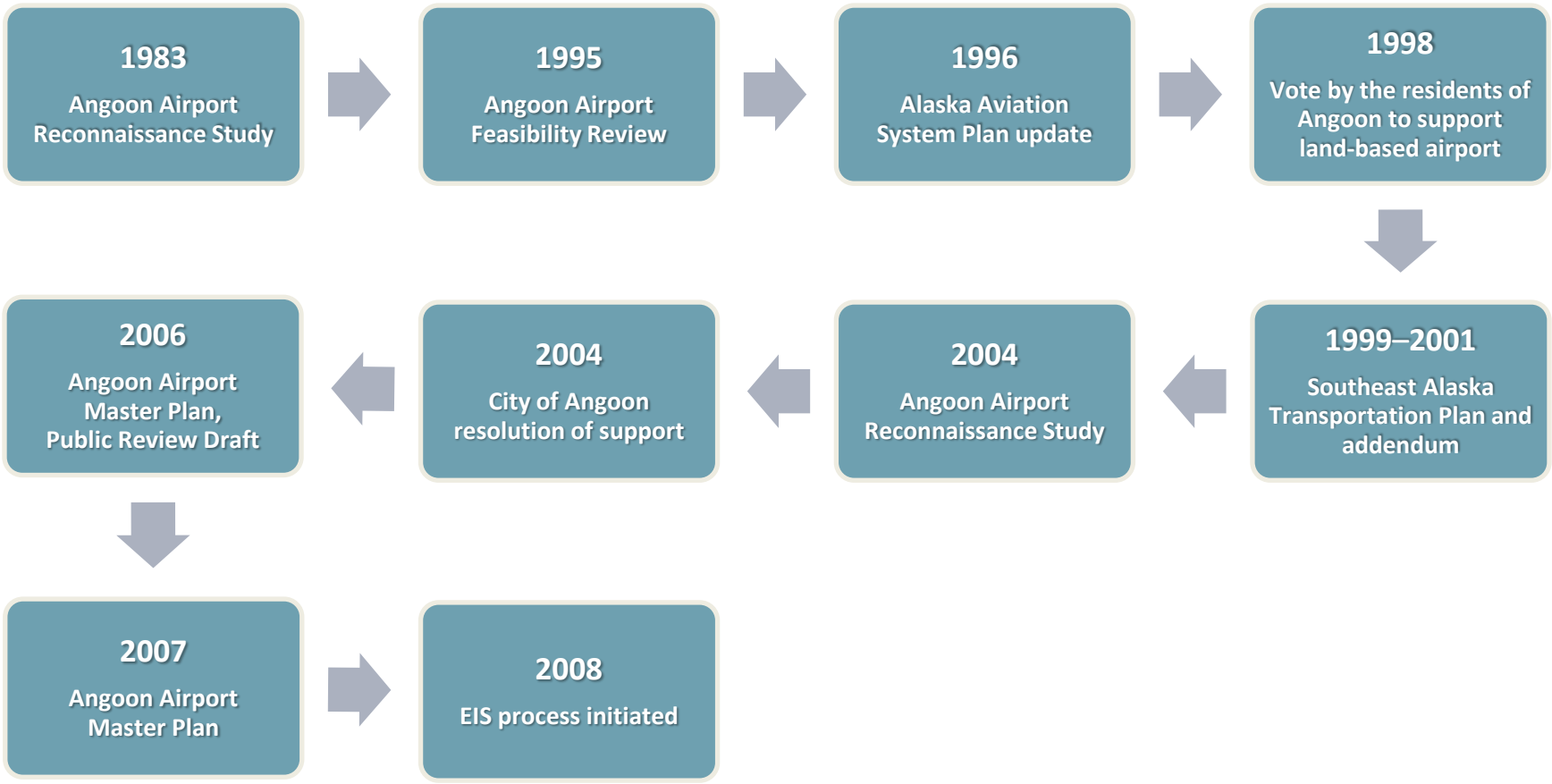
Waters of the U.S.: A federal regulatory term referring to surface waters, rivers, lakes, estuaries, coastal waters, and wetlands that are used or can be used for interstate or foreign commerce.

1.9. How would this project be funded?

The DOT&PF intends to pay for the construction of the airport and access road through a combination of funds obtained from the Airport Improvement Program (pending availability), state funds, and potentially through other agencies such as the Federal Highway Administration. Funding for operation and maintenance of the airport and access road would come from the DOT&PF maintenance and operations budget. The access road would be maintained as needed for public safety.

1.10. What previous studies and actions led to this EIS?

As discussed in the *Angoon Airport Master Plan* (DOT&PF 2007), many studies and actions preceded this EIS. The path to the master plan and this EIS is depicted here:


1983
Angoon Airport Reconnaissance Study
1995
Angoon Airport Feasibility Review
1996
Alaska Aviation System Plan update
1998
Vote by the residents of Angoon to support land-based airport
1999–2001
Southeast Alaska Transportation Plan and addendum
2004
Angoon Airport Reconnaissance Study
2004
City of Angoon resolution of support
2006
Angoon Airport Master Plan, Public Review Draft
2007
Angoon Airport Master Plan
2008
EIS process initiated

2. Purpose of and Need for a Land-Based Airport at Angoon

2.1. What information is provided in Chapter 2?

This chapter summarizes the ***proposed action*** that is intended to meet the ***purpose and need***. It describes the current transportation options, explores reasons why those options are not meeting the need, and identifies the solution to Angoon's transportation issues. This chapter also describes how the proposed action was developed and how the Federal Aviation Administration (FAA) accounts for current and future demand for aviation services. Final sections describe how the ***resources*** and issues analyzed in this EIS were identified, summarize the findings and actions associated with the environmental impact statement (EIS), and list additional actions that would be needed if the selected ***alternative*** is located in the Admiralty Island National Monument and Kootznoowoo Wilderness Area (referred to in this EIS as the "Monument–Wilderness Area").

What is discussed in Chapter 2?

Terms to know

Alternative: A National Environmental Policy Act (NEPA) of 1969 (Public Law [PL] 91-190) term that refers to a required option for a project. Alternatives must meet the goals of the project while providing different possibilities for how the project would affect the environment.

Proposed action: A NEPA term referring to the project or action as put forth by the project sponsor and for which federal funding or approval is requested.

Purpose and need: A NEPA term referring to a statement that is required to explain why a proposed agency action is necessary.

Resources: Natural, cultural, or social features that are valued for their role in the human environment, economy, or society. Examples include archaeological sites, vegetation and wildlife, visual resources (how the land appears), and water bodies such as streams and wetlands.

2.2. What is the proposed action?

The Alaska Department of Transportation and Public Facilities (DOT&PF) has proposed to construct and operate a land-based airport near Angoon. The airport would accommodate small, wheeled aircraft and would include a single runway with an apron (an area where aircraft are maneuvered and parked and where activities associated with the handling of flights can be carried out). It would be comparable to other non-certificated rural airports in Southeast Alaska, such as the airports at Kake or Hoonah (see Figure PN1 for an aerial image of the airport at Hoonah). A new access road for the airport would need to be constructed. The location proposed by the DOT&PF is referred to as Airport 3a in this EIS. The components of the proposed action are summarized below, and most are shown on Figure PN2 below. The process used to develop the proposed action is detailed in section 2.4.

Figure PN1. The airport at Hoonah, Alaska, a primarily Alaska Native village about 50 miles northwest of Angoon.

The proposed action is a land-based airport consisting of the following components:

- Runway: Paved; 3,300 feet long and 75 feet wide, with future expansion to 4,000 feet long*
- Runway safety areas: 150 feet wide, centered on runway centerline, extending 300 feet beyond each runway end
- Object free area: 500 feet wide, centered on runway centerline, extending 300 feet beyond each runway end
- Runway protection zone: Standard visual approach dimensions of 500 × 1,000 × 700 feet
- Single, perpendicular taxiway: Paved
- Aircraft apron: Paved
- Navigational aid: Rotating beacon
- Visual approach aid: Precision approach path indicator
- Runway lights: Pilot-controlled, medium-intensity lights
- Terminal space: Sufficient area for a future terminal or passenger shelter
- Lease lots: 62,500 square feet available for leasing
- Electrical control building and generator: Near future terminal site
- Perimeter fence: For security and wildlife control
- Passenger parking lot: Paved, near future terminal site
- Support facilities: Future weather station, weather cameras, communication, wind cones, etc.
- Access road: Two, paved, 9-foot-wide lanes and 1-foot shoulders with right-of-way sized for future expansion to two 10-foot lanes and 5-foot shoulders*
- Overhead utility lines: Power and telephone lines located within the access road corridor**

*Future expansion would be subject to additional environmental review when proposed for construction.
**Utility lines would only be installed if it is determined to be cost-effective.

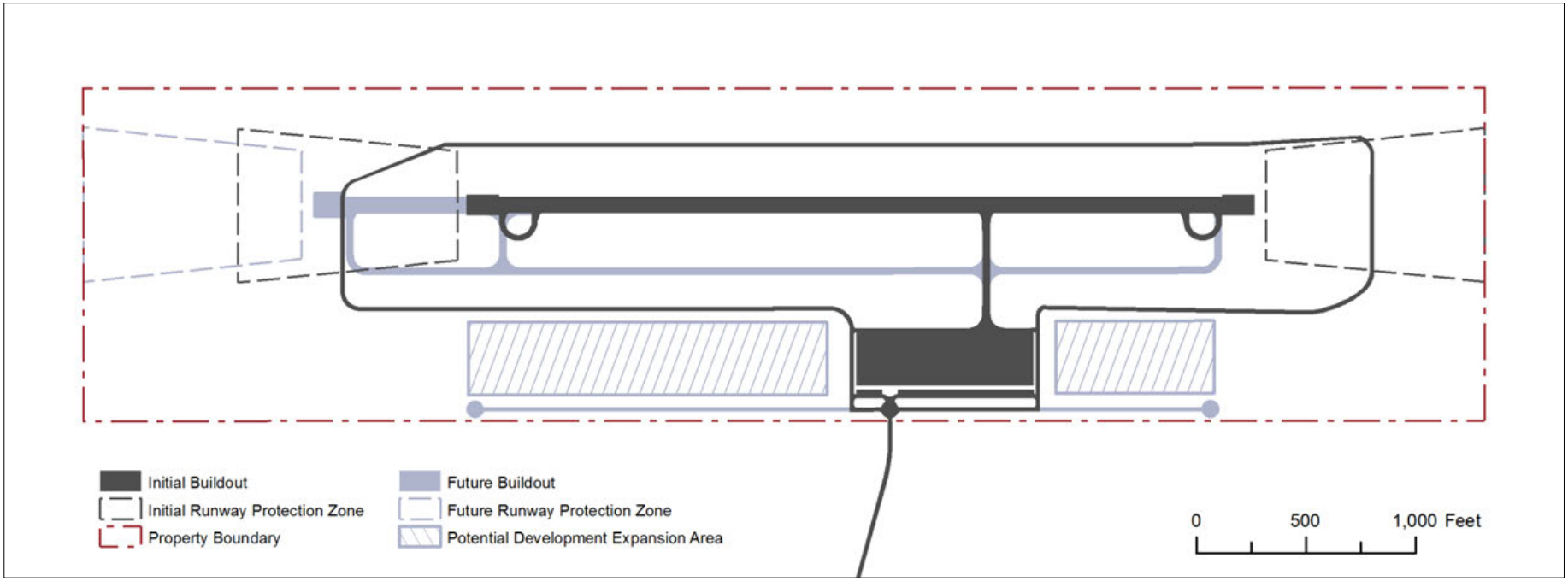


Figure PN2. Conceptual layout of areas of initial airport buildout for a 3,300-foot runway, and potential future airport buildout for a 4,000-foot runway. *Note*: Both areas are subject to change based on actual design work, and future expansion to 4,000 feet would be subject to additional environmental review when proposed for construction.

2.3. What is the purpose and need for the airport project?

The Council on Environmental Quality's implementing regulations for NEPA state that an EIS must "briefly specify the underlying purpose and need [emphasis added] to which the [FAA] is responding in proposing the alternatives including the proposed action" (40 Code of Federal Regulations [CFR] 1502.13). The "need" may be considered the problem that is triggering the action, whereas the "purpose" explains how the action would solve the problem.

As described in section 2.2, the DOT&PF proposes to construct and operate a land-based airport in Angoon. Before identifying alternatives or proceeding with environmental analyses, the FAA must verify the need for a new airport and describe what problems would be corrected by approving and funding the action.

For this EIS, the purpose and need is:

> Current transportation service to and from Angoon is solely by seaplane and ferry. These options do not provide sufficient ***availability and reliability*** in transportation to and from Angoon. A land-based airport will improve the availability and reliability of transportation services to and from Angoon.

A discussion of current transportation problems and the use of a land-based airport as the solution to those problems is provided below in section 2.3.1 and section 2.3.2.

Terms to know

Availability and reliability: Used here, the number of hours or percentage of a year that visibility and daylight hours allow successful completion of a flight (the frequency), and the ability to have on-demand or emergency transportation for varying numbers of passengers.

2.3.1. Why do the current transportation options not meet the need?

Like most communities in Southeast Alaska, Angoon has no road connections outside the local area because the ocean and terrain surrounding Angoon make construction and maintenance of roads and bridges to other communities impractical and prohibitively expensive. As stated in the purpose and need statement above, transportation between Angoon and other communities is limited to two options: the state-run ferry system and commercial or chartered seaplanes. Figure PN3 shows aircraft options, approximate ferry routes, schedules, and travel times. The problems with the current seaplane and ferry options are described in section 2.3.1.1 and section 2.3.1.2.

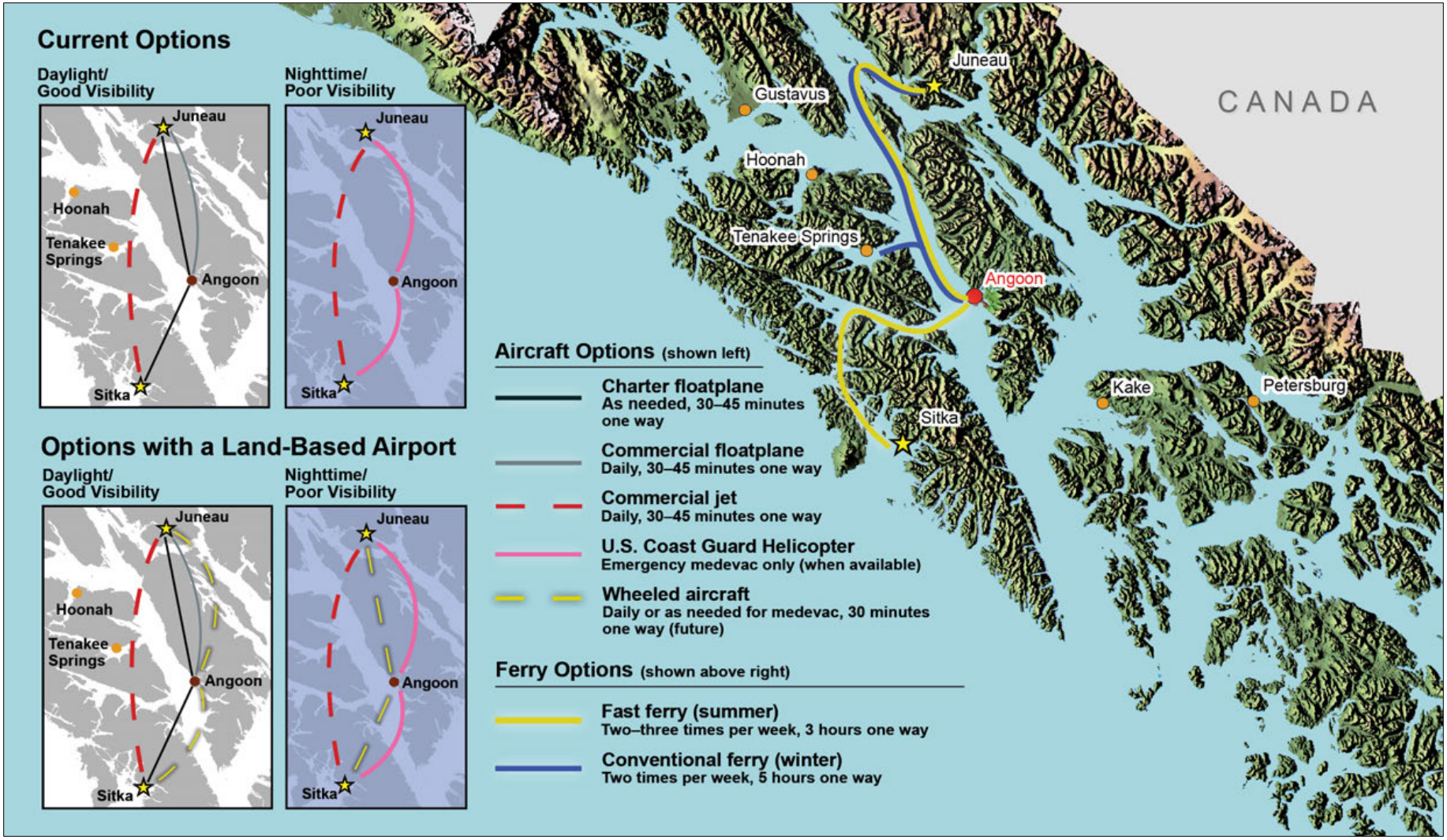


Figure PN3. Existing and potential transportation options in and out of Angoon.

2.3.1.1. The Angoon Seaplane Base

Currently, the only fixed-wing airplane service to and from Angoon is provided by seaplanes using the Angoon Seaplane Base (Figure PN4). The seaplane base is a dedicated dock located in the tidally influenced Favorite Bay. There is no defined seaplane landing area in Favorite Bay; pilots take off and land in the most advantageous area based on water, wind, and weather conditions at the time.

Commercial seaplane flights are offered between Juneau and Angoon two or three times daily, depending on the season. This schedule is sufficient to meet the current ***demand*** for flights (see section 2.5 for more information about aviation demand) but does not provide sufficient aviation availability and reliability of service.

Seaplane service to and from Angoon is available approximately 44% of the hours in any given year. This is for the following reasons:

- Service is primarily available during conditions that permit ***visual flight rules.*** These conditions are daylight hours, good weather, and good visibility.
- Landing in low-light and poor visibility conditions is hazardous because it is difficult for the pilot to determine the condition of the water surface. (An example of poor visibility conditions is provided in Figure PN5.)
- Tidal fluctuations in Favorite Bay limit the availability of suitable landing locations. Low tide exposes rocks and other hazards that are submerged at high tide.

Terms to know

Amphibious planes: Aircraft that can take off and land on both land and water.

Demand: The need of a community for airplanes to accommodate passengers and cargo.

Visual flight rules: Rules that govern flight procedures when visibility and weather conditions are clear enough for a pilot to navigate the airplane by sight instead of by using the instrument panel.

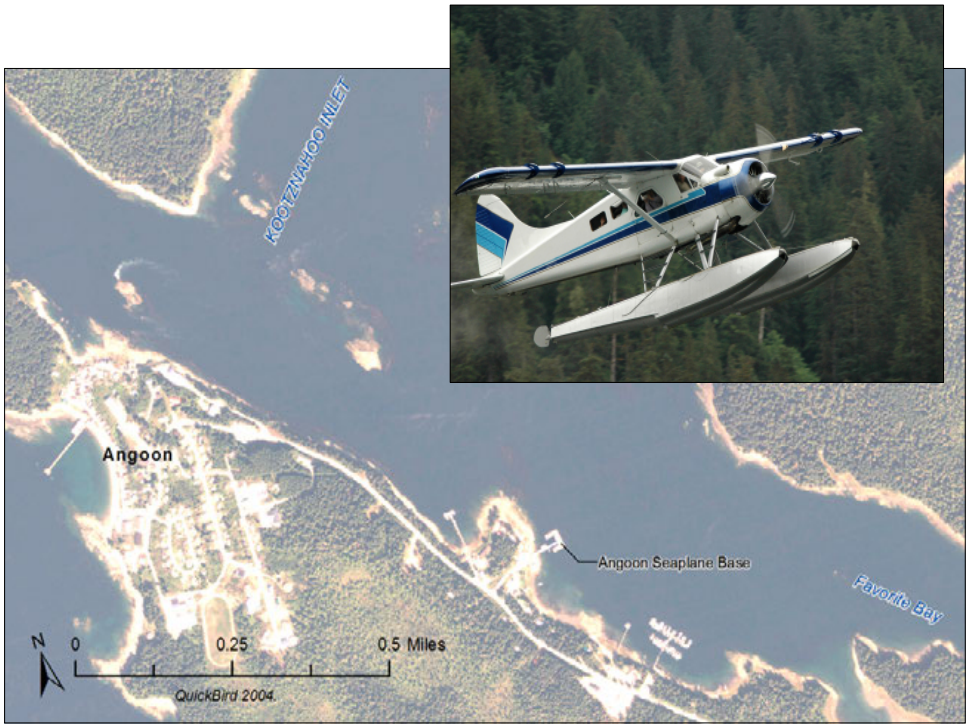


Figure PN4. The de Havilland Beaver (top) provides service to the Angoon Seaplane Base (bottom).

- In winter, ***amphibious planes*** that serve the Angoon Seaplane Base take off from the runway in Juneau if the float pond is frozen. When air temperatures fall below approximately 17 degrees, Favorite Bay may be ice-free, but even so, pilots do not land there because wet gear will freeze and become inoperable for the return to Juneau's runway.

Improvements to seaplane service and the Angoon Seaplane Base could include 1) increasing the number of flights, 2) installing landing area lights, or 3) developing an ***instrument approach procedure*** that allows for navigation under ***instrument flight rules*** for the Angoon Seaplane Base. However, these improvements would still not meet the underlying need for a land-based airport for the following reasons:

- The percentage of time seaplanes can operate into and out of Angoon is determined by weather, lighting conditions, and water conditions in Favorite Bay, not by the number of aircraft. Even if a seaplane is available, the flight would not take place at night or if there is low cloud cover or poor visibility.
- Installation of landing area lights or an otherwise marked and defined seaplane landing area (that could allow a pilot to locate where to land and determine the condition of the water surface) is not practical in Favorite Bay for three reasons:
    - Landing lights or other markings would constitute a navigation hazard for boats.
    - Large tidal fluctuations would cause the landing area size and location to vary unpredictably.
    - Debris would cause the system to fail too often for the benefits to be realized.
- Development of an instrument approach procedure at the Angoon Seaplane Base would increase the total available hours in a given year by less than 3% and would still not permit a water landing in Favorite Bay at night.

Terms to know

Instrument approach procedure: A series of predetermined maneuvers for an aircraft under IFR conditions from the beginning of an initial approach to a landing or to a point from which a landing may be made visually.

Instrument flight rules: Flight procedures used when conditions for visual flight rules are not met (for example, the cloud cover and fog are at less than 1,000 feet or visibility is less than 3 miles).

Figure PN5. Typical poor visibility conditions around Angoon. Note low cloud cover and fog.

2.3.1.2. Alaska Marine Highway System ferry

The state-run Alaska Marine Highway System provides public ferry service connecting Angoon with Juneau and, in summer months, other Southeast Alaska communities such as Sitka. Figure PN6 shows a ferry docked at Angoon.

Figure PN6. Alaska Marine Highway System *M/V Fairweather* off-loading in Angoon. Photograph courtesy Jeremy Woodrow, DOT&PF.

The ferry service provides a relatively low-cost travel option that can usually accommodate passenger demand. The ferry service does not meet the need for sufficient availability and reliability in transportation, however, for the following reasons:

- Ferry service is infrequent, with two or three scheduled trips a week, depending on season.
- Travel time is significantly longer than by air. The fast ferry, which is available during the summer, takes just under 3 hours to get to Juneau. The trip to Juneau by the conventional ferry takes approximately 5 hours. Travel time to Juneau by air is 30–45 minutes.
- The ferry system is subject to its own set of restrictions due to sea and weather conditions. Service to Angoon is occasionally cancelled due to bad weather and rough seas.
- The number of available ferries is limited, which means that adding service to Angoon is unlikely. When a ferry is out of service for repairs, schedules to Angoon and other Southeast Alaska communities may be reduced until that ferry is returned to service.
- Use of the ferry system for medical evacuation or even routine medical travel is often impractical due to the time involved and the infrequent service.
- As discussed further in *Alternatives Eliminated from Detailed Analysis* (SWCA 2014a, included as Appendix B), the ferry system is further constrained by state budgets, maximum travel speeds, and demand throughout Southeast Alaska.

For all of the reasons described here, the ferry docked at Angoon as few as 105 times and as many as 138 times per year from 2007 to 2013 (Alaska Marine Highway System 2013a:20). Current and future planned ferry service is unlikely to improve the availability and reliability of transportation to and from Angoon.

Terms to know

Fixed threshold: The start or end of a runway.

2.3.2. What is the solution to Angoon's transportation issues?

A land-based airport would meet Angoon's unmet transportation needs by improving transportation availability and reliability. A land-based airport would have, or would allow for, the following:

- Runway lighting, allowing a pilot to safely land at night or in low-light situations
- The development of an instrument approach procedure using a ***fixed threshold*** that would allow pilots to navigate to and land at the Angoon Airport during instrument flight rules weather conditions (not currently an option for the seaplane base)
- Aircraft operations that are not affected by low temperatures

A land-based airport with runway lights, an instrument approach procedure, and a fixed runway threshold would improve the availability of transporation service to and from Angoon, allowing flights to occur 89%–94% of the total hours in a given year (see Table ALT3 in Chapter 3). This more than doubles the 44% of hours per year that seaplane service is currently availabile (as reported in section 2.3.1.1).

Other potential benefits of a land-based airport could include

- a wider variety of aircraft,
- use of dedicated, fixed-wing, medical evacuation aircraft when needed,
- more seats and cargo capacity, and
- the potential for additional direct flights to Sitka (the location of the regional Native hospital) and other Southeast Alaska communities.

2.4. How was the proposed action developed?

The DOT&PF developed their proposed action through a series of planning activities beginning in the 1980s and culminating in 2007 with the *Angoon Airport Master Plan* (DOT&PF 2007).

This planning process included

- an analysis of the existing and future demand for aviation services (called an aviation demand forecast);
- an analysis of potential aircraft approach paths to determine if a land-based airport could operate safely near Angoon;
- an analysis of many potential airport locations to determine if they would meet safety standards while providing a minimum level of aircraft access;
- discussions about the project with the public, the FAA, and ***regulatory agencies***; and
- preliminary screening of potential social and environmental effects from the project in the *Angoon Airport Reconnaissance Study* (DOT&PF 2004) and the *Angoon Airport Master Plan Public Review Draft. Background Report: Planning & Facility Requirements, Access & Apron Alternatives Analysis* (DOT&PF 2006).

Through this planning process, the DOT&PF identified their proposed airport location, referred to during planning as "Site 3," and prepared an airport layout plan showing the locations and layouts for the proposed airport facilities. The location of Site 3 was on the east side of Favorite Bay, within the boundaries of the Monument–Wilderness Area.

Early in this EIS process, the FAA conducted independent aviation studies to confirm that the location proposed by the DOT&PF would offer safe aircraft approach and departure paths and meet other airport safety standards. The FAA found that by making slight modifications to Site 3—moving it to the north and adjusting the orientation of the runway—the new location would offer better access to incoming aircraft. This new location, originally termed "Site 3a," is referred to as "Airport 3a" in this EIS.

Terms to know

Regulatory agencies: Local, state, and federal agencies responsible for ensuring that laws and policies related to specific public lands or environmental resources are followed.

Air transportation in Alaska

Compared to all other states, Alaska has far fewer miles of roads as a percentage of its land area. Many communities, such as Angoon, are not connected by road to other towns, villages, and cities. Residents of these communities rely on ferries, other boats, and aircraft for access to employment, educational opportunities, cultural activities, food, supplies, services, and medical care. A recent study of the Alaska aviation system found that residents in rural communities fly eight times more frequently each year than do rural residents of other states (Northern Economics 2011). The study also found that rural Alaskans receive approximately 39 times more air freight annually than do their rural counterparts elsewhere.

2.5. How does the FAA account for current and future aviation demand?

Unmet aviation demand—requests for more seats or additional cargo capacity—was not a factor in evaluating the purpose and need for this project. As stated in section 2.3, the purpose of a land-based airport at Angoon is to improve aviation service availability and reliability, not to increase the number of planes that fly to Angoon. As described in section 2.3.1.1 above, it is possible to increase the number of seaplane flights, but adding more seaplanes would not improve the percentage of the time that any given flight can successfully navigate to and land at the Angoon Seaplane Base. Additional planes—no matter how many are added—would still be limited by weather and light conditions.

However, the FAA is still required by *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b) to objectively review historical and current aviation demand as well as projected future aviation demand, and these topics are described in the following sections.

2.5.1. Historical and current aviation demand

As with most small communities, Angoon's air travel fluctuates from year to year. As shown in Figure PN7, the number of enplaned passengers ranged from a low of just over 1,700 in 2008 to a high of almost 4,000 in 1995. The amount of mail and freight generally follows the same pattern as passenger service.

This fluctuation can be attributed to multiple factors such as a construction project that increases air travel for a short time. Figure PN7 details the historic aviation activity of the Angoon Seaplane Base over the years 1991 through 2010.

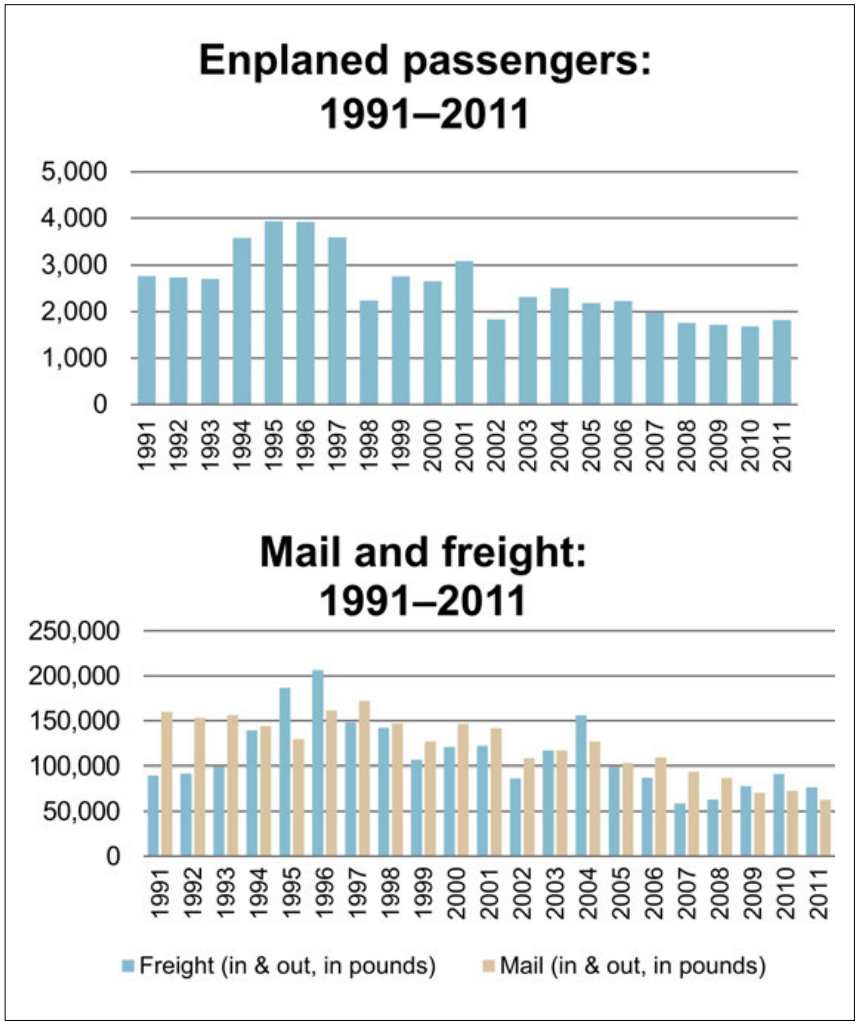


Figure PN7. Historic aviation activity for Angoon. *Source*: Bureau of Transportation Statistics 2012; DOT&PF 2007.

2.5.2. Projected future aviation demand

As described in section 2.4, the DOT&PF's planning process included the development of an aviation demand forecast for a land-based airport. This forecast, developed in accordance with *FAA Advisory Circular 150/5070-6B Airport Master Plans* (FAA 2007a), demonstrated a reasonable level of growth for aviation services in the Angoon area if a land-based airport were to be built. The DOT&PF aviation demand forecast predicted a mid-level yearly growth rate of approximately 0.50% over the next 20 years and the addition of three Angoon-based aircraft at that mid-level growth.

The FAA is required to compare the DOT&PF's aviation forecast to the FAA standard forecast using the Terminal Area Forecast system; these forecasts provide information for use by state and local authorities, the aviation industry, and the public. The Terminal Area Forecast provides projections for key elements of aviation activity (***enplanements*** and ***operations***) for the Angoon Seaplane Base and predicts a yearly growth rate of approximately 0.55% over the same 20-year period as the DOT&PF aviation forecast predicted.

Terms to know

Enplanement: A passenger boarding an aircraft for departure at a given location.

Human environment: The natural, cultural, and social resources that make up the physical and social environment in which humans live and with which they interact.

Operations: In aviation contexts, a take-off or a landing at a given airport. Each is considered an operation.

Scoping: An activity conducted early in an EIS process in which the public and federal, state, and local agencies are invited to provide input on project alternatives and issues of concern. Scoping helped the FAA identify what should be analyzed in this EIS and potentially significant issues related to the proposed action.

2.6. How did the FAA identify the resources and issues analyzed in this EIS?

The FAA determined which resources and issues would need to be analyzed in this EIS by considering the requirements of NEPA, the Council on Environmental Quality's regulations for implementing NEPA, FAA *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a), FAA Order 5050.4B (FAA 2006b), and the results of public and agency ***scoping***. NEPA and its implementing regulations require a comprehensive consideration of effects from federal actions to the resources in the ***human environment***. These resources and issues related to the human environment are discussed in detail in Chapter 4: Existing Conditions and Project Effects. Other federal laws, for example, the Endangered Species Act of 1973, as amended (United States Code [USC] 1531 et seq.) and the National Historic Preservation Act of 1966 (36 CFR 800, as amended), also provide direction about the consideration of certain resources during the planning of federal actions.

As part of public and agency scoping, the FAA asked the public, regulatory agencies, and key groups such as the Angoon Community Association (the local federally recognized tribe) and Kootznoowoo, Inc. (the local Alaska Native corporation) for input about what issues should be considered in the EIS. During the scoping period, the FAA held meetings, sent out informational mailers and direct mailings, advertised in local newspapers and other media, and conducted other outreach efforts. A notice of intent to prepare the EIS and details about the scoping period were published in the *Federal Register* on September 24, 2008. The scoping period was open for 99 days, closing December 31, 2008.

Many comments were received during scoping, including some the FAA determined to be outside the scope of this EIS and outside the potential range of alternatives. Other comments the FAA considered directly relevant, and they were used in the development of alternatives and environmental analyses. These comments are paraphrased and summarized as follows:

- Consider a longer runway to accommodate larger aircraft.
- Consider alternatives other than a land-based airport.
- Analyze the anticipated ***socioeconomic*** effects of any alternative that would require the use of private, municipal, or Alaska Native corporation land rather than U.S. Forest Service land.
- Analyze the anticipated effects from the alternatives on ***subsistence use*** of resources by Angoon residents, including negative effects such as loss of plant and animal habitats, potential contamination from airport-related chemicals, and increased competition for resources, as well as beneficial effects such as increased access to subsistence resources.
- Analyze the effects to the community from airport-related noise.

A complete list of all comments received during the scoping period and the FAA's response to comments are provided in the *Public and Agency Scoping Report* (SWCA 2009, included as Appendix A).

The EIS process has included extensive public and agency coordination. A notice of availability for the draft EIS and details about the public comment period were published in the *Federal Register* on January 9, 2015. The official comment period closed on March 11, 2015; however, because the public hearings were scheduled later in the comment period, and

Terms to know

Socioeconomic: A term that refers to the field of social economics, which examines the relationship between social life and economic activity and assesses social or economic change in human populations.

Subsistence use: According to Section 803 of ANILCA, "the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade." See section 4.13 Subsistence Resources and Uses for more information.

per FAA Order 5050.4b, the FAA accepted comments through March 20, 2015. Comments have been documented and incorporated into the analysis and decision-making process. A complete list of all comments received during the public comment period and responses to these comments are provided in the *Response to Comments on the Draft EIS* in Appendix T.

2.7. What determinations, findings, and actions are associated with this EIS?

An EIS serves as the basis for many determinations, findings, and actions that must take place before a selected alternative could be implemented. Most of these determinations, findings, and actions are documented in the record of decision that would be issued for this EIS. Others would occur after the record of decision is issued. The necessary determinations, findings, and actions that must occur for this EIS, and the parties responsible for them, are listed here:

The FAA is responsible for the following:

- Issuing a record of decision (71 Federal Register 29014 [NEPA Implementing Instructions for Airport Projects]; 42 USC 4321 et seq. [NEPA]; 40 CFR 1505.2)
- Issuing a Section 4(f) determination under the Department of Transportation Act (49 USC 1653(f))
- Documenting compliance with Executive Order 11990, Protection of Wetlands (42 USC 4321 et seq.)
- Approving the airport layout plan (unconditional approval or mixed approval) (71 Federal Register 29014 (part of record of decision requirements)
- Issuing a determination that the project complies with aeronautical and airspace requirements (14 CFR 157 and 14 CFR 77)
- Issuing a final decision regarding project eligibility for grant-in-aid funds, and issuing funding (71 Federal Register 29014 [part of record of decision requirements])
- Issuing a finding that no possible and prudent alternative to the project exists and that every reasonable step has been taken to minimize the project's significant adverse effects on natural resources (49 USC 47106.(c)(1)(B))
- Issuing certification that the proposed facility meets requirements for use in air commerce or national defense (49 USC 44502(b))
- Developing and implementing flight procedures for the new airport (49 USC 40113 and 49 USC 44701)
- Implementing government-to-government consultation (42 USC 4332)
- Issuing determinations of eligibility and findings of effect on cultural resources under the National Historic Preservation Act (16 USC 470 et seq.)
- Finding that the project is consistent with existing plans of public agencies for the development of the area surrounding the airport (49 USC 47106(a)(1)) and with Executive Order 12372
- Finding that the interests of the communities in or near which the project may be located have been given fair consideration (49 USC 47106(b)(2))
- Finding that there are no actions associated with the project involving a disproportionately high and adverse impact to minority or low-income populations (USDOT Order 5610.2)
- Finding that the sponsor has informed the community that they have the right to petition the DOT Secretary about a new airport location. (49 U.S.C. 47106(c)(1)(A)(ii))

Other federal agencies are responsible for the following, depending on which alternative is selected:

- The U.S. Army Corps of Engineers
  - issues a record of decision independent of the FAA's record of decision (40 CFR 1505.2),
  - issues an individual permit under Section 404 of the Clean Water Act (Public Law [PL] 107-303) if wetlands or waters of the U.S. are affected, and
  - issues a permit under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403), if needed.
- The U.S. Fish and Wildlife Service
  - would provide concurrence of no effects (16 USC 1536).
- The National Marine Fisheries Service
  - makes conservation recommendations regarding effects to essential fish habitat and some marine mammals, if needed (16 USC 1536).
- The U.S. Forest Service
  - issues an independent record of decision (40 CFR 1505.2) and
  - issues a special use permit, easement, or other right-of-way for any project construction on National Forest System lands (36 CFR 251.50).

The DOT&PF is responsible for the following:

- Revising and submitting the airport layout plan to the FAA for approval (49 CFR 47103)
- Submitting application for financial assistance from the FAA (National Plan of Integrated Airport Systems Airport Improvement Program)
- Obtaining any required construction permits
- Obtaining land use approval and documentation under 49 USC 47106(a)(1)
- Purchasing rights-of-way, if necessary
- Providing documentation under 49 USC 47107(a)(10) regarding compatible land use adjacent to the airport
- Complying with FAA grant requirements and mitigation requirements (National Plan of Integrated Airport Systems Airport Improvement Program)
- Affording the public with an opportunity for a hearing under 49 USC 47106(c)(1)(A)(i)
- Informing the community that they have the right to petition the DOT Secretary on a new airport location.

Other state and local entities are responsible for the following:

- The Alaska Department of Environmental Conservation
  - issues a Clean Water Act Section 401 certification and
  - a Clean Water Act Section 402 National Pollutant Discharge Elimination System permit.
- Kootznoowoo, Inc. and the City of Angoon
  - transfer land, issue easements, grant rights-of-way, and/or possibly rezone land depending on which, if any, alternative is selected by the FAA in the record of decision.
- The Alaska State Historic Preservation Officer
  - issues concurrence with the FAA's determinations of eligibility and findings of effect on cultural resources under the National Historic Preservation Act (16 USC 470 et seq.)

2.8. Would any additional actions be needed because the proposed action is located in the Monument–Wilderness Area?

Because the DOT&PF's proposed action is located in the Monument–Wilderness Area, the process related to Title XI of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 (PL 96-487) must be completed, and approval from the President of the United States and Congress must be received before an airport could be constructed at that location. Title XI (entitled ***Transportation and Utility Systems*** in and across, and Access into, ***Conservation System Units***) and the process required under it are discussed in detail in Chapter 5: Requirements of the Alaska National Interest Lands Conservation Act. The general steps are outlined at right.

The DOT&PF submits a Title XI application to place the airport (considered a transportation and utility system) in the Monument–Wilderness Area (a conservation system unit). The application is submitted with supporting documentation, which, for this project, is the EIS. The FAA, the U.S. Forest Service, and the U.S. Army Corps of Engineers would all receive the DOT&PF's application.

Federal agencies review information and issue recommendation:

- Once the final EIS is published, each agency reviews all relevant information (including public comment on the EIS) and issues an independent recommendation, including findings on key criteria for whether the DOT&PF's application should be approved or disapproved. The agencies do not have to agree on their recommendations.

Federal agency recommendation is forwarded to the President:

- Regardless of the nature of the federal agencies' recommendations, the application and recommendations must be forwarded to the President of the United States. The President then issues a personal decision to approve or deny the application.
  If the President approves the application, it is forwarded to Congress (see the next step).
  If the President denies the application, the ANILCA application process terminates. The DOT&PF could challenge the President's disapproval by filing a lawsuit.

Presidential approval is forwarded to Congress:

- If the President approves the application, Congress must issue a joint resolution to also approve it before an airport can be built. Otherwise, the application is considered denied and an airport cannot be built in the Monument–Wilderness Area. If Congress does issue a joint resolution (thereby approving the application), all relevant federal agencies are directed to issue the necessary permits for project approval. The permits can include terms and conditions to protect resources.

Terms to know

Conservation system unit: Per ANILCA (Section 102(4)), "any unit in Alaska of the National Park System, National Wildlife Refuge System, National Wild and Scenic Rivers System, National Trails System, National Wilderness Preservation System, or a National Forest Monument."

Transportation and utility system: As defined in ANILCA Section 1102(4)(A), the term "transportation or utility system" is any system—such as roads, transmission lines, or airports, as defined in ANILCA 1102(4)(B)—where any portion of that system is located in a conservation system unit.

3. ALTERNATIVES

3.1. What information is provided in Chapter 3?

This chapter explains why the Federal Aviation Administration (FAA) is considering ***alternatives*** to the action proposed by the Alaska Department of Transportation and Public Facilities (DOT&PF). (See section 2.2 in Chapter 2: Purpose of and Need for a Land-Based Airport at Angoon for a description of the ***proposed action***.) This chapter describes and compares the alternatives with regard to construction requirements, aviation performance and ability to enhance aviation access into Angoon, cost, effects on the environment, and compatibility with land management goals. This chapter also outlines construction methods, sources of construction materials, and actions necessary for the construction and operation of each action alternative. It also describes how the FAA developed the range of alternatives, how those alternatives were screened, why some were dismissed from detailed analysis, the alternative that the FAA has identified as their preferred alternative, and the current status of the process for approval or disapproval required under Title XI of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 (Public Law [PL] 96-487).

What is discussed in Chapter 3?

Terms to know

Alternatives: A National Environmental Policy Act (NEPA) term that refers to a required option for a project. Alternatives must meet the goals of the project while providing different possibilities for how the project would affect the environment.

Proposed action: A NEPA term referring to the project or action as put forth by the project sponsor and for which federal funding or approval is requested.

3.2. Why is the FAA considering other alternatives in addition to the proposed action?

The National Environmental Policy Act (NEPA) and its implementing regulations specify the following requirements that relate to alternatives:

1. A range of reasonable alternatives to the proposed action must be considered when a ***major federal action*** such as the proposed Angoon Airport project is being evaluated (40 Code of Federal Regulations [CFR] 1502.1). An alternative other than the proposed action might avoid or reduce certain environmental effects while still meeting the project's purpose and need.

2. Reasonable alternatives "not within the jurisdiction of the lead agency" must be assessed (40 CFR 1502.14(c)). This means that the FAA, as the lead agency for the Angoon Airport project, must consider alternatives that do not involve air transportation or facilities that they oversee. Alternatives can be put forward by parties other than the lead federal agency conducting an environmental impact statement (EIS), and such was the case for the proposed Angoon Airport. The public and other agencies suggested many alternative ways to improve access into and out of Angoon. For example, for this EIS, transportation options such as expanded ferry service or a new road connecting Angoon with Juneau were considered to determine if they would meet the project need and were ***practical or feasible***.

3. The effects of taking no action must be considered (40 CFR 1502.14(d)). In the case of the Angoon Airport, the "no action" alternative would mean that no land-based airport and access road would be built, and the need for improved aviation availability and reliability would not be met.

In practical terms, establishing a range of reasonable alternatives allows the FAA to rigorously explore and objectively compare the merits of various options, especially any adverse or beneficial environmental effects, any operational advantages or drawbacks, and the cost of each alternative. This analysis helps define the issues and ensure a range of reasonable alternatives that warrant detailed environmental review and full consideration, ultimately providing full disclosure of the process to the public and a clear basis for choice by the FAA decision-maker.

Terms to know

Major federal action: An action that potentially requires the use of federal lands or money or that requires a federal permit, and that would have effects that may be significant.

Practical or feasible: In a NEPA context, an alternative may be practical or feasible if it is "technically implementable" (in other words, possible to construct and operate) and economically viable (meaning its construction, operation, and maintenance costs are generally reasonable).

3.3. Which alternatives are analyzed in this EIS?

What is discussed in this section?

The FAA used a screening process to identify which alternatives to analyze in detail in this EIS. Those that passed the screening criteria were carried forward for detailed analysis. Alternatives that did not pass the screening criteria were dismissed from further consideration. The FAA's screening process is described in section 3.6.2, and alternatives that were considered but dismissed from detailed analysis are described in section 3.7 and *Alternatives Eliminated from Detailed Analysis* (SWCA 2014a, included as Appendix B).

The FAA identified five alternatives, including the DOT&PF's proposed action, that would meet the purpose and need and that are both practical and feasible. These are called the "action" alternatives. Any action alternative, if approved at all stages in the ANILCA Title XI and NEPA processes, would require additional approvals and funding from the FAA and other federal and state agencies to be constructed and operated. Along with the required no action alternative, the action alternatives represent the range of reasonable alternatives evaluated for environmental effects.

All the action alternatives share the components of the DOT&PF's proposed action (for the details of the proposed action, see section 2.2 in Chapter 2: Purpose and Need for a Land-Based Airport at Angoon). But each action alternative differs in certain respects based on its distance from the community of Angoon and the topography of its location, among other things. Section 3.3.2 below describes the details of each action alternative. A side-by-side comparison of the five action alternatives is provided in Table ALT1 below.

It is important to note that all design details and numbers presented for each action alternative are preliminary. Further refinements and a final design would be completed if an action alternative is approved at all stages in the ANILCA Title XI and NEPA processes.

3.3.1. No action alternative

Implementing regulations for NEPA require that a no action alternative be analyzed in the EIS (40 CFR 1502.14(d)). If the FAA selects the no action alternative, it would mean the proposed project would not take place. The no action alternative also serves to establish a benchmark of existing conditions against which the potential effects of the action alternatives can be compared.

Key aspects of the no action alternative are as follows:

- No land-based airport or access road would be built.
- Air transportation options would remain as they exist today, meaning
    - the Angoon Seaplane Base would continue to operate under ***visual flight rules (VFR)*** only and
    - no ***instrument flight rules (IFR)*** procedures would be developed.

Under the no action alternative, current transportation services as described in section 2.3.1 of Chapter 2 would continue.

Terms to know

Avigation easement: A right-of-way tool used in airport planning to grant certain rights to the holder of the easement. For this EIS, avigation easements outside of airport property would provide DOT&PF the right to access areas to clear them of obstructions and maintain that clearance.

Instrument flight rules (IFR): Flight procedures used when conditions for visual flight rules are not met (for example, the cloud cover and fog are at less than 1,000 feet or visibility is less than 3 miles).

Visual flight rules (VFR): Rules that govern flight procedures when visibility and weather conditions are clear enough for a pilot to navigate the airplane by sight instead of by using the instrument panel.

3.3.2. Action alternatives

The five action alternatives evaluated in this EIS are as follows:

- Airport 3a with Access 2 (the proposed action)
- Airport 3a with Access 3
- Airport 4 with Access 2
- Airport 4 with Access 3
- Airport 12a with Access 12a

As discussed above, all action alternatives have in common certain components of the proposed action (see section 2.2 in Chapter 2 for a description of these components). All would require the following construction activities:

- Vegetation removal related to the airport, road, and certain ***avigation easements*** (clearing of all vegetation for construction, line of sight, and open areas for flight approach and take-off).
- Tree felling in certain avigation easements (cutting down the trees but not other vegetation). For the effects analysis, where tree felling is identified in certain avigation easements, it is assumed that all trees within these easements would be felled (cut down).

- Terrain disturbance related to the airport, airport access road, and access roads to avigation easements (cutting and filling of soil or blasting of bedrock to level the ground)
- Terrain disturbance from potential extraction of construction materials such as gravel, soil, and rock from an on-island materials source
- Pavement related to the airport and road (creating ***impervious*** surfaces)
- Bridge construction (temporary staging areas for construction and permanent and temporary bridge piers placed in or alongside Favorite Creek). This could involve soil compaction and vegetation removal for the duration of the construction period. Cleared areas would be revegetated at the end of construction.
- ***Culverting***, re-routing, or filling of streams
- Movement of construction equipment and vehicles along roads
- Construction activity and equipment in work areas, including bridge construction equipment that may be taller than the surrounding trees
- Illumination of construction areas and of some equipment for low-light daytime and nighttime construction
- Barging of construction materials to the island and unloading of barged materials at the ferry terminal
- Construction of airport perimeter fence

Terms to know

Culverting: The creation of a drain or pipe that allows water to flow under a road, runway, or similar structure.

Impervious: The quality of not allowing water to pass through a surface. Instead, water collects and can create runoff.

All alternatives would also require the use of lands for construction staging, material stockpiling, fueling area and fuel storage, and equipment storage. In addition, as discussed in *Construction Methods and Issues* (DOWL HKM 2013, included as Appendix C), not all excavated earthwork materials would be usable, and some materials would need to be disposed of near the project area. This EIS assumes that the construction contractor would permit and use up to 15 acres of private land for disposal of unusable excavated materials, and up to 2 acres of private land for staging. Because it is the contractor's responsibility to obtain the use of these private lands, the exact location for these uses would be determined, and necessary permitting completed by the contractor, prior to construction. This EIS assumes that some staging will occur at the existing barge landing site and at the existing materials source site, which are already disturbed lands, and in areas cleared for construction of the airport or access road.

For further discussion on how the airports and access roads would be constructed, see section 3.4 below.

All action alternatives also have in common certain operations and maintenance activities:

- Arrival and departure of airplanes
- Maintenance of cleared areas, which could include cutting back vegetation along access roads as well as the airport perimeter, and tree felling in avigation easements for trees that could cause obstructions
- Periodic maintenance of road and airport pavement
- Vehicles traveling on airport access roads
- Increased presence and activity of humans, sometimes in previously remote areas
- Noxious weed treatments, as required
- Operation of radio-controlled lights during flight arrival and departure
- Airport generator refueling and aircraft refueling

(Note: Aviation fuel would not be provided by DOT&PF at the airport. Future development of lease lots could include fueling facilities, but those would be permitted at that time.)

The differences among the alternatives are the result of each alternative's location, the terrain of that location, and access requirements specific to each location. For example, the exact area where aircraft would park would vary depending on the location of the runway ends or the access road, both of which are influenced by the terrain. The location, terrain, and access requirements determine the following characteristics and construction or operation and maintenance requirements of each alternative:

- Configuration of airport components
- Total acreage required for airport property, access road right-of-way, and any easements that would be needed
- Acres of paved surface, terrain disturbance, vegetation removal, avigation easements, and temporary use areas required for construction

- Length and width of the access road
- Need for and length of a bridge over Favorite Creek
- Number of streams requiring culverting, rerouting, or filling
- Amount of fill material required for construction
- Number of barge and truck trips needed to haul materials
- Construction duration
- Aviation performance characteristics for the airport and runways (see section 3.5.2 for a discussion and comparison of these characteristics for each alternative)
- ***Flight paths*** for approach and departure

Terms to know

Flight path: The generalized ways that aircraft would approach and depart from an airport

3.3.2.1. Airport 3a with Access 2 (the DOT&PF's proposed action)

Airport 3a with Access 2 (Figure ALT1) is the DOT&PF's proposed action. This alternative would be located on lands owned or managed by the U.S. Forest Service; Kootznoowoo, Inc. (the local village Alaska Native corporation); and the City of Angoon. The airport would be located on the north side of Favorite Bay within the boundaries of the Admiralty Island National Monument and Kootznoowoo Wilderness Area (referred to in this EIS as the "Monument–Wilderness Area"). Access 2 would begin at the existing Bureau of Indian Affairs (BIA) Road, and travel around the southeastern end of Favorite Bay within 1,000 feet of the shoreline. This access road would be 20 feet wide and consist of two 9-foot lanes with 1-foot shoulders, with a right-of-way sized for future expansion to two 10-foot lanes and 5-foot shoulders. It would require the construction of a bridge across Favorite Creek (further discussion about bridge construction can be found in section 3.4.1). Figure ALT2 shows the characteristics for this alternative, and Figure ALT3 shows the flight paths for approach and departure. Because this alternative would be located in the Monument–Wilderness Area, it would require approval under ANILCA Title XI (see section 3.8.1 for more information on this status of this process). This alternative would require access to the avigation easements on the Angoon peninsula for vegetation removal.

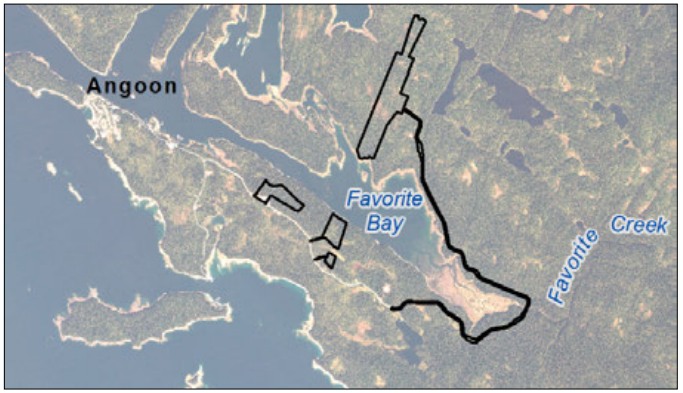


Figure ALT1. Location and general layout of Airport 3a with Access 2.

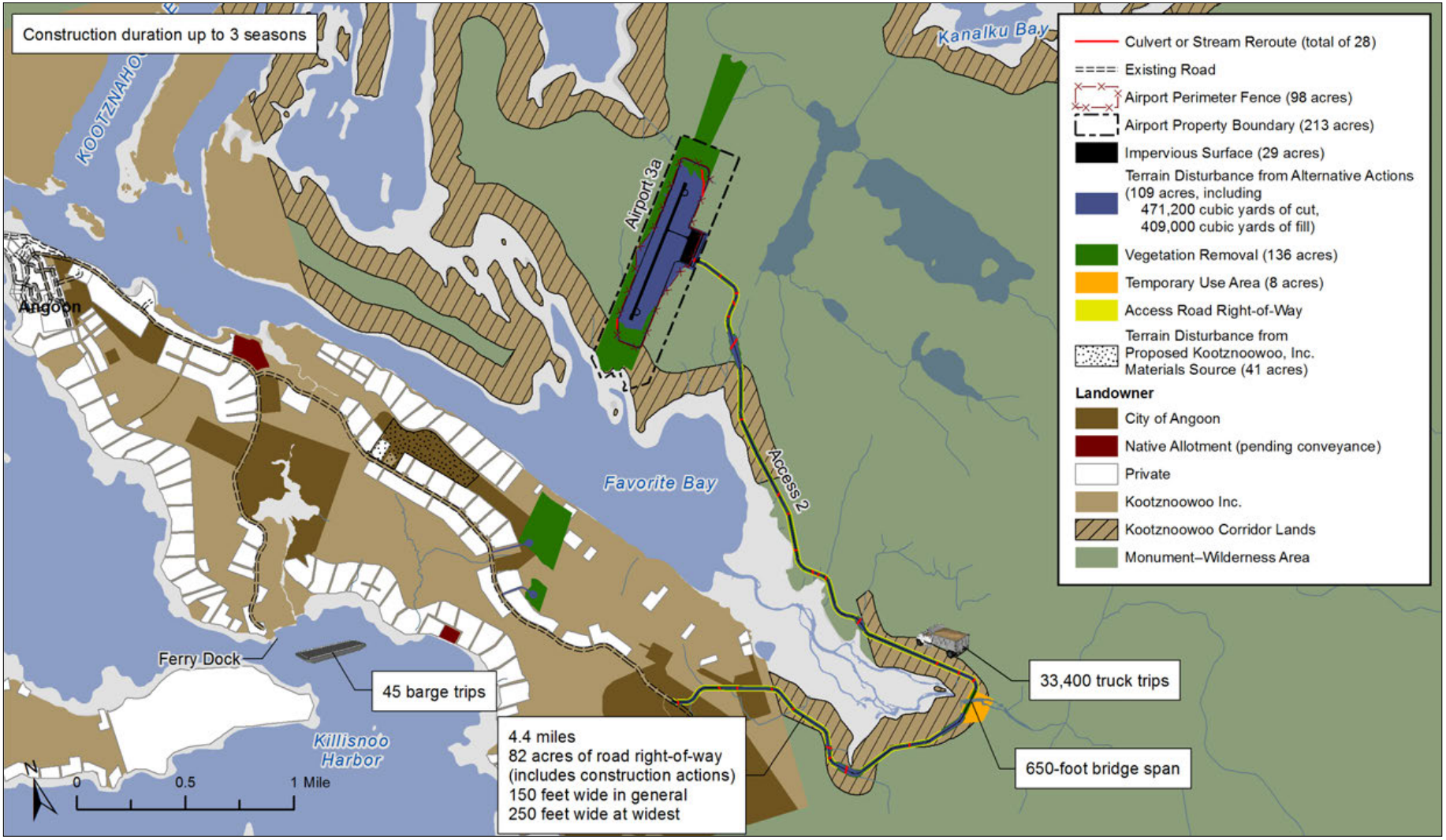


Figure ALT2. Characteristics of Airport 3a with Access 2, and requirements for its construction.

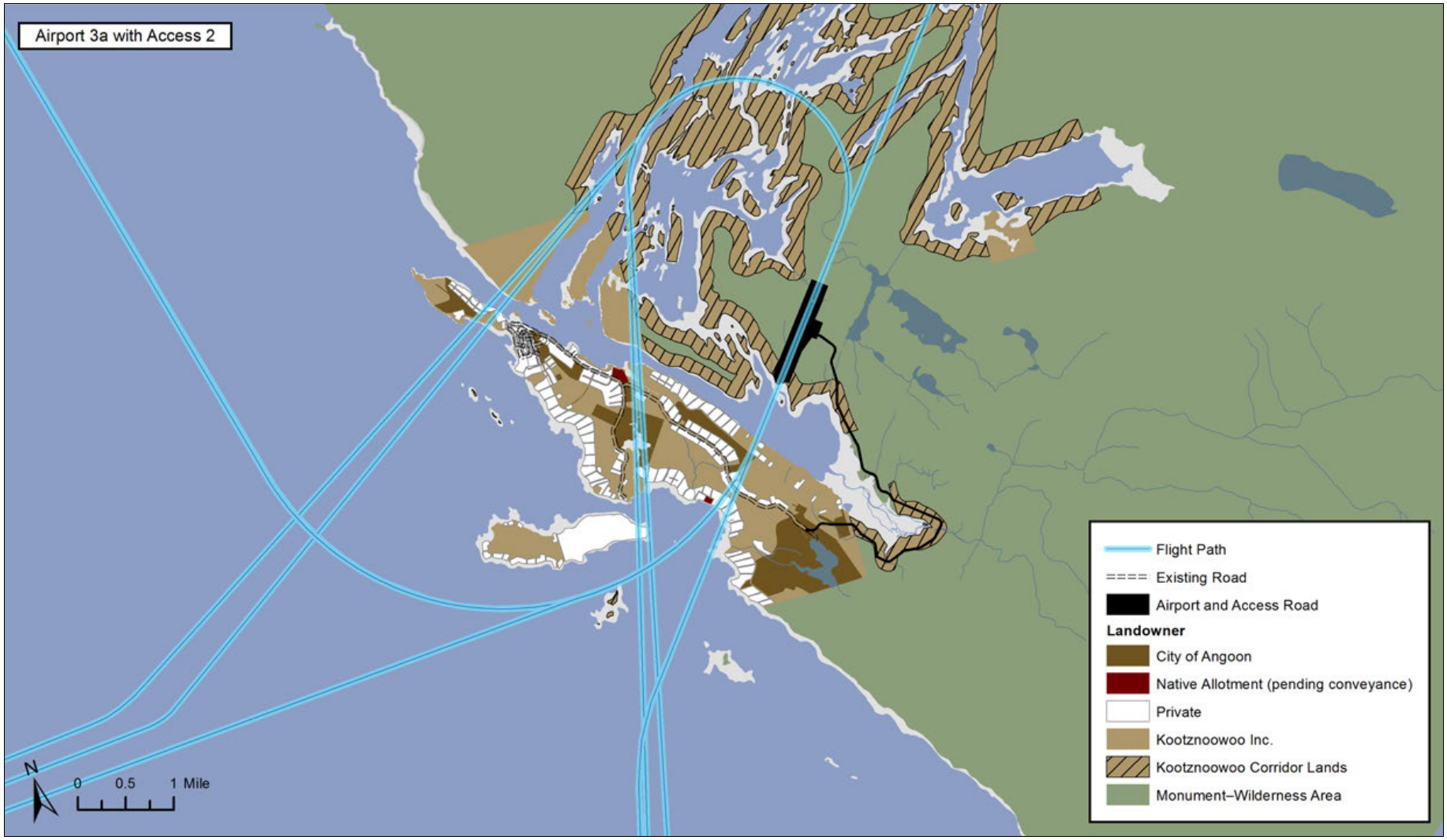


Figure ALT3. Flight path maps for Airport 3a with Access 2.

3.3.2.2. Airport 3a with Access 3

The route of the access road would be the only difference between this alternative (Figure ALT4) and Airport 3a with Access 2 (the DOT&PF's proposed action). The location and details for the airport would be the same as for Airport 3a with Access 2 described above. As with Access 2, Access 3 would begin at the existing BIA Road, but it would stay farther inland from the Favorite Bay shoreline. This access road would be 20 feet wide, and consist of two 9-foot lanes with 1-foot shoulders, with the right-of-way sized for future expansion to two 10-foot lanes and 5-foot shoulders. The bridge crossing at Favorite Creek would be located farther upstream than the bridge crossing for Access 2. Characteristics of this alternative are shown in Figure ALT5 below, and Figure ALT6 shows the flight paths for approach and departure. Because this alternative would be located in the Monument–Wilderness Area, it would require approval under ANILCA Title XI (see section 3.8.1 for more information about status of this process). This alternative would require access to the avigation easements on the Angoon peninsula for vegetation removal.

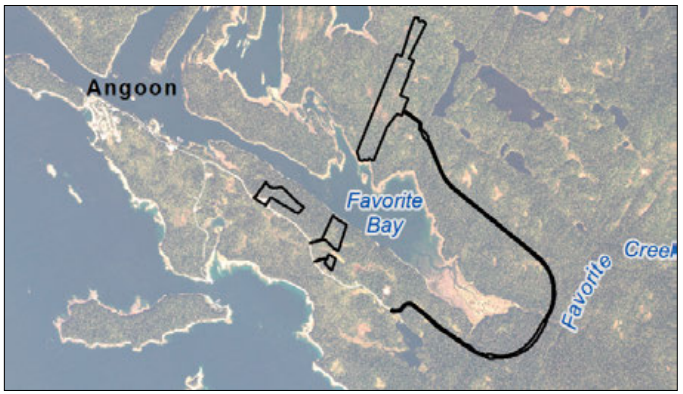


Figure ALT4. Location and general layout of Airport 3a with Access 3.

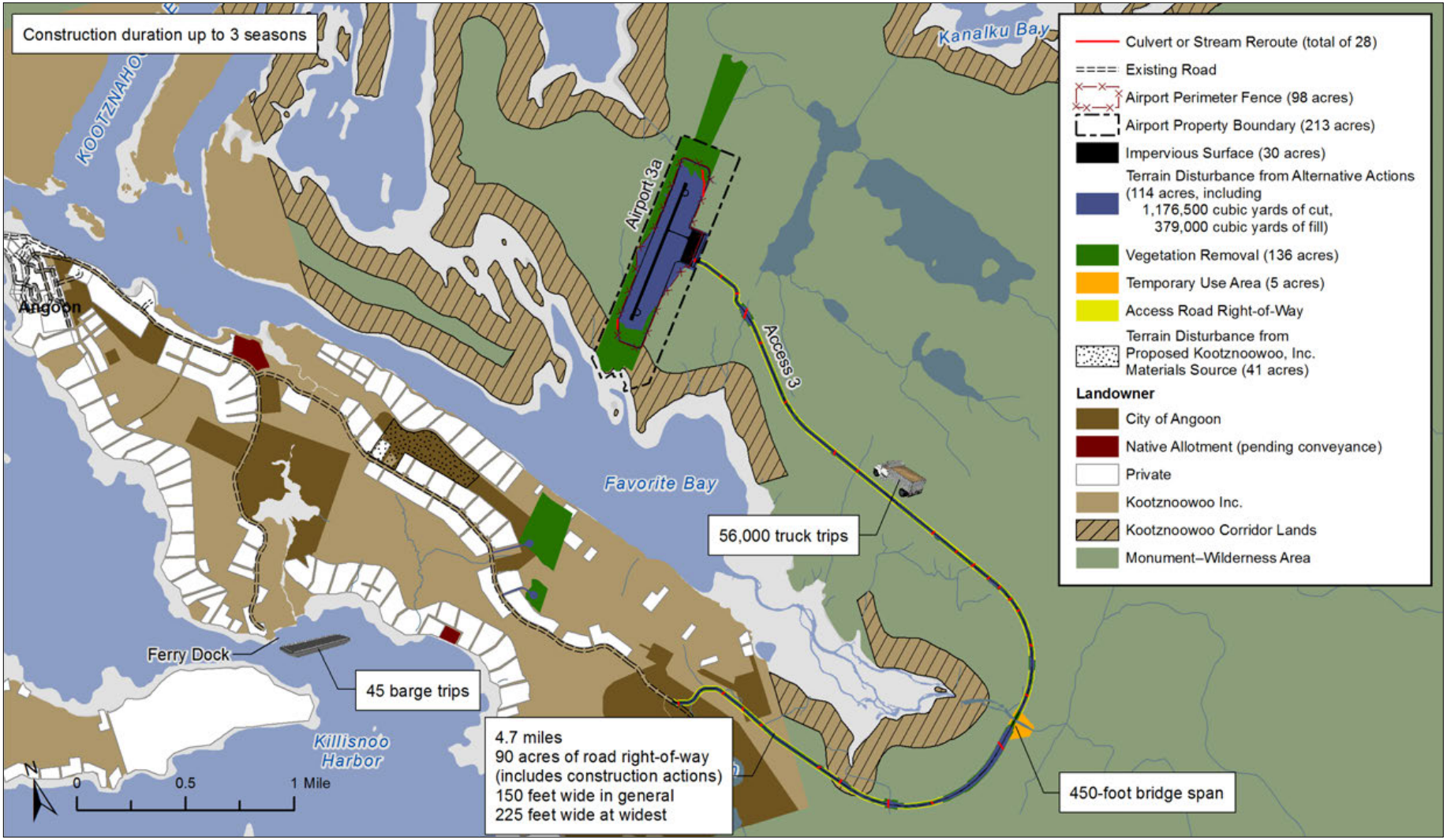


Figure ALT5. Characteristics of Airport 3a with Access 3, and requirements for its construction.

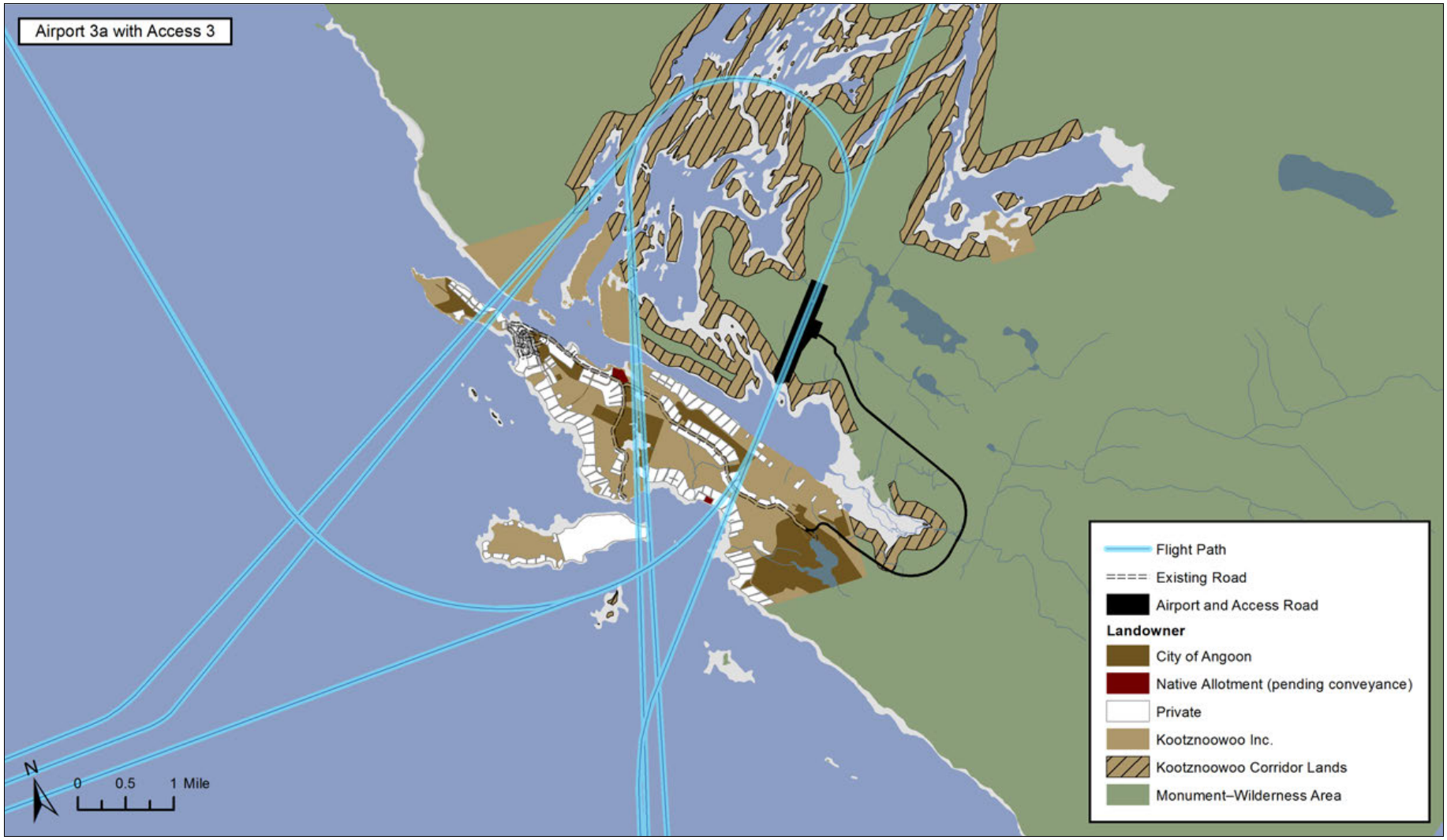


Figure ALT6. Flight path maps for Airport 3a with Access 3.

3.3.2.3. Airport 4 with Access 2

Airport 4 with Access 2 (Figure ALT7) would be located in the Monument–Wilderness Area on lands owned or managed by the U.S. Forest Service; Kootznoowoo, Inc.; and the City of Angoon. The airport would be located on the east side of Favorite Bay. Access 2 would begin at the existing BIA Road and travel around the eastern end of Favorite Bay within 1,000 feet of the shoreline. This access road would also be 20 feet wide, and consist of two 9-foot lanes with 1-foot shoulders, with the right-of-way sized for future expansion to two 10-foot lanes and 5-foot shoulders. A bridge crossing at Favorite Creek—the same bridge location as for Airport 3a with Access 2—would be required. Figure ALT8 below shows the characteristics of this alternative, and Figure ALT9 shows the flight paths for approach and departure. Because this alternative would be located in the Monument–Wilderness Area, it would require approval under ANILCA Title XI (see section 3.8.1 for more information on the status of this process).

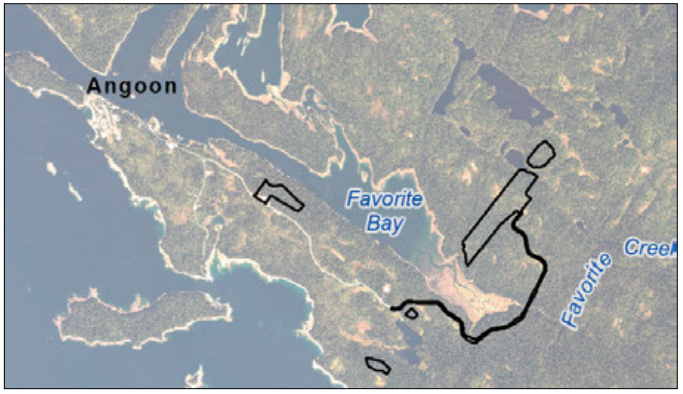


Figure ALT7. Location and general layout of Airport 4 with Access 2.

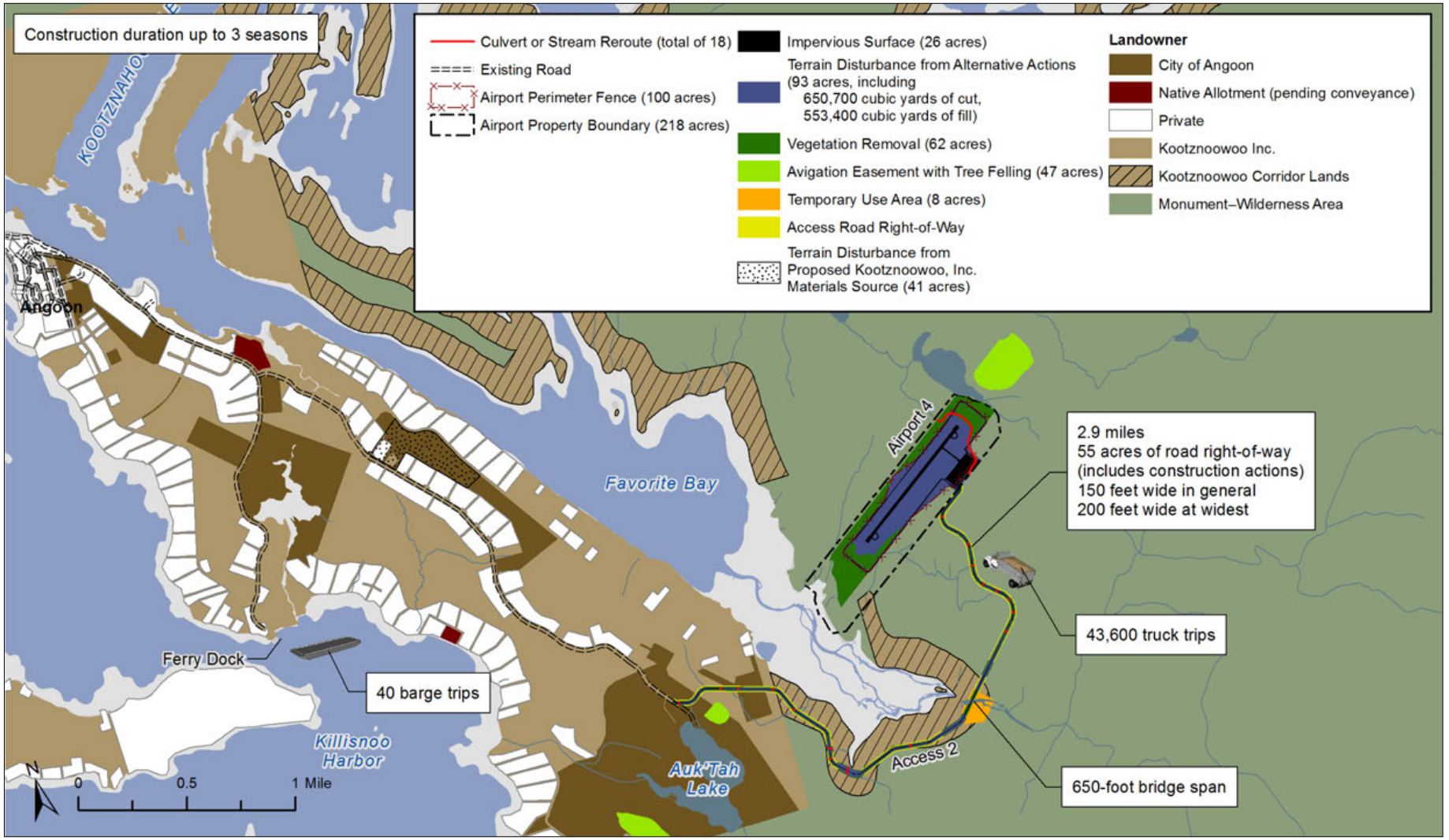


Figure ALT8. Characteristics of Airport 4 with Access 2, and requirements for its construction.

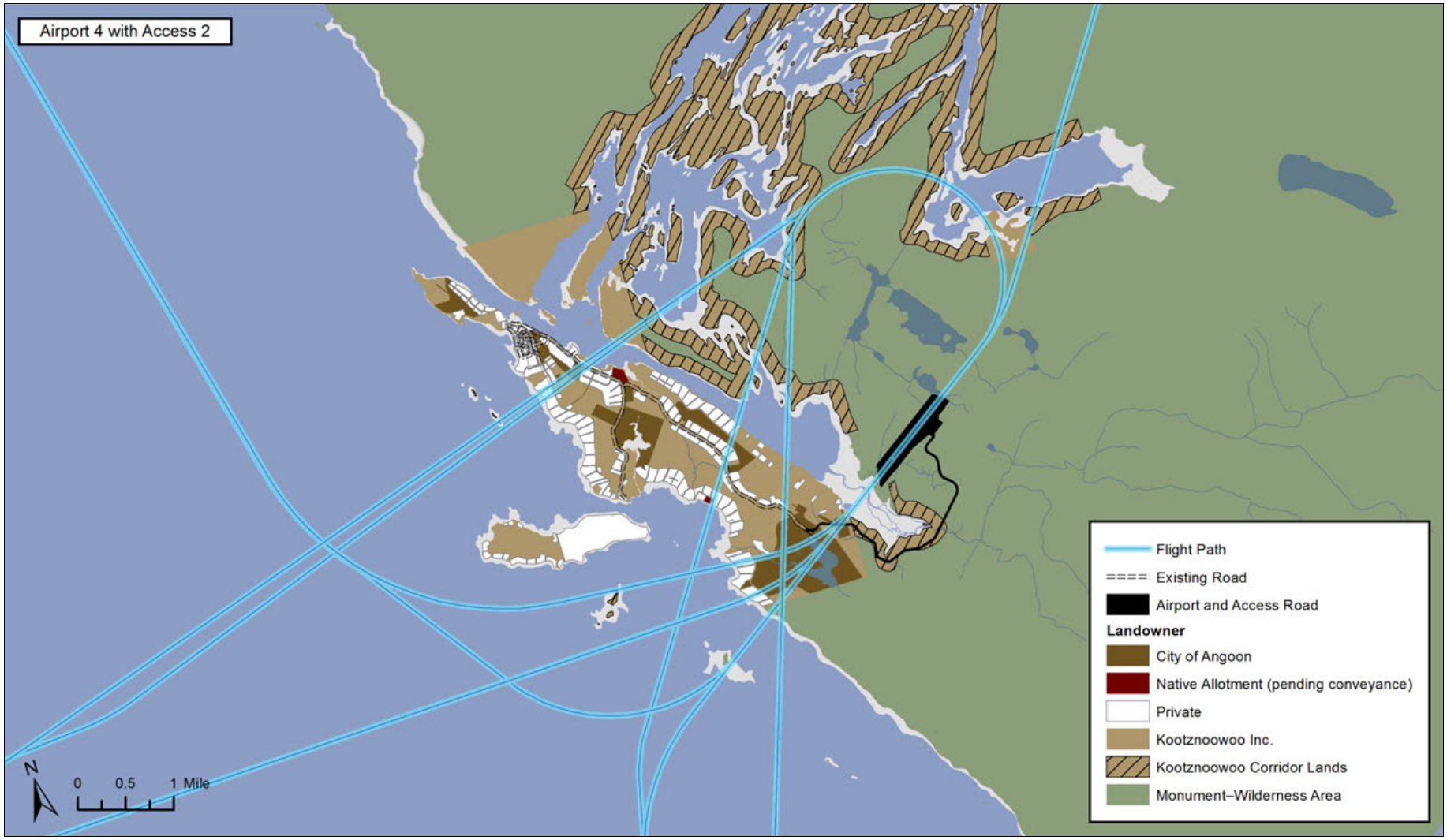


Figure ALT9. Flight path maps for Airport 4 with Access 2.

3.3.2.4. Airport 4 with Access 3

The route of the access road would be the only difference between this alternative (Figure ALT10) and Airport 4 with Access 2. The location and details for the airport would be the same. As with Access 2, Access 3 would also begin at the existing BIA Road, but it would stay farther inland from the Favorite Bay shoreline. This access road would also be 20 feet wide, and consist of two 9-foot lanes with 1-foot shoulders, with the right-of-way sized for future expansion to two 10-foot lanes and 5-foot shoulders. The bridge crossing at Favorite Creek would be located farther upstream than the bridge crossing for Access 2, and the road would then go northwest to the proposed Airport 4 location. Characteristics of this alternative are shown in Figure ALT11 below, and Figure ALT12 shows the flight paths for approach and departure. Because this alternative would be located within the Monument–Wilderness Area, it would require approval under ANILCA Title XI (see section 3.8.1 for further information about this status of this process).

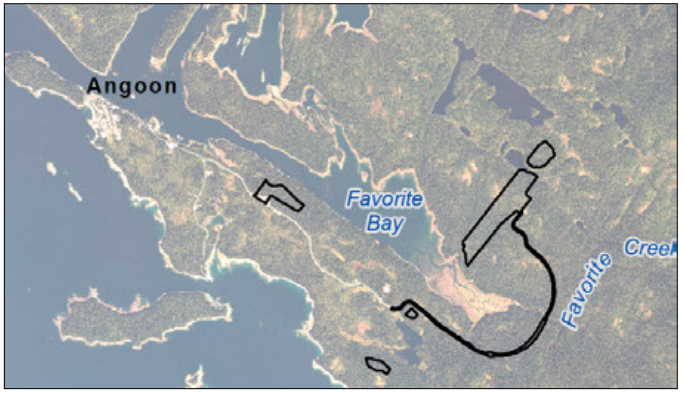


Figure ALT10. Location and general layout of Airport 4 with Access 3.

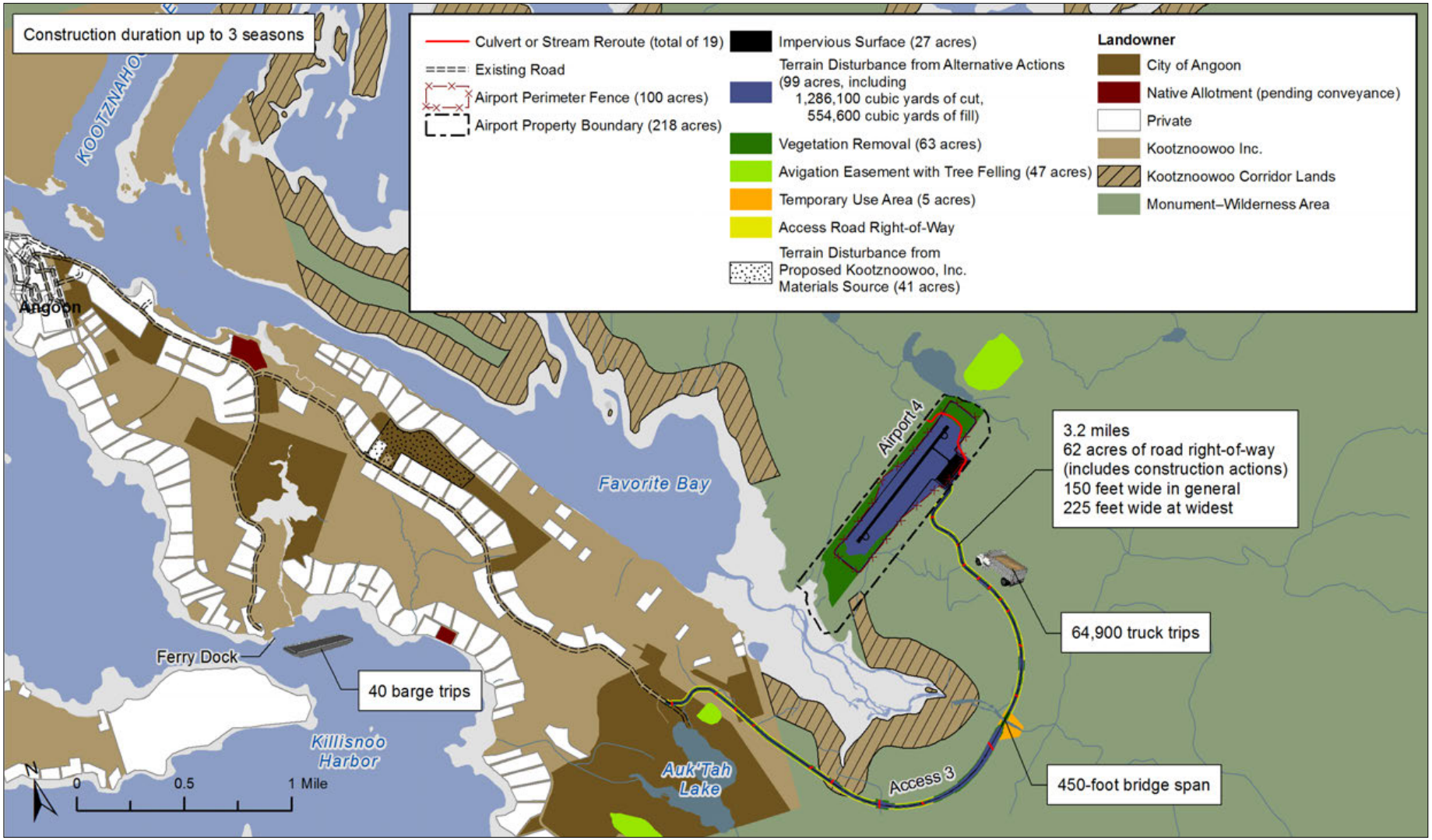


Figure ALT11. Characteristics of Airport 4 with Access 3, and requirements for its construction.

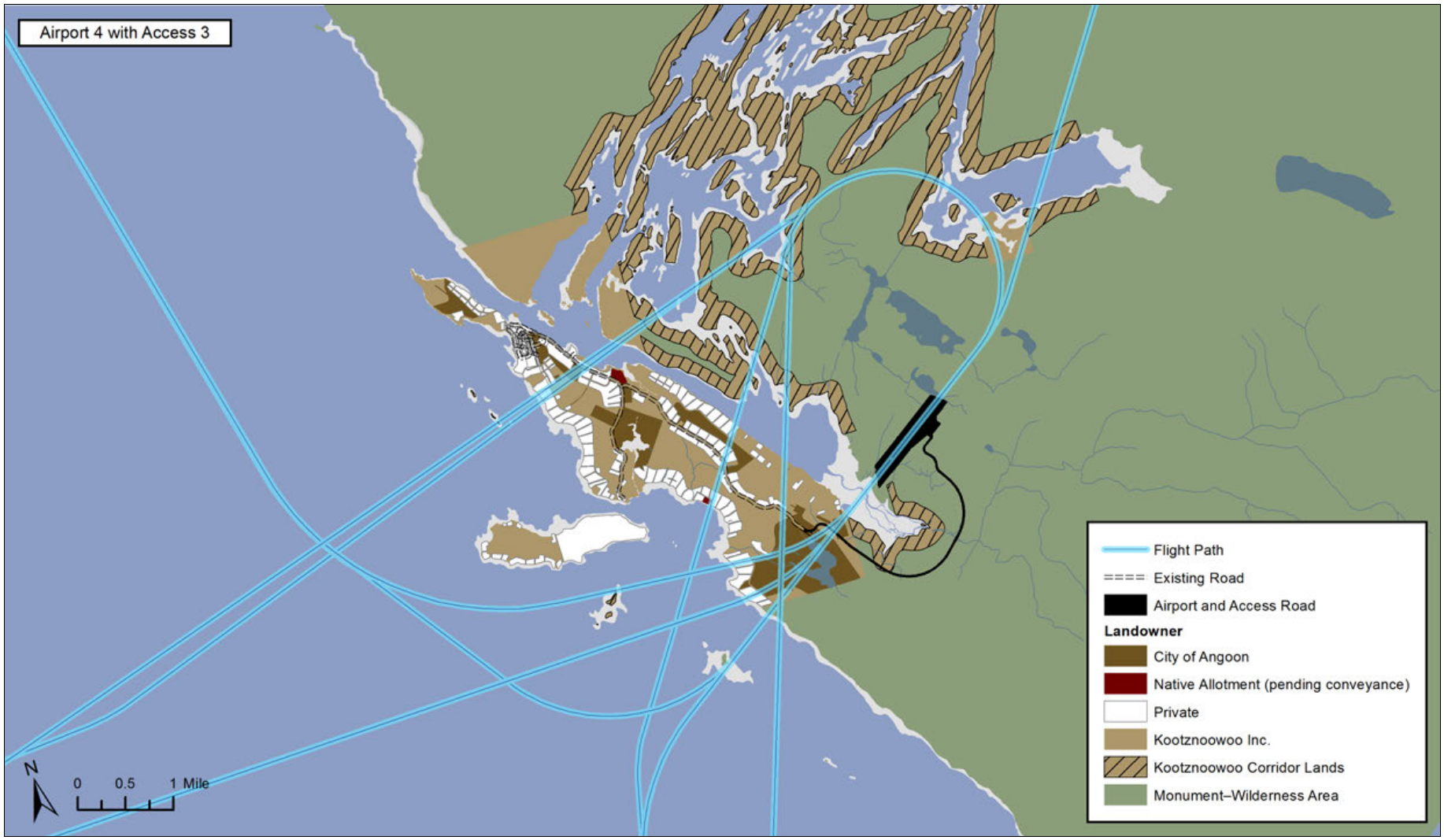


Figure ALT12. Flight path maps for Airport 4 with Access 3.

3.3.2.5. Airport 12a with Access 12a

Airport 12a with Access 12a (Figure ALT13) would be located on lands owned or managed by private landowners; Kootznoowoo, Inc.; and the City of Angoon. Both the airport and access road would be on the Angoon peninsula southeast of the community of Angoon; no part of this alternative would be located on Monument–Wilderness Area lands. Access 12a would begin at the existing BIA Road and travel directly to the proposed airport location. Access 12a would begin at the existing BIA Road and travel directly to the proposed airport location. Unlike the access roads to Airport 3a or Airport 4, this road would be built to two 10-foot lanes with 5-foot shoulders and would require no bridge. Figure ALT14 below provides the details on this alternative, and Figure ALT15 shows the flight paths for approach and departure.

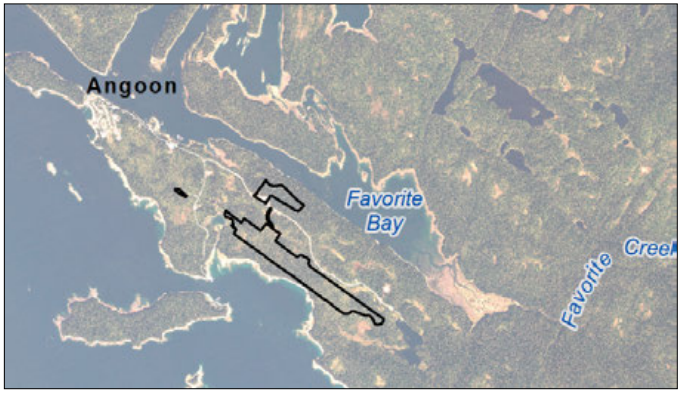


Figure ALT13. Location and general layout of Airport 12a with Access 12a.

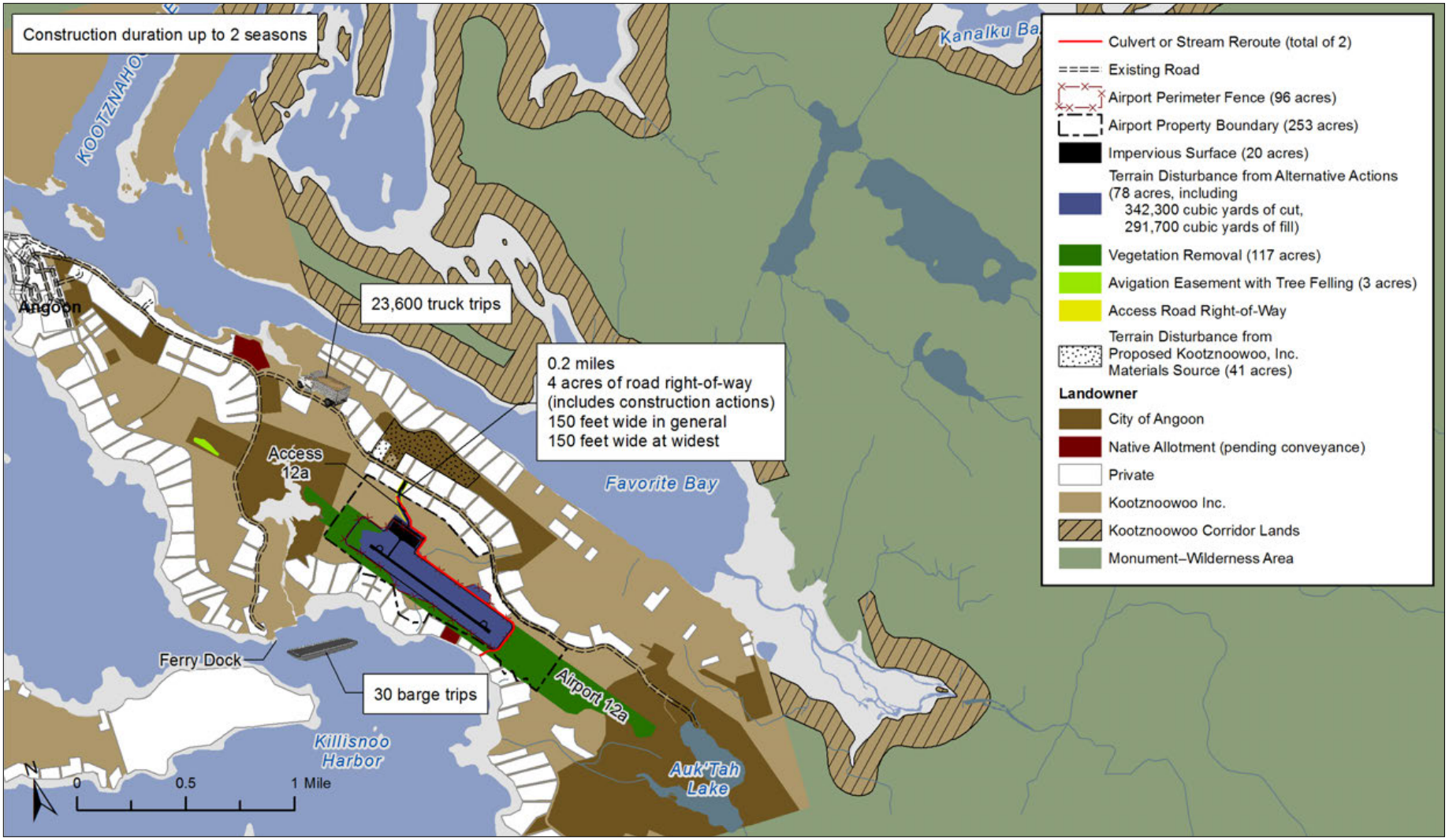


Figure ALT14. Characteristics of Airport 12a with Access 12a, and requirements for its construction.

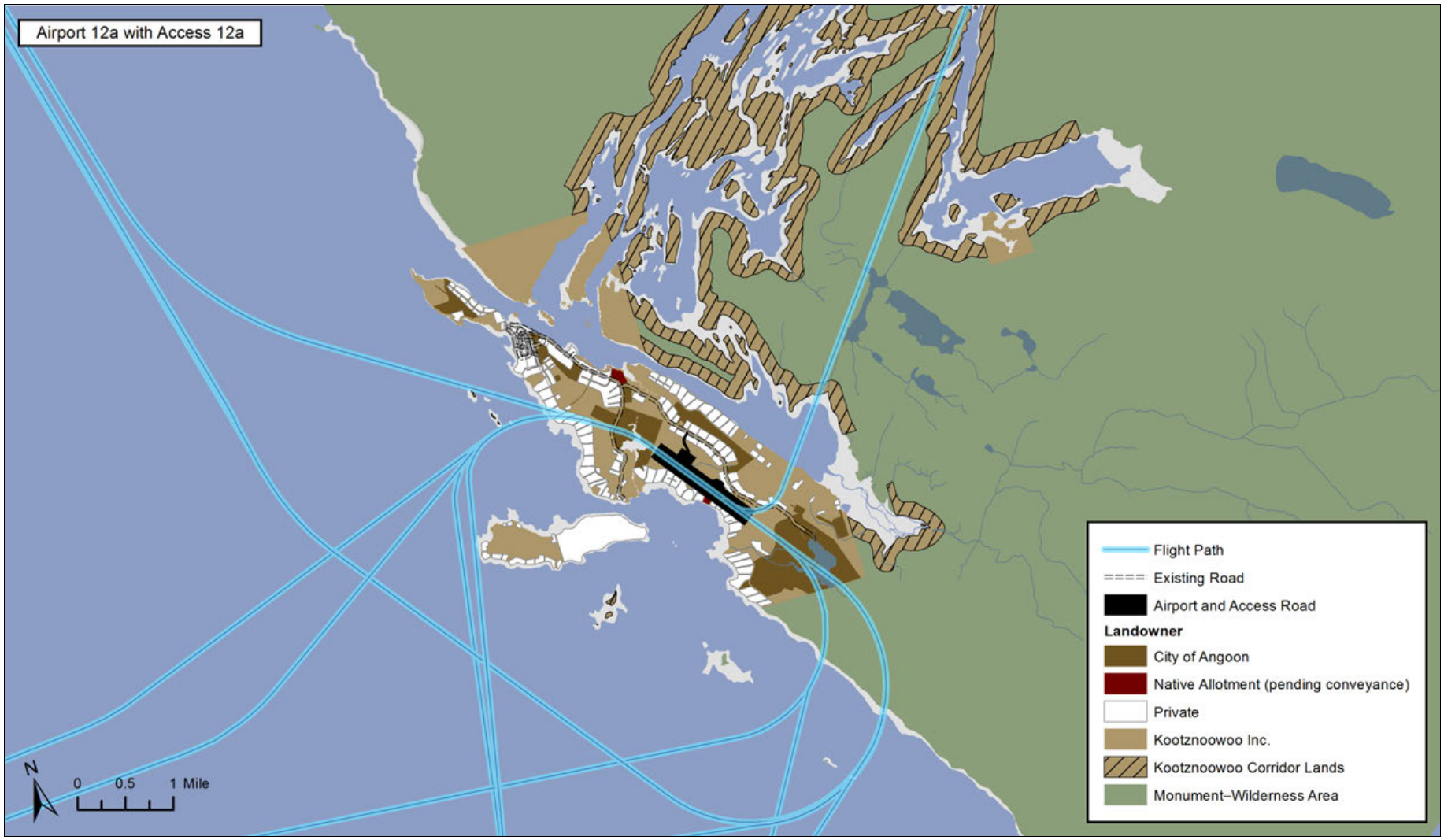


Figure ALT15. Flight path maps for Airport 12a with Access 12a.

3.4. How would the airport and access road be constructed?

What is discussed in this section?

Terms to know

Mitigate: To reduce or offset an effect on the environment. As defined by the Council on Environmental Quality (40 CFR 1508.20), measures one can take to mitigate an effect include the following:

(a) Avoiding the effect altogether by not taking a certain action or parts of an action.

(b) Minimizing effects by limiting the degree or magnitude of the action and its implementation.

(c) Correcting the effect by repairing, rehabilitating, or restoring the affected environment.

(d) Reducing or eliminating the effect over time through preservation and maintenance operations.

(e) Compensating for the effect by replacing or providing substitute resources or environments.

As described in section 3.3.2, the differences between the alternatives are the result of each alternative's location, the location's terrain characteristics, and the access requirements specific to each location. However, the design components of the airport and access road do not change per alternative, and the following summary of construction methods and materials applies to all five action alternatives. More details are in Appendix C.

These construction details inform the environmental analysis, allow more accurate cost estimates, and can create opportunities to reduce or ***mitigate*** adverse environmental effects. If the project were approved, many more design details would be developed as part of permit applications and during construction planning.

As discussed in section 3.3.2, all action alternatives would require construction activities such as vegetation removal; terrain disturbance; paving; tree felling in certain avigation easements; rerouting, culverting, or filling of streams; bridge construction; and potential extraction of construction materials such as gravel, soil, and rock from an on-island materials source. See Figure ALT16 for example depictions of some of these activities. For the effects analysis, where tree felling is identified in certain avigation easements (as detailed in Figures ALT2, ALT5, ALT8, ALT11, and ALT14), it is assumed that all trees within these easements would be felled (cut down). However, once further planning is completed, only those trees that cause an obstruction would be felled. It is not possible at this time to identify which trees would cause an obstruction and require felling.

The access road would be constructed first to provide access for construction at the airport. For Access 2 and Access 3, the roadway would be 20 feet wide, consisting of two 9-foot lanes with 1-foot shoulders. For Access 12a, the roadway would be 30 feet wide, consisting of two 10-foot lanes with 5-foot shoulders. Regardless of access alternative, the road would be cleared and built as a haul road for use during construction. Paving of the road would occur as the final phase of construction. Final paving would need to be completed during the summer season.

An Erosion and Sediment Control Plan would be developed during final airport and road design and construction planning. That plan would identify ***best management practices*** that the contractor would be required to implement to ensure the project area and surrounding natural resources are protected from erosion during construction. The contractor would also be required to use an approved Storm Water Pollution Prevention Plan during construction to control runoff and prevent degradation of adjacent natural resources, including wetlands and waterways.

Terms to know

Best management practices: Processes, procedures, or systems that have been determined to be effective and practicable in preventing or reducing environmental effects from a project.

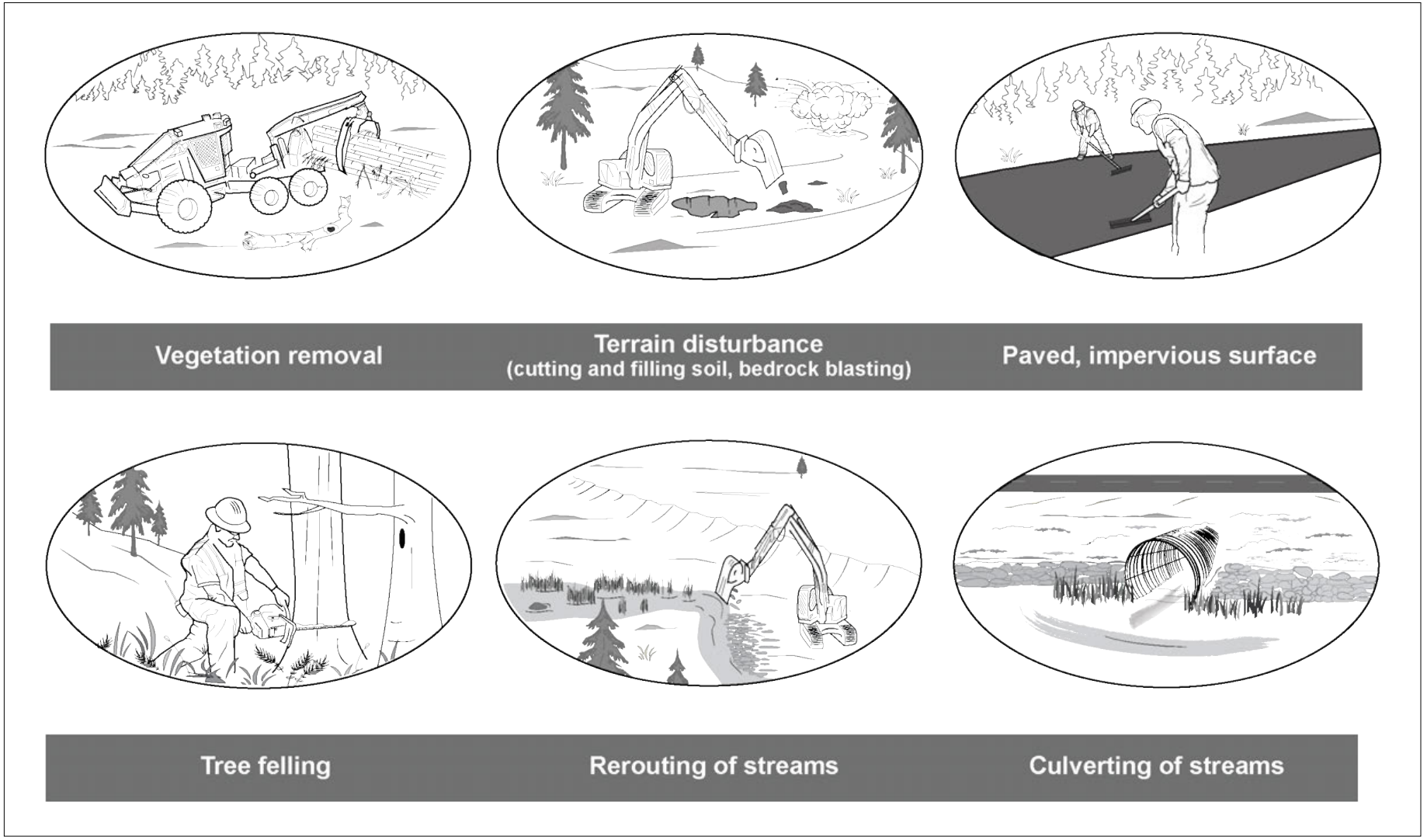


Figure ALT16. Depictions of construction activities.

3.4.1. Bridge construction

Terms to know

Pier: Upright support for a structure.

The location of either Airport 3a or Airport 4 would require a permanent bridge over Favorite Creek as part of its access road. Construction of the bridge would require a temporary use area outside the permanent access right-of-way (shown in the alternatives characteristics maps above**)**. Actions that are likely to occur within this temporary use area include the following:

- Vegetation removal
- Construction of a temporary access road
- Installation of a temporary bridge
- Terrain disturbance (for access road, permanent bridge support ***piers***, and temporary bridge support piers)
- Installation of a permanent bridge

The temporary access road and temporary bridge would be used to move equipment back and forth, facilitate construction of the permanent bridge over the creek, and as a haul route. The structure would be designed by the selected contractor during the final design phase to support their specific technique for building the permanent bridge. In general, though, the width of a temporary bridge is designed to match the width of the permanent bridge, in this case 30 feet. Construction materials would likely be steel, concrete, and wood. The number of supports would be dictated by the type of temporary bridge the contractor would use, but regardless of bridge type, the temporary bridge would likely require multiple supports in the stream channel and above the ordinary high water mark. The temporary bridge would likely be constructed in the first season, and its removal would be one of the last construction steps prior to completion of the project.

The permanent bridge would be 30 feet wide for either access. The length of the Access 2 bridge would be 650 feet, and the length of the Access 3 bridge would be 450 feet. Figure ALT17 shows an example of a similar bridge. Figure ALT18 shows scaled drawings of the measurements and some characteristics of each bridge. The bridge construction terms in the next two paragraphs are also shown in Figure ALT17.

The bridge would be constructed of precast concrete bulb tee girders with 140 foot spans. It would rest on steel H piles or steel pipe piles with concrete piers and batter piles. As currently designed, the Access 2 bridge would have two piers in the stream channel and below ordinary high water mark, but all other piers would be well outside the ordinary high water mark. The Access 3 bridge would not require piers in the stream channel or below the ordinary high water mark.

A large crane with a pile-driving hammer would be used for pile foundations. The crane would be located adjacent to the foundations and would not be in the creek during construction. Once pile foundations were in place, concrete piers and abutments could be constructed and girders would be set. Once girders were in place, bridge decking would be installed.

Figure ALT17. Example of similar bridge (KiwiRail Whau Creek Bridge, Auckland, New Zealand) under construction (photograph courtesy of HEB Construction Limited).

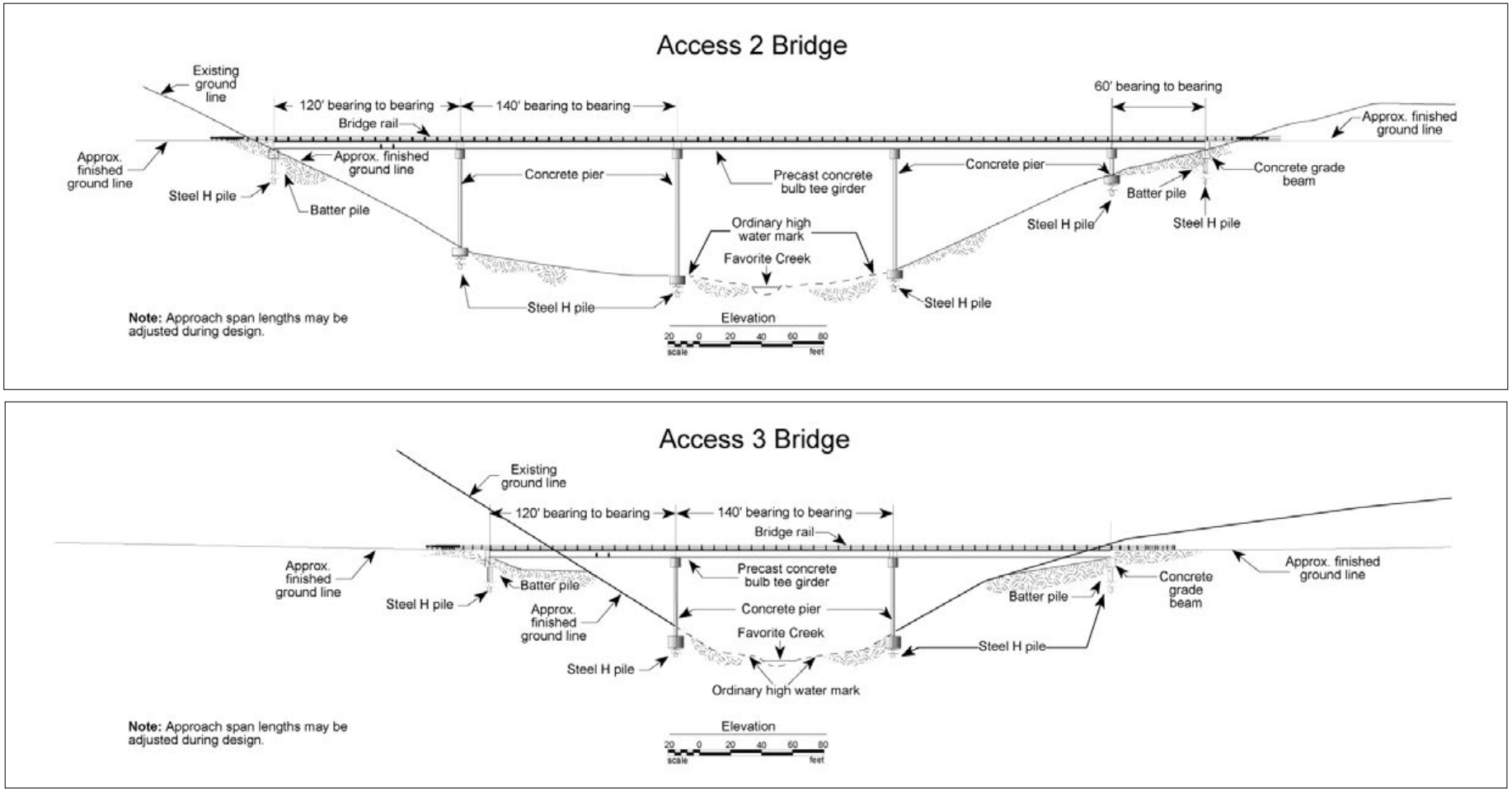


Figure ALT18. Representative cross section of the Access 2 and Access 3 bridges over Favorite Creek.

3.4.2. Construction materials and sources

Many construction materials would be needed for completion of a new airport and access road, including earth and rock used as fill, asphalt, fencing, and paint. This section discusses the materials required in the greatest volume, and the likely sources of those materials, whether local or from off the island.

Construction of the airport and access road requires changing the shape of the land through "cut and fill" to provide flat, stable surfaces. The steps in that process (from bottom to top) and the materials required for each step are listed below.

- Build up the ***embankment*** layer. This requires fill, which is usually ***borrow.***
- Lay a ***subbase*** layer to create a flat and stable support for the next layers of material. This requires material of hard durable particles or fragments of aggregates mixed with fine sand, stone dust, or similar building material.
- Lay a relatively thin ***base*** layer. This would likely be composed of ***crushed aggregate***.
- Finish the surface layer with asphalt. This would require ***paving aggregate*** and asphalt. An asphalt ***batch plant*** would be brought to a staging area on or near the access road and airport site to manufacture asphalt for the site.

These construction materials may come from a variety of sources, including locales where grading and cutting were conducted for construction, an existing materials source site near Angoon or from sources other than Admiralty Island.

The following factors must be taken into account when determining the amount of material needed and the possible sources of that material:

- The costs of acquiring and transporting the material
- Whether the material is available locally, is of suitable quality, and is available in sufficient quantities
- The environmental effects associated with acquiring the material locally or bringing it in from elsewhere

Terms to know

Base: The foundation for the paved surface layer.

Batch plant: A machine used to mix and produce asphalt.

Borrow: Material (usually rock, gravel, or soil) that was taken from one area and used in another place.

Crushed aggregate: A material composed of coarse gravel created from crushing larger rocks. It is frequently used in the base course of fill material for roads or other prepared surfaces such as runways. Different sizes of gravels are used for different purposes.

Embankment: A raised structure of earth, usually designed to prevent water from flowing over it.

Paving aggregate: A material used for the surface layer of pavement. Like crushed aggregate, it must be of clean, sound, durable particles or crushed stone or gravel. It must be free of organics, silt, or clay coatings, and it must meet specifications for wear and durability.

Subbase: A foundation for the base course in road construction.

3.4.2.1. Material quantities and costs

In calculating cost estimates and construction material quantities for the airport and access alternatives, the FAA determined that site excavation and grading at Airport 3a or Airport 4 would produce all of the embankment fill material needed at those airport locations. In fact, because the topography at these locations has many hills and slopes, excess fill material would probably be generated. On the other hand, available fill material is not sufficient to build the access road options for these two airport alternatives. In these cases, the access road would be constructed to the airport location with available fill and then completed to final design standards using the excess material generated during airport excavation. Neither Airport 12a nor its access road would generate sufficient amounts of fill to meet the fill needs of this alternative; fill for Airport 12a would need to be supplemented from other materials sources.

How much is a cubic yard?

Construction materials such as embankment fill or soil or crushed aggregate are typically discussed in terms of cubic yards. A cubic yard is a measure of volume that describes a three-dimensional cube measuring 3 feet tall by 3 feet wide and 3 feet deep. In layman's terms, this is equivalent to the size of a typical clothes washing machine or dryer.

Approximately 94,000 cubic yards of material for subbase course and 19,000 cubic yards for base course would be needed under the different action alternatives. Although some of this material could be generated during cutting, grading, and leveling for airport and road construction, the rest would have to come from other sources. This EIS estimates that up to 19,400 cubic yards would be needed.

3.4.2.2. Identification of materials sources

The FAA does not control which materials source must be used, nor can the DOT&PF stipulate in advance of a construction contract the source that must be used. Still, while the origin of construction materials cannot be determined until the necessary approvals are given and permits issued, it is reasonable to assume that they could consist of a combination of the on-island source and off-island existing DOT&PF and commercial sources.

3.4.2.2.1. Off-island source

Because the quantity of on-island materials is unknown, the amount of materials to be sourced from the island is also unknown. It is possible that all materials would need to be barged in. Therefore, this EIS assumes the maximum material volume that would have to be barged in. Known sources for construction materials have already been developed in other locations in Southeast Alaska and British Columbia, Canada. The contractor would be responsible for shipping all required fill and paving material to Angoon.

Materials from these non-local sources would be barged to Angoon for construction, and would likely enter Angoon at the existing DOT&PF ferry terminal (see Figures ALT2 through ALT14 in section 3.3.2 for the number of barge trips required by alternative). Any new source of construction material for the airport project or expansion of a commercial source beyond its permitted limits would be subject to environmental permitting under applicable state and federal laws and regulations.

3.4.2.2.2. On-island source

Using locally sourced construction materials generally would be less expensive than using non-local sources because shipping would not be required, transportation distances would be shorter, and handling would be reduced. For this reason, the FAA initially evaluated four potential materials sources around Angoon. Because of restrictions on extracting such materials from lands in the Monument–Wilderness Area, the FAA considered only potential sources located outside the Monument–Wilderness Area boundary.

A Material Site Evaluation (included in Appendix C) was conducted in the summer of 2009. In addition to evaluating an existing material site location and an existing gravel extraction site in Angoon, the FAA evaluated two currently undeveloped potential sources (see Appendix C for a full discussion on these sites). Since this evaluation was completed, Kootznoowoo, Inc. provided information to the FAA detailing their plans to expand the existing on-island materials site (Kootznoowoo, Inc. 2013a). It is reasonable to assume that a construction contractor would use an existing materials site rather than develop a new source. Therefore, this EIS assumes that if on-island materials are determined to be adequate for construction of the airport, the construction contractor would likely use Kootznoowoo, Inc.'s proposed material source site (see Figures ALT2 through ALT14 in section 3.3.2 for a location of this site).

Full testing of the on-island sources would need to be completed to determine that the materials are adequate. However, the DOT&PF conducted materials testing on the Angoon peninsula for the Kootznahoo Road improvement project (DOT&PF 1996). This testing found material of adequate quality for constructing road surfacing for that project, and it is therefore reasonable to assume that possible materials sources on the Angoon peninsula could be suitable for use for the Angoon Airport project. If, following further testing to evaluate suitability, the Kootznoowoo, Inc., materials source or possibly others on the Angoon peninsula are chosen by the construction contractor for further development, the site would have to go through the appropriate permitting processes at that time.

3.5. How do the alternatives compare?

The alternatives can be compared in several ways, and each type of comparison is important to a final decision about a land-based airport at Angoon. In the following sections, the alternatives are compared as follows:

- Characteristics and construction requirements such as land ownership, acres required or affected, and length of access road
- Aviation performance, including how crosswinds affect each alternative's usability for aircraft
- Cost
- Environmental effects

What is discussed in this section?

3.5.1. Comparison of characteristics and construction requirements

As described in section 3.3.2 above, all the action alternatives share core components such as length of runway and design features of the access road. But because each alternative occupies a different location, the terrain and access route for that location means that each alternative has certain characteristics and construction requirements. These characteristics and requirements as shown on Figures ALT2, ALT5, ALT8, ALT11, and ALT14 above are summarized and compared in Table ALT1. The location and general layout of each alternative is shown in Figure ALT19.

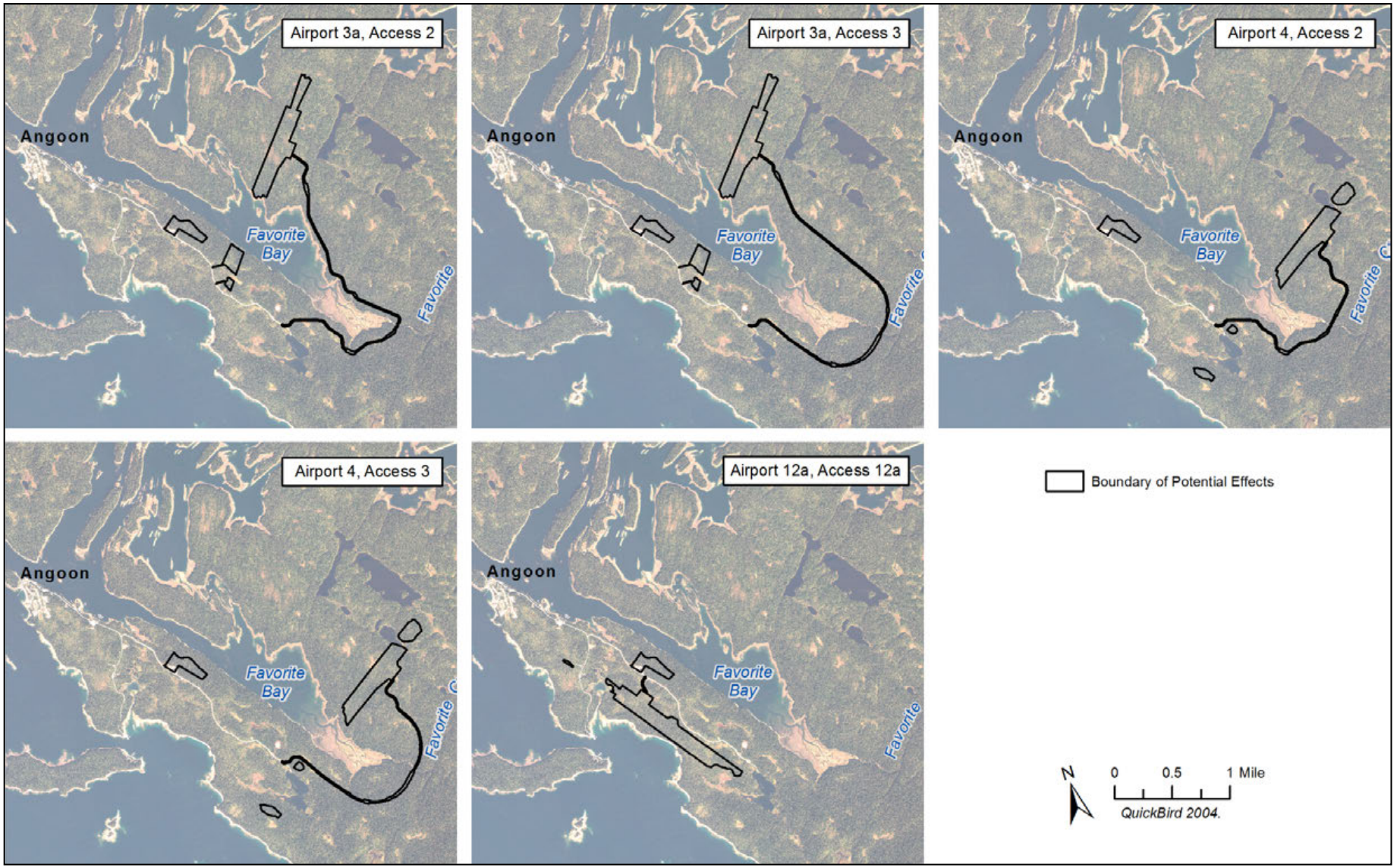


Figure ALT19. Location and general layout of each action alternative.

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Table ALT1. Comparison of characteristics and construction requirements

	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Landownership	• Federal public lands (Monument–Wilderness Area) • Kootznoowoo, Inc. • City of Angoon	• Federal public lands (Monument–Wilderness Area) • Kootznoowoo, Inc. • City of Angoon	• Federal public lands (Monument–Wilderness Area) • Kootznoowoo, Inc. • City of Angoon	• Federal public lands (Monument–Wilderness Area) • Kootznoowoo, Inc. • City of Angoon	• Private • Kootznoowoo, Inc. • City of Angoon
Airport property	213 acres	213 acres	218 acres	218 acres	253 acres
Airport perimeter fence (acres inside fence)	98 acres	98 acres	100 acres	100 acres	96 acres
Impervious surface	29 acres	30 acres	26 acres	27 acres	20 acres
Terrain disturbance from Alternative Actions	109 acres	114 acres	93 acres	99 acres	78 acres
Terrain disturbance from Kootznoowoo, Inc. proposed material source	41 acres	41 acres	41 acres	41 acres	41 acres
Cut needed for construction	471,200 cubic yards	1,176,500 cubic yards	650,700 cubic yards	1,286,100 cubic yards	342,300 cubic yards
Fill needed for construction	409,000 cubic yards	379,000 cubic yards	553,400 cubic yards	554,600 cubic yards	291,700 cubic yards
Vegetation removal	136 acres	136 acres	62 acres	63 acres	117 acres
Avigation easement with tree felling	0 acres	0 acres	47 acres	47 acres	3 acres
Temporary use area	8 acres	5 acres	8 acres	5 acres	None required
Access road right-of-way	82 acres	90 acres	55 acres	62 acres	4 acres
Width of access road right-of-way	150–250 feet wide	150–225 feet wide	150–200 feet wide	150–225 feet wide	150 feet wide
Length of access road	4.4 miles	4.7 miles	2.9 miles	3.2 miles	0.2 miles
Bridge span at Favorite Creek	650 feet	450 feet	650 feet	450 feet	No bridge required
Number of culverts and stream reroutes	28	30	18	19	3
Truck trips	33,400	56,000	43,600	64,900	23,600
Barge trips	45	45	40	40	30
Construction duration	Up to three seasons	Up to three seasons	Up to three seasons	Up to three seasons	Up to two seasons

*Numbers presented for each action alternative are preliminary. Further refinements and a final design would follow if an action alternative is approved at all stages in the ANILCA Title XI and NEPA processes.

3.5.2. Comparison of aviation performance criteria

To be considered practical and feasible, the airport alternatives selected for detailed evaluation in the EIS had to satisfy performance screening criteria for aviation performance in the following three categories:

1. Airport constructability and future development capability. (In other words, it is possible for the airport to be built at the location and there would be room for expansion if warranted in the future.)
2. ***Instrument approaches***.
3. ***Wind coverage***.

Terms to know

Instrument approaches: Maneuvers for an aircraft under IFR conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually.

Wind coverage: A term used in aviation to represent the percentage of the total wind energy that is blowing in line with the runway. See Table ALT2 for more detail.

All three airport alternatives satisfy these criteria. Table ALT2 compares the airport alternatives with respect to wind coverage. Table ALT3 compares the airport alternatives with respect to instrument approaches. Airport 3a is nominally better by having instrument approach capability, generally lower minimums, and greater overall year-round availability than the other two alternatives.

The terms and concepts used in aviation performance are technical and require some interpretation. Some notes that apply to both tables are provided here. Other notes are provided in each table.

- **Runway names**: Both tables refer to runway names. All runways are referred to by two names, one for each direction of travel on the runway. Each name has a two-digit number, which is assigned based on compass bearings rounded to the nearest tenth degree and with the last zero removed. For example, a runway with a bearing of 277° would be designated Runway 28. One with a bearing of 92.5° would be designated Runway 09.
- **Instrument flight rules (IFR)**: As defined in section 3.3.1, IFR refers to flight procedures used when conditions for visual flight rules (see below) are not met (for example, the ceiling is less than 1,000 feet or visibility is less than 3 miles).
- **Visual flight rules (VFR)**: As defined in section 3.3.1, VFRs govern flight procedures when visibility and weather conditions are clear enough for a pilot to navigate the plane by sight.

Table ALT2. Comparison of aviation performance criteria: wind coverage

Criterion	No action alternative (ongoing seaplane operations)	Airport 3a	Airport 4	Airport 12a
All weather wind coverage* (10.5- and 13-knot crosswind component with 5-knot tailwind component) *For this criterion, a higher percentage means a better performance*.	Pilot will land into the wind at all times.	• 99.88% for Runway 02/20 with 10.5-knot crosswind • 99.94% for Runway 02/20 with 13-knot crosswind	• 99.87% for Runway 03/21 with 10.5-knot crosswind • 99.94% for Runway 03/21 with 13-knot crosswind	• 99.86% for Runway 12/30 with10.5-knot crosswind • 99.93% for Runway 12/30 with 13-knot crosswind
IFR weather wind coverage (10.5- and 13-knot crosswind component with 5-knot tailwind component) *For this criterion, a higher percentage means a better performance*.	Pilot will land into the wind at all times.	• 99.20% for Runway 02/20 with 10.5-knot crosswind • 99.59% for Runway 02/20 with 13-knot crosswind	• 99.39% for Runway 03 with 10.5-knot crosswind • 99.76% for Runway 03 with 13-knot crosswind	• 96.94% for Runway 12 with 10.5-knot crosswind • 97.40% for Runway 12 with 13-knot crosswind

*****Wind coverage is an important consideration in airport design for the following reasons:

- When wind is blowing at some angle relative to the runway orientation, wind can mathematically be split into two components: that part of the total wind energy flowing in line with the runway and the part blowing across the runway.
- A properly aligned runway will maximize the amount of wind blowing in line with the runway, and minimize the effect from the crosswind component of the total wind energy. The FAA recommends that a runway be aligned so that more than 95% of the prevailing wind energy is directed in line with the runway orientation.
- Strong crosswind components affect smaller aircraft more dramatically than larger aircraft. For the aircraft planned for use at the Angoon Airport, the maximum recommended crosswind component is 10.5 knots for the smallest aircraft and 13 knots for the larger aircraft (classified as ARC A/B-I and A/B-II, respectively).
- The percentages shown indicate the amount of time the crosswind component (that part of the wind energy that can blow the aircraft off course/make the aircraft unstable during landing or takeoff) is below the recommended maximum level. The higher the percentage of wind coverage, the better the runway is aligned with prevailing winds, and the easier it is to keep a plane stable at lower approach speeds. A 99.88% coverage with a 10.5- knot crosswind component means that the wind energy blowing across the runway is below 10.5 knots less than 1.12% of the time.

Table ALT3. Comparison of aviation performance criteria: instrument approach

Criterion	No action alternative (ongoing seaplane operations)	Airport 3a	Airport 4	Airport 12a
Instrument approach procedure capability	Yes (but does not meet purpose and need for the project)	• Yes for Runway 02 and 20	• Yes for Runway 03 only	• Yes for Runway 12 only
IFR minimums* (ceiling/visibility) *For this criterion, a lower number means better performance.*	VFR/daylight hours only	• 500 feet / 1.25 mile for Runway 20 • 700 feet / 2.5 mile for Runway 02	• 700 feet / 2.0 miles for Runway 03 • No instrument approach to runway end for Runway 21 (VFR only)	• 1,000 feet / 1.5 mile for Runway 12 • No instrument approach to runway end for Runway 30 (VFR only)
Runway availability†: VFR conditions *For this criterion, a higher percentage means better performance.*	44% or 3,854 hours (VFR/daylight hours only)	• 87.7% / 7,682 hours for Runway 20/02	• 87.7% / 7,682 hours for Runway 03/21	• 87.7% / 7,682 hours for Runway 12/30
Runway availability: VFR and IFR conditions *For this criterion, a higher percentage means better performance.*	IFR not available	• 8,251 hours / 94.2% for Runway 20 • 7,892 hours / 90.1% for Runway 02	• 7,892 hours / 90.1% for Runway 03 • IFR not available for Runway 21	• 7,787 hours / 88.9% for Runway 12 • IFR not available for Runway 30

* In this EIS, a minimum is the lowest or closest point at which the pilot must be able to visually locate the landing threshold of a runway. The height and distance differ under IFR and VFR. The lower the minimums, the more often the runway can be accessed in poor visibility conditions.

†The runway availability criterion is considered in terms of hours and percentages. It works like this:

- There are 8,760 hours in a year (365 days × 24 hours).
- Of those hours, there are 7,682 hours where visibility and cloud ceiling are above the minimums allowed for flying under VFR (this is the same for each alternative except the no action alternative).
- The remaining 1,078 hours of the year, visibility and cloud ceiling are below that allowable for VFR flight. To fly to and land at Angoon during these times, the pilot must use an IFR approach procedure.
- IFR approaches have minimum visibility requirements that are lower (smaller) than VFR; for example, Runway 20 of Alternative 3a allows a pilot to approach and land when visibility is as low as 1.25 miles and cloud cover is as low as 500 feet above ground. Even with these lower minimums, there are still hours where weather conditions will not permit a pilot to approach and land.
- Using the same runway as above (Runway 20 for Alternative 3a), of the 1,078 hours a year where visibility and cloud ceiling are below VFR minimums, the use of an IFR approach procedure allows an additional 569 hours of availability. This additional 569 hours represents 6.5% of the 8,760 available hours in a year.

3.5.3. Comparison of costs

3.5.3.1. Construction costs

Although the design of all action alternatives is based on the same proposed components (see section 2.2 in Chapter 2 for a description of these components), construction costs vary by alternative primarily because of the terrain unique to each site. At a location where there are more hills and varied topography, costs are increased because of the extra excavation and fill needed to create a level surface for the runway, apron, taxiway, and facilities. Drainage control would also increase costs (particularly so for Airport 12a). The major factors affecting access road costs would be the overall length of the road, terrain differences, and the number and size of drainage crossings requiring culverts, bridges, or other structures.

Construction costs were calculated in 2012 dollars for each action alternative based on estimates of labor, materials, and, where applicable, purchase of private land and rights-of-way. Estimates are provided in Table ALT4, but readers should be aware that the final cost of any alternative involving construction may differ from these estimates, depending on the specifics of the final design and the material and labor rates at the time of construction.

Table ALT4. Estimated construction costs for action alternatives

Alternative	Airport	Access road	Right-of-way acquisition*	Total estimated cost
Airport 3a with Access 2	$26,667,000	$30,075,000	$356,911	**$57,098,911**
Airport 3a with Access 3	$26,667,000	$45,588,000	$223,881	**$72,478,881**
Airport 4 with Access 2	$34,876,000	$25,292,000	$204,413	**$60,372,413**
Airport 4 with Access 3	$34,876,000	$39,560,000	$136,275	**$74,572,275**
Airport 12a with Access 12a	$31,562,000	$2,009,000	$1,000,000	**$34,571,000**

*Per the U.S. Forest Service, right-of-way acquisition costs for Airport 3a and 4 are lower because the U.S. Forest Service currently waives most fees to the State of Alaska for occupancy on National Forest System lands through a memorandum of understanding (MOU). The waiver does not apply when the principal source of revenue from the authorized use is customer charges. It remains uncertain how the airport and fees for long-term apron and future hangar uses would fit into the terms of the MOU. The MOU is negotiated periodically, and a waiver is not guaranteed in perpetuity. U.S. Forest Service policy is to establish fees reflecting the fair market value prior to authorizing the use. If an alternative on National Forest System lands is approved, the State of Alaska and the U.S. Forest Service will revisit the issue to determine if it is mutually beneficial and in the public interest to waive the collection of fees.

Funding sources for construction of the Angoon Airport have been identified. Pending availability of funds, the FAA expects to provide most of the airport construction funding through its Airport Improvement Program, regardless of alternative (see section 1.9 in Chapter 1: Project Background). The DOT&PF would provide the rest of the airport funding. Should Airport 12a with Access 12a be selected in a record of decision, the FAA would also provide a portion of the funding for the access road. The DOT&PF would provide the remainder of the funding for Access 12a construction.

Funding sources for Access 2 and 3 for either Airport 3a or Airport 4 remain uncertain. Due to the high cost of these access alternatives relative to the cost of airport construction and limited funding available in the Airport Improvement Program, the FAA has determined that it cannot fund the construction of these access alternatives. The DOT&PF would be responsible for providing the funding necessary to construct the access roads under these alternatives.

3.5.3.2. Operation and maintenance costs

Operation and maintenance costs would vary by alternative because of the location of each alternative. The major factor affecting operation and maintenance costs is the length of the access road.

There are two options for how the airport may be operated and maintained.

- Option 1: The airport would be operated and maintained by the DOT&PF. Under this option, the DOT&PF would have an employee or contractor located in Angoon, and would procure and locate maintenance equipment at the airport. The Hoonah, Alaska, airport is operated and maintained in this fashion, and was used as a basis for the cost estimates.
- Option 2: The airport would be operated and maintained under a reimbursable maintenance agreement between the State of Alaska and the City of Angoon. Under this option, the State would pay the City to perform most services. The airport for the City of Kake, Alaska, is operated and maintained this way, and was used as a basis for the cost estimates.

Operation and maintenance costs were calculated in 2016 dollars for each action alternative (Table ALT5). The difference in the total miles of access road per airport alternative does not result in a difference in costs for that alternative, and the access road options for each airport alternative are therefore combined in this table.

Table ALT5. Estimated operation and maintenance costs for action alternatives

Alternative	Option 1	Option 2
Airport 3a with Access 2 or Access 3	$242,000/year One-time cost to procure equipment: $500,000	$110,000/year
Airport 4 with Access 2 or Access 3	$234,000/year One-time cost to procure equipment: $500,000	$102,000/year
Airport 12a with Access 12a	$223,000/year One-time cost to procure equipment: $500,000	$95,000/year

Funding for operation and maintenance of the airport and access road, regardless of options above, would come from the DOT&PF's annual operating budget. Fees charged for long-term use of airport space for aircraft based at the airport would also contribute to operation and maintenance of the airport and access road. Funding for equipment under Option 1 could be eligible for federal funding assistance through the FAA's Airport Improvement Program.

3.5.4. Summary of environmental effects

Per the Council on Environmental Quality's regulations for implementing NEPA (40 CFR 1502.14), an EIS should present the environmental effects "of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the [decision-maker] and the public." Many EISs, including this one, present this comparison in the form of a table. In this EIS, these comparisons are included as a set of tables in section 3.10.

3.6. How did the FAA develop a range of reasonable alternatives?

What is discussed in this section?

The FAA used the following two-step process to compile a range of reasonable alternatives:

1. Identify a broad range of possible alternatives (discussed below in section 3.6.1).
2. Screen those possible alternatives to determine if they meet purpose and need, and are reasonable (discussed below in section 3.6.2).

Following a final decision, if an action alternative is approved at all stages in the ANILCA Title XI and NEPA processes and the airport is constructed, minor refinements can also be made during operation reviews.

3.6.1. How did the FAA initially identify alternatives?

Shortly after publishing a notice of intent to prepare an EIS in the *Federal Register* (Notices; Notice of Intent; Environmental Impact Statement: Angoon Airport, Angoon, Alaska; FAA 2008a:55200), the FAA began to identify possible alternatives to the proposed action to accomplish at least one of the following:

- Respond to environmental, operational, and economic concerns and alternatives raised by the public, agencies, businesses, special interest groups, and other stakeholders during project scoping
- Address potential environmental, engineering, or operational issues discussed in DOT&PF studies or identified during the FAA's operational planning studies
- Satisfy statutory requirements

The scoping process discussed in section 2.6 of Chapter 2 generated many comments from agencies and the public about the project, and was critical in helping the FAA identify key issues and potential alternatives to the proposed action. For example, many commenters identified subsistence uses and streams supporting anadromous fish as important social and environmental concerns. Some commenters suggested airport locations that could avoid or reduce effects to resources or that could possibly have other benefits such as safer road access with reduced travel time. Other commenters identified alternative means of transportation (such as expanded ferry service) that could be developed instead of a new airport (see Appendix B for a full list of alternatives identified during scoping).

The FAA also critically reviewed project studies like the Angoon Airport Reconnaissance Study (DOT&PF 2004) and Angoon Airport Master Plan (DOT&PF 2007) to evaluate airport and access road alternatives previously identified by the DOT&PF. In addition, the FAA conducted independent studies for the EIS addressing different airport locations and runway orientations. The alternatives identified through these efforts focused on airport locations and access road routes that could provide a range of such benefits as 1) reducing the distance and travel time from Angoon to a land-based airport; 2) avoiding or reducing specific environmental effects, such as the loss of lands used in subsistence gathering; 3) avoiding lands in the Monument–Wilderness Area; and 4) making better use of terrain for design and engineering. As explained in section 3.2, airport alternatives also had to meet strict FAA design standards to be considered practical or feasible.

The FAA also considered the no action alternative as required in regulations of the Council on Environmental Quality (see section 3.2).

3.6.2. How did the FAA screen alternatives?

The scoping process (see *Public and Agency Scoping Report* [SWCA 2009], included in this EIS as Appendix A) and many studies identified a broad spectrum of alternatives, including 15 different airport locations and five access road routes, other modes of airport access, different transportation systems, improvements to existing air service, and the possible use of existing nearby airports (in Kake, Hoonah, or Petersburg, for example) instead of constructing a new airport in Angoon (see *Alternatives Eliminated from Detailed Analysis* [SWCA 2014a, included as Appendix B]). After compiling this list of potential alternatives, the FAA screened each according to the following criteria:

1) Does it meet the purpose of and need for the project (as defined in section 2.3 of Chapter 2)? If a possible alternative did not meet the purpose and need, it was eliminated from further consideration.

2) Are the alternatives that do address purpose and need reasonable from a NEPA perspective? In other words, would they be practical or feasible from an engineering perspective and economic perspective? If a possible alternative was determined to not be practical or feasible, it was considered not reasonable and was eliminated from further consideration.

An airport project such as the Angoon Airport is considered a "transportation action." A transportation action that would affect certain lands known as ***Section 4(f) properties*** must also pass another screening criterion in that it must be considered ***feasible*** and ***prudent***. Possible alternatives were not initially screened for whether they would be prudent because a complete environmental analysis is needed to determine whether an action is prudent. Effects to Section 4(f) properties are analyzed and disclosed in section 4.4 U.S. Department of Transportation Act Section 4(f) Evaluation Summary and the *U.S. Department of Transportation (USDOT) Section 4(f) Evaluation* (SWCA 2014b, included as Appendix D).

Terms to know

Feasible: In a Section 4(f) context, a feasible alternative is one that can be built as a matter of sound engineering judgment.

Prudent: In a Section 4(f) context, a proposed alternative or measure does not compromise the project to an extent that it

- is unreasonable to proceed, given the project's purpose and need;
- results in unacceptable safety or operational problems;
- causes, even with mitigation, severe social, economic, or environmental effects; disruption of established communities; disproportionate effects to minority or low-income populations; or effects to environmental resources protected under other federal statutes;
- results in extraordinary additional construction, maintenance, or operational costs;
- causes other unique problems or unusual factors; or
- creates cumulative effects of an extraordinary magnitude.

Section 4(f) properties: Publicly owned land that is designated as a public park, recreation area, or wildlife refuge of national, state, or local significance, or any historic site of national, state, or local significance.

3.6.2.1. What aviation and safety factors did the FAA consider?

In airport projects, a reasonable alternative must meet established aviation design and safety standards. This section provides an overview of some of the aviation and safety factors considered as part of the alternatives screening process. For readers interested in more detail, the following references are available at www.angoonairporteis.com or directly from the FAA:

- *Supplemental Airport Planning Memorandum, Working Paper One* (Barnard Dunkelberg & Company 2008a): This study explains the airport design and layout requirements for a land-based airport classified as B-II (see section 3.6.2.1.1 below).
- *Supplemental Airport Planning Memorandum, Working Paper Two* (Barnard Dunkelberg & Company 2008b): Also prepared for the EIS, this study includes an analysis of different airport locations, with particular emphasis on the aviation criteria concerning instrument approach landings.
- *Angoon Airport Master Plan* (DOT&PF 2007): Prepared by the DOT&PF as part of the planning studies to determine whether a land-based airport should be proposed for Angoon, this document includes different airport location alternatives, design and safety considerations, and the airport layout plan.

Terms to know

Design aircraft: The most demanding aircraft that will use an airport regularly and for which a given airport is designed.

Airport reference codes

Airport reference codes are assigned based on approach speed and wingspan of the design aircraft. Based on the design aircraft for the Angoon Airport, its code is B-II.

Category	Approach speed
A	<90 knots
B	**91–120 knots**
C	121–140 knots
D	141–165 knots
E	166 or more knots

Design group	Wingspan
I	Up to 48 feet
II	**49–78 feet**
III	79–117 feet
IV	118–170 feet
V	171–213 feet
VI	214–262 feet

3.6.2.1.1. Design criteria

Airports are designed in accordance with the airport reference code standards outlined in the FAA Advisory Circular *AC 150/5300-13A, Airport Design* (FAA 2012a). These standards ensure that the airport is designed to accommodate the needs of what is known as the ***design aircraft***, or the aircraft that will use the airport. Therefore, the first step in airport design is to determine the design aircraft.

The design aircraft is determined from the types of aircraft used locally and in the region, as well as those likely to be used in the future. As concluded in the *Angoon Airport Master Plan* and reconfirmed as part of this EIS, the types of

aircraft most likely to use a land-based airport are small, fixed-gear, propeller-driven aircraft with between eight and 11 passenger seats. The Beech Super King Air 200 turboprop is representative of the most operationally demanding (meaning it requires the longest takeoff and landing distance) type of aircraft likely to operate at Angoon on a regular basis. Based on this information, the FAA determined that the design aircraft for Angoon are those with approach speeds of 91–120 knots and a wingspan of 49–78 feet. Examples of these types of aircraft are depicted in Figure ALT20.

Once the design aircraft is known, an airport reference code can be assigned. This code contains the approach speed and wingspan information of the design aircraft, and this information determines the standard measurements of airport facilities, including runways, taxiways, and aprons. Based on the design aircraft for the Angoon Airport, the airport reference code for Angoon is B-II.

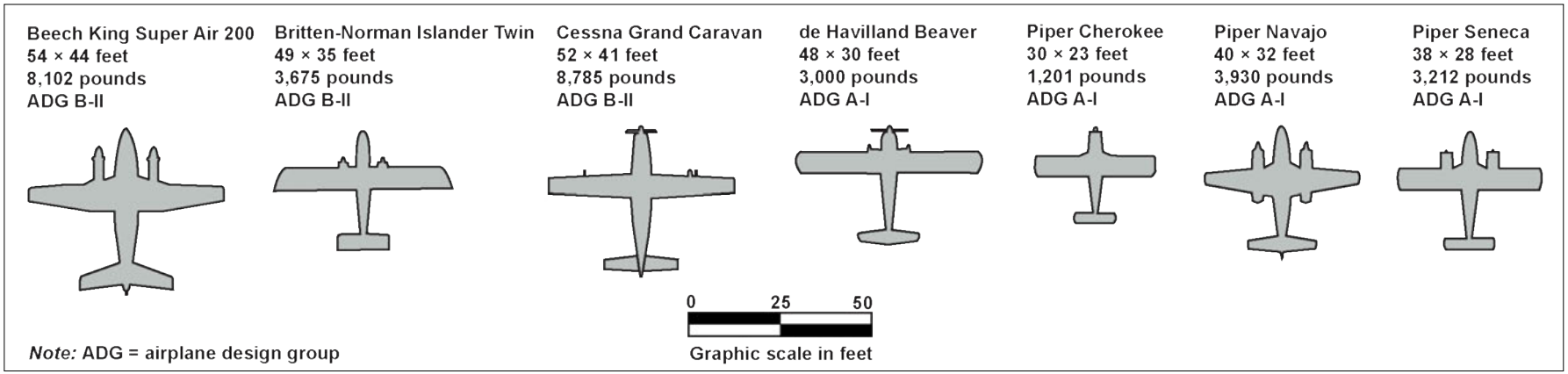

Figure ALT20. Examples of B-II and smaller aircraft.

Using this reference code, the FAA established the minimum development footprint of airport alternatives that would meet the project's purpose and need. Figure ALT21 illustrates the FAA's standard dimensions for key characteristics of a B-II airport. Supplemental aviation planning for this project identified a potential future requirement for a longer runway. To ensure that the airport could accommodate future expansion, potential sites were also screened for their ability to fit a runway up to 4,000 feet long.

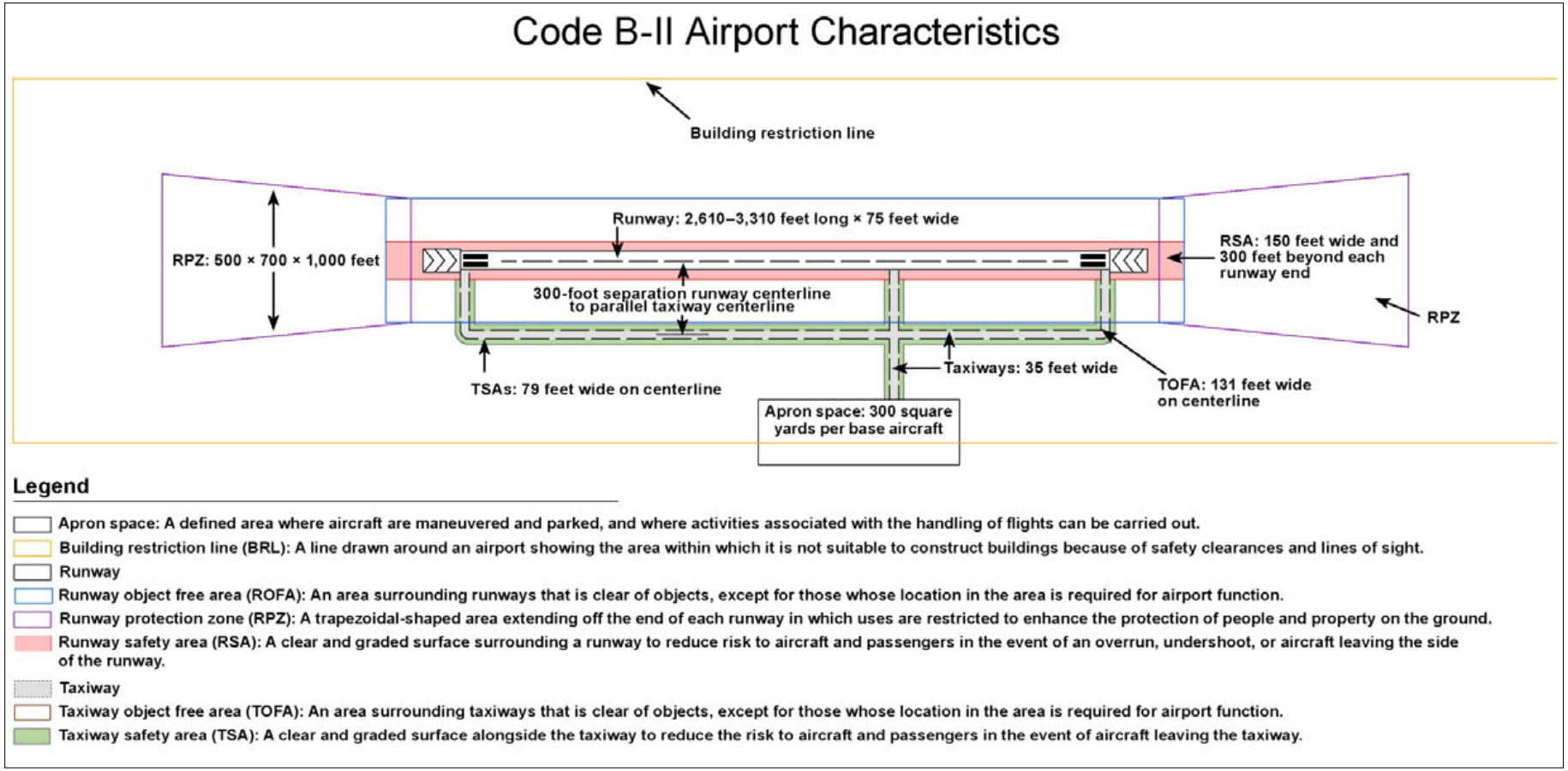

Figure ALT21. FAA standard dimensions for airport reference code B-II airports.

3.6.2.1.2. Safety factors

Airport design involves much more than just runway length or physical dimensions. The area surrounding an airport—on the ground and in the airspace overhead and nearby—must be suitable for safe operations in different weather and lighting conditions. Consequently, any alternative carried through for detailed analysis in the EIS must meet the minimum FAA standards for

- wind coverage,
- safe approaches and departures,
- obstacle and obstruction clearance, and
- other factors relating to air navigation.

Wind coverage influences the direction a runway is oriented. Pilots know that because wind helps create lift, it can reduce takeoff lengths; this is why aircraft usually take off into the wind. Conversely, landing into the wind allows the aircraft to maintain altitude and control at a lower speed. Crosswinds make it harder to control an aircraft on landings or takeoffs, and smaller aircraft (such as those that would be flying into Angoon) are affected by crosswinds more than larger aircraft. Therefore, a runway ideally aligns with the prevailing winds. Because the FAA has determined that "the desirable wind coverage for an Airport is 95%..." (FAA 2012a:226), airport site locations had to achieve 95% or greater wind coverage to be considered practical or feasible for Angoon.

Approaches and departures must be safe; the area must be free of obstacles and obstructions; and other factors must be met to make an alternative reasonable. Some of the other factors used to determine reasonable alternatives are as follows:

- Instrument approach capability: Would the airport location allow for use of navigational equipment during times of low visibility, so that pilots could land at Angoon using instrument approach procedures rather than being dependent on visual observations?
- ***Glidepath qualification surface*** clearance: Would the location allow for 3.0° and 3.5° glidepath angles (the angle between the approach of a plane coming in for a landing and the runway surface)?
- Assessment of obstacles for final and ***straight missed approach***: Would the location meet 200-foot above runway ***threshold*** height ***decision altitude*** standards for final and straight missed approaches?
- ***Turning missed approach*** segment obstacle assessment: Would the location meet 1,000-foot ***decision altitude*** standards for ***turning missed approaches***?

A detailed analysis of how airport location alternatives did or did not meet FAA aviation standards is included in *Supplemental Airport Planning Memorandum, Working Paper Two* (Barnard Dunkelberg & Company 2008b).

Terms to know

Decision altitude: The minimum altitude above the runway threshold at which a pilot must decide whether or not to initiate a missed approach procedure.

Glidepath qualification surface: An *imaginary surface* extending from the runway *threshold* along the runway centerline to the decision altitude point. It limits the height of allowable obstructions between the decision altitude and runway threshold. Certain instrument approaches are not authorized when obstructions exceed the height of the glidepath qualification surface.

Imaginary surface: An aviation planning term describing the airspace around an airport as measured from the sides and ends of a runway and extending in different directions from those points. The FAA has defined different types of imaginary surfaces at public airports to ensure that the airspace around approaching and departing aircraft is clear of obstacles that could create safety hazards.

Straight missed approach: An instrument approach procedure when a pilot reaches the decision altitude and determines that he/she cannot land on the runway. In a straight missed approach, the aircraft maintains the same heading as when approaching the runway for landing but climbs in altitude rather than descends. The path in a straight line beyond the runway must be clear of obstructions.

Threshold: An airport planning term referring to the point on a runway behind which aircraft cannot land or from which aircraft begin their takeoff.

Turning missed approach: Similar to a straight missed approach, but instead of continuing in a straight line, the aircraft turns. A turning missed approach is used when a straight missed approach is not possible because of obstructions beyond the end of the runway.

3.7. What alternatives were considered but dismissed from detailed analysis, and why?

Alternatives that passed the FAA's multiple levels of screening were carried forward for detailed analysis in this EIS (see section 3.3 above), whereas alternatives that did not meet all screening criteria were dismissed from further consideration. This section describes some of the typical reasons why alternatives were eliminated from the EIS analysis. Appendix B provides more information on the spectrum of alternatives initially considered, the reasons why each alternative was developed, and rationale for why alternatives were dismissed from full environmental review.

Some suggested alternatives did not meet the project purpose and need. This was primarily the case for the suggestions for other modes of transportation, such as improving the Alaska Marine Highway System (the state-run ferry system) or siting a new emergency helicopter landing pad in Angoon. Although both these alternatives may have benefits, and each could help address some of the apparent deficiencies associated with the seaplane transportation system, neither would address the need to improve availability and reliability of transportation service. Similarly, upgrades to Angoon's existing clinic to accommodate emergency medical facilities and care would do nothing to improve day-to-day transportation needs, although they might reduce the frequency of medical evacuation flights to Sitka or Juneau.

Other suggested alternatives that could potentially meet purpose and need, or at least improve transportation access to Angoon, were not practical or feasible, and were dropped from further analysis. For example, a road from Angoon to Juneau would be economically impractical and perhaps even technically infeasible. A bridge across Favorite Bay, a possible alternative raised during the scoping process and in previous studies, is another example of an access road option that would be economically impractical.

Most of the airport and road locations were eliminated from full environmental analysis because they could not meet one or more of the required design or safety standards. The most common failing of these possible alternatives was "terrain obstructions" from hills or mountains that would be too close to the airport and prevent the airport from meeting glidepath clearance standards, or that would preclude the ability for final approach and straight missed approach.

3.8. Which alternative does the FAA prefer?

> **What is a preferred alternative?**
>
> A preferred alternative is "the alternative which the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors" (Council on Environmental Quality 2013).

The FAA has identified Airport 12a with Access 12a as its preferred alternative in both the draft EIS and this final EIS. As the lead federal agency for this project, the FAA is required by 40 CFR 1502.14(e) to identify its preferred alternative, if one exists. The FAA recognizes that each of the alternatives has environmental, cultural, and economic benefits and drawbacks, and has evaluated all alternatives equally in this EIS. It should also be noted that the identification of a preferred alternative does not mean that the FAA has made a final decision on what alternative would be selected. The DOT&PF's proposed action remains Airport 3a with Access 2. The DOT&PF submitted an ANILCA application to the FAA, the U.S. Forest Service, and the U.S. Army Corps of Engineers on January 9, 2015, for Airport 3a with Access 2, using the draft EIS as supporting documentation. Further discussion about how this affects the EIS process is detailed below in section 3.8.1.

Among the three airport locations, there are small aviation differences based on instrument approach capability, minimums for visibility, and year-round availability. However, as discussed in section 3.6 above, the FAA went through an extensive alternatives development process to ensure that any analyzed alternative would improve the availability and reliability of aviation service to and from Angoon. All action alternatives would double the current availability of air travel in and out of Angoon, and meet or exceed FAA standards for the type of aircraft that would use the proposed airport. Given that the aviation differences among all airport alternatives are so small, the FAA identified the preferred alternative based on the following three criteria:

1. Social and environmental effects
2. Section 4(f) regulations
3. The effects on natural resources as outlined in 49 United States Code (USC) 47106(c)(1)(B)

The following is a summary of the FAA's findings for each of these criteria.

Social and environmental effects: The social and environmental analyses are summarized below in section 3.10 and provided in full in Chapter 4. Based on these analyses, Airport 12a with Access 12a has the fewest significant adverse effects.

Section 4(f) regulations: As detailed in section 4.4, the FAA is required to also evaluate effects to certain types of lands and resources referred to in this EIS as "Section 4(f) resources" or "Section 4(f) properties." Under Section 4(f) of the Department of Transportation Act of 1966, as amended by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (PL 109-59), the FAA cannot affect Section 4(f) resources or properties unless

- there is no feasible and prudent alternative to avoid such effects and the action in question includes all possible planning to minimize harm to the property in question *or*
- the use of that property will have a ***de minimis impact*** on it.

Based on the summary analysis in section 4.4 and the full analysis in Appendix D, the FAA has found that Airport 3a with Access 2 (the proposed action), Airport 3a with Access 3, Airport 4 with Access 2, and Airport 4 with Access 3 would result in Section 4(f) physical use of the Monument–Wilderness Area. The no action alternative and Airport 12a with Access 12a would avoid physical use of Section 4(f) resources. The FAA has determined that Airport 12a with Access 12a is both feasible and prudent. The FAA has further determined that the no action alternative is not feasible and prudent in that its selection would compromise the project to such a degree that the purpose and need for the project would no longer be met.

The effect on natural resources as outlined in 49 USC 47106(c)(1)(B): Under this statutory provision, the FAA cannot approve funding of a proposed airport development project that has significant adverse effects if a determination can be made that there is a possible and prudent alternative to the project, and that every reasonable step has been taken to minimize the adverse effect.

As summarized in section 3.10, the FAA has determined that the DOT&PF's proposed action (Airport 3a with Access 2) would have significant adverse impacts to Section 4(f) resources, light emissions and visual resources, wetlands,

Terms to know

De minimis impact: In the context of Section 4(f), a "*de minimis* impact" is an effect on a public park, recreation area, wildlife refuge, or historic site that will not adversely affect the property's important activities, features, or attributes.

wilderness, and the national monument. The FAA has determined that the significant effects to these resources, with the exception of wetlands, cannot be mitigated below the level of significance. Having determined that the DOT&PF's proposed action would have a significant adverse effect, the FAA is required to determine if there is a possible and prudent alternative. The FAA has made the following determinations:

- Airport 3a with Access 3 would have the same significant effects as the proposed action.
- Airport 4 with either access would have significant adverse effects to Section 4(f) resources, wilderness, and the national monument that could not be completely mitigated below the level of significance.
- Airport 12a with Access 12a would have significant adverse effects to wetlands. However, these impacts could be mitigated as described in Chapter 7: Mitigation of this final EIS.

FAA *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b) states that a "prudent" alternative refers to rational judgment, and that an alternative "may be possible, but not prudent when one considers its safety, policy, environmental, social, or economic consequences." Table Alt6 lists the factors used to determine if an alternative is prudent and the FAA's findings.

Table ALT6. Prudence criteria and findings

FAA Order 5050.4B guidance	FAA finding
Does the alternative meet the project's purpose and need?	All action alternatives would meet the purpose and need for improving aviation availability and reliability.
Does the alterative cause extraordinary safety or operational problems?	None of the action alternatives would cause extraordinary safety or operational problems.
Are there unique problems or truly unusual factors present with the alternative?	Airport 3a and Airport 4 would require the placement of an airport and access road within the Monument–Wilderness Area. Although this placement is allowed under ANILCA Title XI, the process has never been used for a wilderness area. The Angoon Airport would be the first if an alternative to build in the Monument–Wilderness Area is approved at all stages in the ANILCA Title XI and NEPA processes. The impacts to the Monument–Wilderness Area could not be avoided or entirely mitigated, and are incompatible with the desired conditions for the area, as detailed in section 4.16 Wilderness Character and section 4.19 Admiralty Island National Monument.
Does the alternative cause unacceptable and severe adverse social, economic, or other environmental impacts?	Airport 3a and Airport 4 with either access would have significant impacts that could not be completely mitigated as summarized in Section 3.10. Airport 12a with Access 12a would also have significant impacts to wetlands, but these impacts can be fully mitigated as described in Chapter 7 Mitigation.

Table ALT6. Prudence criteria and findings

FAA Order 5050.4B guidance	FAA finding
Does the alternative cause extraordinary community disruption?	Airport 12a with Access 12a would require acquisition of 37 (6%) of the area's available home sites, and therefore its effects would be too small to result in large-scale shifts in population or to influence the pattern of growth (see evaluation of these effects in section 4.12.3.3.6). None of the action alternatives would be close to the town core and would therefore not cause extraordinary community disruption.
Does the alternative result in added construction, maintenance, or operational costs of an extraordinary magnitude?	As detailed in section 3.5.3, Airport 12a with Access 12a is the most cost-effective action alternative, costing approximately $40 million dollars less than the most expensive alternative (Airport 4 with Access 2), and $22 million dollars less than the proposed action (Airport 3a with Access 2). Compared to Airport 3a with Access 2, operation and maintenance costs for Airport 12a with Access 12a would be $19,000 less (under Option 1) or $15,000 less (under Option 2) to operate and maintain per year. (Discussion of the operations options are in section 3.5.3.2.)
Does the alternative result in an accumulation of factors that collectively, rather than individually, have adverse impacts that present unique problems or reach extraordinary magnitudes?	None of the alternatives would result in an accumulation of factors that collectively have unique adverse impacts or reach extraordinary magnitudes.

Based on this information, the FAA has determined that Airport 12a with Access 12a is a possible and prudent alternative to the significant adverse impacts that would be caused by the DOT&PF's proposed action. Therefore, the FAA has determined that Airport 12a with Access 12a is the preferred alternative.

3.8.1. What needs to happen when the preferred alternative is different from the proposed action?

Section 801 of FAA Order 5050.4B (FAA 2006b) states that when the preferred alternative is different from a sponsor's (in this case, the DOT&PF's) proposed action, the FAA must notify the sponsor and work with them to reach consensus. Because it is up to the sponsor whether to carry out the project, under typical FAA-funded projects, the DOT&PF would need to make one of the following choices:

- Concur with the FAA's preferred alternative
- Reject the FAA's preferred alternative
- Propose an alternative not previously presented
- Take no action to address the purpose and need

However, on this project the sponsor is in a unique position should they choose to reject the FAA's preferred alternative and move forward with the proposed action. As discussed in Chapter 5: Requirements of the Alaska National Interest Lands Conservation Act (ANILCA), the State of Alaska is authorized by ANILCA Title XI to apply for a right-of-way for the airport and access road in the Admiralty Island National Monument and Kootznoowoo Wilderness Area. The DOT&PF submitted the ANILCA Title XI application for Airport 3a with Access 2 (the DOT&PF's proposed action) on January 9, 2015, using the draft EIS and other documents as the supporting information. Because this application has been submitted, all involved federal agencies must comply with the requirements in ANILCA, including the following steps:

- Determination of application adequacy: Each federal agency must determine whether the application contains the information required by ANILCA, and inform the DOT&PF of their determination. If the application does not contain the required information, the agencies must specify what additional information the applicant must provide.

- Development of an environmental impact statement: The FAA as lead federal agency is responsible for completing a draft and final EIS.

- Notification and findings: Following the completion of the first two steps, each federal agency sends notification to the President of the United States indicating if the agency tentatively approves or disapproves the application, and stating the reasons and findings supporting their position. The findings that are required are outlined in section 5.5 of Chapter 5. When making the required findings, the agencies must also comply with ANILCA Section 1103, which states that other applicable laws shall continue to apply during the ANILCA Title XI process. These applicable laws can be superseded only by action from the President and Congress under ANILCA Title XI.

As long as an ANILCA application is being considered, the involved federal agencies are not the only decision makers for this project. The President and Congress would provide the final approval of the application, which would determine whether it would be possible for Airport 3a with Access 2 to be built within the Monument–Wilderness Area.

Table ALT7 summarizes what has occurred in the ANILCA process as of July 2016.

Table ALT7. Summary of ANILCA process status

Requirement	FAA	U.S. Forest Service	U.S. Army Corps of Engineers
Determination of application adequacy	The FAA found that there was adequate information to continue the ANILCA process.	The U.S. Forest Service initially determined that the application lacked the information required in ANILCA Section 1104(g)(2) for agency decision-making. The U.S. Forest Service requested additional information regarding the Admiralty Island National Monument, Kootznoowoo Corridor Lands, and cultural resources. The FAA provided the additional information for analysis of effects to the national monument and the Kootznoowoo Corridor Lands in section 4.19 Admiralty Island National Monument of this final EIS. The U.S. Forest Service has agreed that the use of terms and conditions will satisfy the information requested for cultural resources. (For a discussion on these terms and conditions, see section 5.6.) Following receipt of this additional information, the U.S. Forest Service found that there was adequate information to continue the ANILCA process.	The U.S. Army Corps of Engineers initially determined that more information was essential for the application to be considered complete. Specifically, the agency requested the information required by 33 CFR 325.1(d), a compensatory mitigation plan, and a draft 404(b)(1) guidelines analysis. The DOT&PF provided additional information as requested by the U.S. Army Corps of Engineers. Following receipt of this information, the U.S. Army Corps of Engineers found that there is adequate information to continue the ANILCA process.
Environmental impact statement	The FAA published a draft EIS on January 9, 2015, and will publish the final EIS in 2016,	The U.S. Forest Service reviewed an agency preliminary draft EIS, the public draft EIS, and the agency final EIS, and provided comments to the FAA.	The U.S. Army Corps of Engineers reviewed an agency preliminary draft, the public draft EIS, and the agency final EIS, and provided comments to the FAA.
Notification and findings	The FAA has included draft findings in the final EIS, and has drafted a notification for their tentative disapproval of the application to the President of the United States. At this time, no notification will be sent to the President pending discussions with the sponsor and the cooperating agencies on next steps.	The U.S. Forest Service has drafted findings and a notification for tentative disapproval of the application to the President of the United States. At this time, no notification will be sent to the President pending discussions with the sponsor and the cooperating agencies on next steps.	The U.S. Army Corps of Engineers has provided a letter to the DOT&PF in June 2016 indicating that they would be recommending the permit be denied. At this time, no notification will be sent to the President pending discussions with the sponsor and the cooperating agencies on next steps.

3.9. What other actions may be related to the Angoon Airport project?

NEPA regulations require that the EIS consider three other types of actions that may be related to the proposed Angoon Airport (40 CFR 1508.25): ***similar actions***, ***cumulative actions***, and ***connected actions***.

No similar actions were identified at the time of this EIS. The FAA did identify several cumulative actions in and around Angoon. These projects, along with an airport and access road, have the potential to increase effects on the natural and cultural resources of the area. For this reason, the FAA evaluated the cumulative effects to determine if they would be significant. This analysis can be found in Chapter 8: Cumulative Effects.

Possible connected actions triggered by or dependent on construction or operation and maintenance of the proposed Angoon airport were assessed by the FAA. For example, the FAA investigated whether a new dock or expansion of the existing facility would be needed to off-load construction materials brought in by barge for the access road or airport. Because Angoon has already been planning to upgrade the barge unloading area (A. Kookesh III 2012a) and because the upgrade would occur even without the construction of the airport, this would not be considered a connected action. Similar questions were asked about other facilities, such as the landfill or wastewater treatment plant, but no connected actions were identified.

Terms to know

Connected actions: An action that automatically triggers another action that 1) may require environmental impact analysis, 2) cannot or will not proceed unless other actions are taken previously or at the same time, and 3) are interdependent parts of a large action and dependent on that larger action for their justification.

Cumulative actions: Past, present, and reasonably foreseeable future actions unrelated to the project but occurring in and around the same area and potentially having combined effects on the same environmental resources.

Similar actions: Actions that have similarities (such as timing or location) that provide a basis for evaluating their environmental effects together.

One potential action that is already part of the proposed action, and therefore evaluated in the EIS, would be issuance of an ANILCA Title XI permit (see section 1.4 in Chapter 1 for more information on the ANILCA Title XI process). Two airport alternatives and portions of their access roads would be located in the Monument–Wilderness Area. ANILCA Title XI provides the opportunity for development of an airport in the Monument–Wilderness Area.

As the land manager of the Monument–Wilderness Area, the U.S. Forest Service would be the agency responsible for authorizing such use by the DOT&PF if an alternative in the Monument–Wilderness Area approved at all stages in the ANILCA Title XI and NEPA processes. If use of these lands is authorized through the Title XI process, the U.S. Forest Service would issue a special use permit granting right-of way to the DOT&PF. A special use permit is the authorization mechanism for obtaining a right-of-way with the U.S. Forest Service. The permit would come with terms and conditions

designed to best protect the purposes for which the national monument and wilderness area were established, and it would be for a minimum of 20 years. Any additional FAA funding would require extension of this permit. The conditions would include the minimization and mitigation measures committed to by the FAA in the record of decision for this EIS, but could also contain other measures determined by the U.S. Forest Service. This EIS includes a comprehensive analysis of the elements required by ANILCA for the U.S. Forest Service to make tentative approvals or disapprovals (see Chapter 5).

Terms to know

Conveyance: Used here, the transfer of property from one person or organization to another.

The following two other options could provide the DOT&PF sufficient control of the airport lands in the Monument–Wilderness Area:

- A congressionally mandated ***conveyance***: This would require an act of Congress to direct the U.S. Forest Service to transfer ownership of lands for the airport and access road to the DOT&PF, thereby removing the land from the Monument–Wilderness Area.
- A land exchange or the voluntary trading of land between the U.S. Forest Service and the State of Alaska: In this instance, the State of Alaska would have to provide the U.S. Forest Service with Alaska lands equal in market value to those used for the airport and access road, and the exchange would have to be in the public interest. This process would also remove the lands used for airport and access purposes from the Monument–Wilderness Area. The FAA would have no role in a land exchange.

No congressional action has been taken that would suggest that a mandated conveyance is being contemplated. The U.S. Forest Service and State of Alaska have engaged in discussions about a potential land exchange, but specific lands have not been identified, and no market analysis has been conducted. Neither the U.S. Forest Service nor the State of Alaska currently intend to pursue either of these options.

NEPA requirements would apply to a land exchange between the State of Alaska and the U.S. Forest Service, and possibly also to a congressionally mandated conveyance. The effects of either action would be evaluated, and the results disclosed to the public prior to the exchange. This EIS does not evaluate the possible effects of these other means of land use change because, at this time, neither is necessary for approval, construction, or operation of an airport in the Monument–Wilderness Area—that is to say, they are not connected actions.

A second potential NEPA action evaluated in this EIS is the acquisition of private and Kootznoowoo, Inc., lands using federal funding. Lands owned by the City of Angoon would not need to be acquired. The DOT&PF would negotiate a right-of-way agreement for long-term access to those lands to clear obstacles, but there would be no change in landownership. Further discussion on the process for acquiring private lands can be found in section 4.3.3.3.3 in Compatible Land Use. This action is only needed if Airport 12a with Access 12a is selected in the FAA's record of decision.

Nearly all the private, Alaska Native corporation, and municipal lands in the Angoon area were deeded from the federal government to the Alaska Native corporations (Kootznoowoo, Inc. and Sealaska Corporation) under ANCSA. The exceptions are a few native allotments deeded to individual landholders under the Alaska Native Allotment Act of 1906 and the Kootznoowoo Corridor Lands around the shoreline of Favorite Bay and other local bays that were deeded to Kootznoowoo, Inc. under ANILCA. ANCSA does not have a specific process comparable to ANILCA Title XI or NEPA for the acquisition of lands allocated under ANCSA. The lands are considered held in fee title and available for sale by the owners as with any other private property. However, because the FAA would provide federal funding and approve the site location and final plans, NEPA regulations apply, and the FAA must consider the environmental effects of the action. In this case, the ultimate effect of FAA approval and funding would be that the lands acquired would be developed for airport and airport access purposes, which is the very analysis provided in detail in Chapter 4 of this EIS.

3.10. Summary of environmental effects

As introduced in section 3.5.4, the following tables provide a summary of the effects based on the analysis in Chapter 4. Table ALT8 details which of the alternatives would result in significant effects to resources and provides a link to the resource summary tables (Tables ALT9 through ALT28a and 28b). Significance is discussed in terms of the thresholds established in *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) or other agency guidance.

The FAA does not have established thresholds for five resource categories (stream geomorphology–hydrology, subsistence resources and uses, wilderness character, the national monument, and climate change–greenhouse gas emissions), and this EIS does not establish FAA thresholds for those resources. However, because Airport 3a and Airport 4 with either access would be located on lands managed by the U.S. Forest Service, the FAA uses other guidance to make determinations of significance for three of these resources—subsistence resources and uses, wilderness character, and the national monument.

In the case of subsistence resources and uses, ANILCA Title VIII (810(a)) requires a determination whether withdrawal; reservation; lease; permit; or other use, occupancy, or disposition of such lands would significantly restrict subsistence uses. The U.S. Forest Service commonly uses the thresholds of significance established for ANILCA Section 810 evaluations in the *Kunaknana v. Clark* case to make determinations of significance (see section 4.13.3.2 in Subsistence Resources and Uses for further information). In the case of wilderness character and the national monument, the FAA consulted with the U.S. Forest Service and used their guidance to make determinations of significance specifically for this EIS to satisfy that agency's NEPA requirements (see section 4.16.3.5 in Wilderness Character and section 4.19.3.4 in Admiralty Island National Monument).

Table ALT8. Summary of significant effects
= significant effect. Click on the name of each resource to navigate to its summary of effects table. Click on "Back to Last Location" button to return to this table.

Resource	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Air Quality						
Compatible Land Use						
USDOT Section 4(f) Evaluation		X	X	X	X	
Biological Resources: Terrestrial Habitats and Associated Species						
Biological Resources: Aquatic Habitats and Associated Species						
Biological Resources: Special Status Species						
Floodplains, Stream Geomorphology, and Hydrology						
Hazardous Materials, Pollution Prevention, and Solid Waste						
Cultural Resources						
Light Emissions and Visual Resources		X	X			
Energy Supply, Natural Resources, and Sustainable Design						
Noise						
Socioeconomic Conditions						
Subsistence Resources and Uses						
Water Quality						
Wetlands		X	X	X	X	X
Wilderness Character		X	X	X	X	
Climate Change and Greenhouse Gas Emissions						
Environmental Justice and Children's Health and Safety						
Admiralty Island National Monument		X	X	X	X	

Table ALT9. Air Quality: Summary of effects and significance

	Effects	No action	Any action alternative
Summary of effects	Effects from construction		
	Carbon monoxide	0 tons	57.04 tons*
	Nitrogen oxides and non-methane hydrocarbon	0 tons	107.55 tons*
	Particulate matter	0 tons	3.25 tons*
	Effects from airport operation and maintenance		
	Carbon monoxide	8.71 tons/year	18.02 tons/year†
	Nitrogen oxides	8.96 tons/year	2.84 tons/year†
	Sulfur oxide	0.67 tons/year	0.35 tons/year†
	PM_{10}	0.32 tons/year	0.09 tons/year†
	$PM_{2.5}$	0.32 tons/year	0.08 tons/year†
	Volatile organic compounds (tons/year)	1.20 tons/year	3.62 tons/year†
	Note: Lead emissions are not calculated by the Emissions and Dispersion Modeling System, which was used to calculate aviation air quality emissions. Additionally, given the relatively low number of aircraft that would use the airport and the very low levels of lead potentially emitted by small aircraft, there is no potential for exceeding the NAAQS for that pollutant. Therefore, lead emissions are not reported in this EIS. * Calculations based on emissions rates and sources listed in Table AQ1 in Air Quality. Emissions calculations assume 907,184.7 grams/ton and an average 300 horsepower (224 kilowatts) diesel engine on construction equipment for a total of 50 construction vehicles. † Includes only aviation-based emissions. Vehicle travel during operation and maintenance is not included because its contribution is negligible.		
Summary of significance	**Would there be any significant effects?**	**Why would these effects not be significant?**	
	"No" for all alternatives	• Construction-related emissions would be temporary and minimized through best management practices while all operational-related emissions for the airport and access road alternatives would be below *de minimis* thresholds.	

Note: Supporting effects analysis and significance discussions can be found in section 4.2.3 in Air Quality. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT10. Compatible Land Use: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Summary of effects	Changes in day-night average sound level	• No change in day-night average sound level and duration; 1.3 acres above DNL 65 dBA*	• 4.0 acres above DNL 65 dBA* • Increase in day-night average sound level on Monument–Wilderness Area lands as compared to no action alternative	• Same as Airport 3a with Access 2	• 2.9 acres above DNL 65 dBA* • Increase in day-night average sound level on Monument–Wilderness Area lands as compared to no action alternative	• Same as Airport 4 with Access 2	• 4.0 acres above DNL 65 dBA* • Increase in day-night average sound level on private and ANCSA lands as compared to no action alternative
	Project compatibility	• Compatible with plans and laws	• Compatible because ANILCA Title XI provides a process through which an airport could be allowed within the Monument–Wilderness Area, and no land use plan amendment would be required	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Compatible through rezoning of some acquired lands
	Land acquisition, rights-of-way, permits, and/or leases	• No change in landownership or land use	• Land acquisition, rights-of-way, permit, and/or lease of 210 acres of U.S. Forest Service and 81 acres of Kootznoowoo, Inc. lands • Conversion of 287 acres of recreation or subsistence land uses to transportation	• Land acquisition, rights-of-way, permit, and/or lease of 257 acres of U.S. Forest Service and 41 acres of Kootznoowoo, Inc. lands • Conversion of 289 acres of recreation or subsistence land uses to transportation	• Land acquisition, rights-of-way, permit, and/or lease of 234 acres of U.S. Forest Service and 34 acres of Kootznoowoo, Inc. lands • Conversion of 264 acres of recreation or subsistence land uses to transportation	• Land acquisition, rights-of-way, permit, and/or lease of 261 acres of U.S. Forest Service and 14 acres of Kootznoowoo, Inc. lands • Conversion of 266 acres of recreation or subsistence land uses to transportation	• Land acquisition, rights-of-way, permit, and/or lease of 205 acres of Kootznoowoo, Inc., and 52 acres of private lands • Conversion of 192 acres of commercial land uses, 12 acres of recreation land uses, and 52 acres of land zoned or planned for residential use to transportation

* dBA = A-weighted decibels. DNL = day-night average sound levels. See section 4.11 Noise for more information.

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Table ALT10. Compatible Land Use: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Summary of significance	**Would there be any significant effects?**	**Why would these effects not be significant?**					
	"No" for all alternatives	• There would be no noise-sensitive areas within the DNL 65 dBA contour for any action alternative. • Airports 3a and 4 would be considered a compatible land use because the ANILCA process could allow for an airport and access road to be placed on Monument–Wilderness Area lands. • Airport 12a with Access 12a would be considered compatible with City of Angoon policies because it could be made so through rezoning.					

Note: Supporting effects analysis and significance discussions can be found in section 4.3.3 in Compatible Land Use. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT11. U.S. Department of Transportation Act Section 4(f) Evaluation Summary: Summary of effects and significance

Summary of effects	**Effects**	**No action**	**Airport 3a with Access 2**	**Airport 3a with Access 3**	**Airport 4 with Access 2**	**Airport 4 with Access 3**	**Airport 12a with Access 12a**
	Effects on historic properties	None	None	None	None	None	None
	Effects on publicly owned recreational properties	No physical use	238 acres subject to physical use	285 acres subject to physical use	263 acres subject to physical use	289 acres subject to physical use	*De minimis* impacts to two Section 4(f) resources
	Note: Gray shading denotes use.						
Summary of significance	**Would there be any significant effects?**	**Why would these effects be significant?**					
	"Yes" for Airport 3a with either access and Airport 4 with either access	• Section 4(f) does not use the wording "significant;" rather, it makes a determination of whether there would be use of historic properties or recreation properties. Airport 3a with either access road and Airport 4 with either access road would result in physical use of Section 4(f) resources. According to FAA Order 1050.1E, a significant effect occurs pursuant to NEPA when a proposed action either involves more than *de minimis* use of a Section 4(f) property, or is deemed a "constructive use" substantially impairing the Section 4(f) property, and mitigation measures do not eliminate or reduce the effects of the use below the threshold of significance. Because Airport 3a and Airport 4 with either access would result in physical use of a Section 4(f) property, this use would be considered significant under FAA thresholds.					
	"No" for Airport 12a with Access 12a	• The *de minimis* impacts to Section 4(f) resources under Airport 12a with Access 12a would not be considered significant using the same thresholds described above.					

Note: Supporting effects analysis and significance discussions can be found in section 4.4.3 in U.S. Department of Transportation Act Section 4(f) Evaluation Summary. Gray shading denotes significant effects. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT12. Terrestrial Habitats and Associated Species: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Summary of effects	Long-term habitat removal (acres)	0	308	316	263	271	252
	Long-term habitat alteration (acres)	0	8	5	8	5	0
	Indirect effects from new habitat edges and increased traffic and access (miles of new road)	0	4.4	4.7	2.9	3.2	0.2
Summary of significance	**Would there be any significant effects?**	**Why would these effects not be significant?**					
	"No" for all alternatives	• The action alternatives would not remove or alter existing habitat to the extent that the population dynamics, sustainability, reproduction, mortality, or minimum population size needed to sustain a species would be adversely affected. The effects would not reduce the habitat supporting species below that needed to maintain self-sustaining populations. Maintenance of natural systems would not be adversely affected. The action would be consistent with applicable state natural resources management strategies.					

Note: Supporting effects analysis and significance discussions can be found in section 4.5.1.3 in Terrestrial Habitats and Associated Species. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT13. Aquatic Habitats and Associated Species: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Summary of effects	Acres of stream habitat removal:						
	Long term*	None	0.3	0.2	0.5	0.5*	1.2
	Temporary (only Favorite Creek stream habitat)	None	0.6	0.3	Same as Airport 3a with Access 2	Same as Airport 3a with Access 3	None
	Number of streams with habitat alteration	None	3	Same as Airport 3a with Access 2	3	Same as Airport 4 with Access 2	1
	Acres of riparian management area† removal	None	148	109	91	75	130†
	Behavioral change, injury, or mortality from pier installation in Favorite Creek:						
	Permanent bridge (number of piers)	None	2	None	2	None	None
	Temporary bridge (number of piers)	None	3–10	2–5	3–10	2–5	None
	New or improved human access and the potential for reduction of aquatic resources and damage to aquatic habitats						
	Lakes	No	Yes	Yes	Yes	Yes	No
	Favorite Creek	No	Yes	Yes	Yes	Yes	No
	Favorite Bay	No	Yes	No	Yes	No	No

*Due to rounding, the acreages of fish-bearing stream habitats (Class 1 or 2 streams) are the same as the acreages of all stream classes (Class 1–5), although Class 3–5 streams are not fish-bearing stream habitats. Airport 4 with Access 3 is the only exception, which has 0.4 acre of affected fish-bearing stream habitats (Class 1 or 2 streams) and a total of 0.5 acre of affected stream habitat for all classes, including Classes 3–5.

†Riparian management area designations apply to those streams on lands managed by the U.S. Forest Service; to allow for comparison between alternatives this analysis was applied to Airport 12a with Access 12a.

	Would there be any significant effects?	Why would these effects not be significant?
Summary of significance	"No" for all alternatives	• The action alternatives would not remove or alter existing habitat to the extent that the effects would reach the significance thresholds described in section 4.5.2.3.5. • The project would not cause any of the unacceptable adverse effects to non-wetland waters of the U.S. using the Section 404(b)(1) guidelines identified in section 4.5.2.1.2 in Aquatic Habitats and Associated Species. • None of the action alternatives would have a significant effect on essential fish habitat.

Note: Supporting effects analysis and significance discussions can be found in section 4.5.2.3 in Aquatic Habitats and Associated Species. Definitions for resource-specific terms are in the resource section or glossary.

Table ALT14. Special Status Species: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Summary of effects	Long-term terrestrial habitat value lost (acres)	0	316	321	271	276	252
	Long-term stream habitat value lost (acres)	0	0.3	0.2	0.5	0.4	1.2
	Indirect effects from increased traffic and access (miles of new road)	0	4.4	4.7	2.9	3.2	0.2
Summary of significance	**Would there be any significant effects?**	**Why would these effects not be significant?**					
	"No" for all alternatives	• There would be no long-term direct effects to federally listed species, candidate species, or species protected under the Marine Mammal Protection Act. None of the action alternatives would "jeopardize a species' continued existence or destroy or modify a species' critical habitat." • The potential for collisions between barges and marine mammals is a temporary effect that would cease at the end of construction. The effects of ship strikes to marine mammals as a result of the airport project would be very low and are not expected to affect marine mammal populations in Southeast Alaska. Because Airport 12a with Access 12a is the preferred alternative, the FAA prepared the *Biological Assessment of Listed Species for the Angoon Airport Project* (SWCA 2014c, included in this EIS as Appendix R), determining that this alternative may affect but is not likely to adversely affect humpback whales and Steller sea lions, and the National Marine Fisheries Service concurred with this determination. • The total habitat affected under even the alternative affecting the most acres of habitat is such a small proportion of the available habitat in the study area (less than 6%) that no species would be jeopardized at the population level. • The effects would not be so extensive as to alter the population dynamics, sustainability, reproduction, mortality, or minimum population size needed to sustain a species. The effects would not reduce the habitat supporting species below that needed to maintain self-sustaining populations. Maintenance of natural systems would not be adversely affected. The action would be consistent with applicable state natural resources management strategies.				

Note: Supporting effects analysis and significance discussions can be found in section 4.5.3.3 in Special Status Species. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT15. Floodplains, Stream Geomorphology, and Hydrology: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Summary of effects	Number of streams with • measureable hydrologic changes • greater than 10% change in 2-year peak discharge	 0 0	 8 3	 8 3	 5 3	 6 3	 2 1
	Max change in 2-, 10-, and 100-year peak discharges	0	33%, 19%, 9% in Stream 6	Same as Airport 3a with Access 2	23%, 13%, 6% in Stream 4	Same as Airport 4 with Access 2	16%, 9%, 5% in Stream 10
	Acres of total stream channel area directly permanently affected	0	0.3	0.2	0.4	0.5	1.2
	Largest single stream effect from bridge piers, culverts, rerouting, or filling	0	36% (Stream 2)	16% (Stream 1)	39% (Stream 9D–G)	Same as Airport 4 with Access 2	79% (Stream 10)
	Number of streams directly affected from culverts, rerouting, filling, or bridge piers	0	15	7	9	6	1
	Number of temporary bridge piers in Favorite Creek	0	3–10	2–5	3–10	2–5	0
	Acres of temporary construction in Favorite Creek floodplains	0	1.8	0.2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 3	0
	Square feet of floodplains occupied by permanent bridge piers	0	1,310	0	Same as Airport 3a with Access 2	Same as Airport 3a with Access 3	0
Summary of significance	**Would there be any significant effects?**	**Why would these effects be significant or not significant?**					
	"No" for all alternatives *Note:* The FAA does not have established significance thresholds for stream geomorphology and hydrology, and does not set them in this EIS.	• Airport 3a and Airport 4 with either access alternative would change the floodplain in the locations of bridge piers, causing limited and localized effects on the floodplain's natural and beneficial functions, such as flood storage and filtration. The limited area of the piers would not endanger human lives or reduce floodplain capacity enough to measurably increase flood risk, and therefore would not be considered significant. • Although the FAA does not have established significance thresholds for stream geomorphology and hydrology, it should be noted that Airport 12a with Access 12a would likely result in the largest effects to hydrology and stream geomorphology. All stream function would presumably be lost within the airport footprint. Changes in channel width, depth, or form would be likely to extend noticeably downstream due to changes in water velocity or sediment size and the volume of water coming from disturbed channels. Other alternatives would also result in effects but to a lesser degree. Affected streams would maintain their ability to support wildlife and fish habitat in non-affected sections and support natural sediment and water movement.					

Note: Supporting effects analysis and significance discussions can be found in section 4.6.3 in Floodplains, Stream Geomorphology, and Hydrology. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT16. Hazardous Materials, Pollution Prevention, and Solid Waste: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Summary of effects	Acres of terrain disturbance	0	150	155	134	140	119
	Acres of new impervious surface	0	29	30	26	27	20
	Construction duration* (Maximum number of seasons)	0	3	3	3	3	2
	Length of road from airport site to barge terminal (miles)	0	8.3	8.6	6.8	7.1	2.4
	* Construction seasons presented here are conservative estimates. Actual construction seasons would be determined after a build alternative is selected in the record of decision, the airport is designed, and a construction bid is accepted. A construction season typically occurs from May to October, but due to the mild climate in Angoon, construction could occur year-round depending on weather conditions.						

	Would there be any significant effects?	**Why would these effects not be significant?**
Summary of significance	"No" for all alternatives	• None of the action alternatives would involve a property on or eligible for the Environmental Protection Agency's National Priority List; the project sponsor would not have difficulty meeting applicable local, state, or federal laws and regulations on hazardous materials; and there are no unresolved issues regarding hazardous materials.

Note: Supporting effects analysis and significance discussions can be found in section 4.7.3 in Hazardous Materials, Pollution Prevention, and Solid Waste. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT17. Cultural Resources: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Summary of effects	Historic properties in the area of landscape disturbance	0	0	0	0	0	0
	High-probability lands in areas of landscape disturbance	0	119	84	96	85	128
	Historic properties in one or more of the indirect effects areas of potential effects (APEs)	0	5	5	5	5	4
	High-probability lands in new or improved access APE, and increased potential for disturbance from human activity	0	854	949	678	697	N/A*
	High-probability areas in vibration APE and potential for vibration disturbance	0	193	32	71	34	13
	High-probability areas in visual APE, and increased potential for visual intrusion	0	25	25	N/A**	N/A**	15
	*Airport 12a with Access 12a would not improve access to any areas beyond those already currently accessible. **There is no visual APE for this alternative because the altered landscape would not be visible from outside the immediate disturbance area. NA = not applicable.						

	Would there be any significant effects?	Why would these effects not be significant?
Summary of significance	"No" for all alternatives	• No significant effects to cultural resources were identified for any action alternative. Significant effects could occur if currently buried or hidden cultural resources are uncovered during construction. As detailed in section 7.4.2 of Chapter 7: Mitigation, cultural resource monitors would be used during construction to watch for the exposure of buried cultural resources hidden by dense vegetation. Standard protocol for reporting the discovery to the proper agencies and consulting with agencies and other consulting parties about the best way to address the discovery would be followed.

Note: Supporting effects analysis and significance discussions can be found in section 4.8.3 in Cultural Resources. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT18. Light Emissions and Visual Resources: Summary of effects and significance

	Effects	Airport 3a with Access 2 (proposed action)	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a (preferred alternative)
Summary of effects	**Light emissions**	• Temporary visibility of lights and skyglow at night and during daytime low-light conditions from construction vehicles and illuminated construction areas and equipment • Long-term visibility of intermittent, brief, and low-intensity skyglow during airport operation at night and during daytime, low-light conditions	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Temporary visibility of lights and skyglow would be same as Airport 3a with Access 2 but would increase the existing light in these areas, contributing to existing skyglow • Long-term visibility of lights from Viewpoint 5 and long-term visibility of intermittent, brief, and low-intensity skyglow during airport operation at night and during daytime, low-light conditions
	Visual resources					
	Viewpoint 1	• Temporary visibility of bridge construction equipment • No visibility of airport, access road, or avigation easements in the long term	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• No visibility of construction actions • No visibility of airport, access road, or avigation easements in the long term
	Viewpoint 2			• No visibility of construction actions • No visibility of airport, access road, or avigation easements in the long term	• Same as Airport 4 with Access 2	• Same as Airport 4 with Access 2
	Viewpoint 2a	• No visibility of construction actions • No visibility of airport, access road, or avigation easements in the long term	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2
	Viewpoint 4	• No visibility of construction actions • No visibility of airport, access road, or avigation easement in the long term	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2
	Viewpoint 5	• Temporary visibility of construction traffic and barge traffic • No visibility of airport, access road, or avigation easements in the long term	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Temporary visibility of construction traffic and barge traffic • Major contrasts from vegetation clearing for the airport, producing a long-term effect

Table ALT18. Light Emissions and Visual Resources: Summary of effects and significance

	Effects	Airport 3a with Access 2 (proposed action)	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a (preferred alternative)
	Viewpoint 6	• Temporary visibility of construction traffic • No visibility of airport, access road, or avigation easements in the long term	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Temporary visibility of construction traffic • Visibility of vegetation clearing at avigation easement along the Kootznahoo Road • No visibility of airport or access road
	Viewpoint 7	• Temporary visibility of construction traffic • No visibility of airport, access road, or avigation easements in the long term	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• No visibility of construction traffic • No visibility of airport, access road, or avigation easements in the long term
	Wilderness	• Temporary effects to opportunities for solitude from visibility of nighttime and low-light daytime light emissions from construction equipment and construction lights • Long-term effects to opportunities for solitude from visibility of airport developments and motorized equipment, and from nighttime and low-light daytime skyglow during airport operation	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Temporary effects to opportunities for solitude from visibility of nighttime and low-light daytime light emissions from construction equipment and construction lights • Long-term effects to opportunities for solitude from nighttime and low-light daytime skyglow during airport operation
Summary of Significance	*Note:* Gray shading denotes significant effects					
	Would there be any significant effects?	**Why would these effects be significant or not significant?**				
	"Yes" for Airport 3a with either access *Note:* U.S. Forest Service thresholds are used to determine the significance of effects for Airport 3a and Airport 4.	Vegetation clearing for Airport 3a would be visible from Viewpoint 2 to the Favorite Bay shoreline, producing clearly observable deviations from the designated "High" scenic integrity in the U.S. Forest Service–administered Monument–Wilderness Area. The contrasts would not repeat the surrounding form, line, color, and texture, and would exceed the planning objectives for the area. Mitigation of visual contrasts within the airport site would not sufficiently reduce the contrasts below the significance threshold.				
	"No" for Airport 4 with either access and for Airport 12a with Access 12a	Airport 4 with either access would not be visible from any of the viewpoints and would therefore cause no effects to visual resources. Vegetation clearing for Airport 12a with Access 12a would be visible from Viewpoint 5 (Whaler's Cove Lodge) and would cause long-term visual effects. However, because Airport 12a is not located on lands managed by the U.S. Forest Service, no visual resource significance thresholds would be exceeded unless the FAA determines, in consultation with the public, that these long-term effects would be visually objectionable. No comments were received during the draft EIS comment period to indicate that the public, tribes, or agencies find the effects objectionable.				

Note: Supporting effects analysis and significance discussions can be found in section 4.9.3 of Light Emissions and Visual Resources. Gray shading denotes significant effects. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT19. Energy Supply, Natural Resources, and Sustainable Design: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Summary of effects	Miles of new road	0	4.4	4.7	2.9	3.2	0.2
	Acres of land committed	0	408	408	360	365	350
	Acres of landscape disturbance	0	344	349	290	295	258
	Cut and fill (cubic yards)	0 cut; 0 fill	471,200 cut; 409,000 fill	1,176,500 cut; 379,000 fill	650,700 cut; 553,400 fill	1,286,100 cut; 554,600 fill	342,300 cut; 291,700 fill
	Cubic yards of construction aggregate	0	119,130	122,748	102,430	105,748	72,500
	Water use (Mgal*)	0	2,000–10,000	2,000–10,000	2,000–10,000	2,000–10,000	2,000–10,000
	Project fuel use† (gallons)	20,000 diesel and gasoline / month‡ (existing usage)	500,000 diesel, 20,000 gasoline	500,000 diesel, 20,000 gasoline	400,000 diesel, 15,000 gasoline	400,000 diesel, 15,000 gasoline	300,000 diesel, 10,000 gasoline
	Source: DOWL HKM (2013), included as Appendix C, unless otherwise noted. * Mgal = million gallons. † Estimated quantities are for construction. Fuel would also be consumed by additional air traffic and additional passenger vehicles traveling to and from the airport, but a specific analysis of fuel use for those categories was not conducted. An estimated 500–1,000 gallons of fuel would be maintained at the airport to fuel the on-site lighting generator. ‡ Thompson and Thompson 2012.						

	Would there be any significant effects?	Why would these effects not be significant?
Summary of significance	"No" for all alternatives	• Given the FAA threshold for effects to energy supplies and natural resources, none of the alternatives are expected to have significant effects. None would create demands for energy and natural resources that would exceed available or future natural resources or energy supplies in the Angoon area. The materials that would be barged in for this project are in sufficient supply in other locations in Southeast Alaska (see section 3.4.2.1 for further description of potential materials source sites).

Note: Supporting effects analysis and significance discussions can be found in section 4.10.3 in Energy Supply, Natural Resources, and Sustainable Design. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT20. Noise: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Summary of effects	Acres in DNL 65 dBA contour	1.3	3.7	3.7	2.6	2.6	3.7
	Number of grid points experiencing a 5-dBA or greater increase in DNL*	No change	21	21	21	21	21
	Number of grid points experiencing a 5-dBA or greater increase in Leq*	No change	31	31	32	32	24
	Number of grid points experiencing a 3-dBA or greater increase in Lmax*						
	+3.0 to +4.9 dBA	No change	11	11	14	14	15
	+5.0 to +9.9 dBA	No change	16	16	27	27	22
	+10.0 to +19.9 dBA	No change	28	28	39	39	39
	+20.0 to +32.9 dBA	No change	11	11	14	14	3
	Total	No change	66	66	94	94	69
	Number of grid points experiencing an increase in TAA*						
	0.1–4.9 minutes	No change	320	320	368	368	379
	5.0–9.9 minutes	No change	62	62	70	70	31
	10.0–19.9 minutes	No change	19	19	36	36	31
	20.0–29.9 minutes	No change	1	1	4	4	7
	30.0–39.9 minutes	No change	0	0	1	1	5
	Total	No change	402	402	479	479	453
	Construction noise level	No effect	Temporary increase	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2
	* A grid point is a specific location established at predetermined intervals of 1 nautical mile. dBA = A-weighted decibels. DNL = day-night average sound levels. Leq = equivalent noise level. Lmax = maximum sound level. TAA = time above ambient. See section 4.11 Noise for more information on these terms.						

Summary of significance	**Would there be any significant effects?**	**Why would these effects not be significant?**
	"No" for all alternatives	• There would be no noise-sensitive areas within the DNL 65 dBA contour for any action alternative. Therefore, per FAA orders, there would be no significant effect from noise to noise-sensitive areas.

Note: Supporting effects analysis and significance discussions can be found in section 4.11.3 in Noise. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT21. Socioeconomic Conditions: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Summary of effects	Relocation of residents	• No relocation of residents	• Same as no action	• Same as no action	• Same as no action	• Same as no action	• Acquisition of 37 zoned residential parcels
	Business relocation	• No relocation of businesses	• Same as no action	• Same as no action	• Same as no action	• Same as no action	• Same as no action
	Disruption in local traffic patterns • Change in average daily traffic during operation • Change in average daily traffic during construction • Number of daily truck trips during construction	• No change in average daily traffic • No change in level of service	• 2–5% increase in average daily traffic during operation • 12% increase in average daily traffic during construction • 62 daily truck trips	• Average daily traffic during construction, operation, and maintenance same as Airport 3a with Access 2 • 104 daily truck trips	• Average daily traffic during construction, operation, and maintenance same as Airport 3a with Access 2 • 81 daily truck trips	• Average daily traffic during construction, operation, and maintenance same as Airport 3a with Access 2 • 120 daily truck trips	• Average daily traffic during construction, operation, and maintenance same as Airport 3a with Access 2 • 66 daily truck trips
	Increase in sales tax during construction	• No change	• $23,403	• $31,422	• $23,759	• $32,456	• $12,759
	Changes in business activity and economic revenue • Number of construction-based jobs • Total revenue generated during construction • Number of operation-related jobs	• No change to long-term economic activity, revenue, employment	• 13.4 jobs created • $1,382,780 in economic benefits generated • 1.5 jobs created	• 16.4 jobs created • $1,762,454 in economic benefits generated • 1.5 jobs created	• 13.7 jobs created • $1,390,715 in economic benefits generated • 1.5 jobs created	• 16.7 jobs created • $1,799,801 in economic benefits generated • 1.5 jobs created	• 7.2 jobs created • $761,630 in economic benefits generated • 1.5 jobs created
	Changes in population movement and growth	• No effect on projected long-term population trends • Continued outmigration by younger residents	• Potential decrease in outmigration and subsequent population rise	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2

Table ALT21. Socioeconomic Conditions: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
	Changes in public service demand	• No change to city service demand • Continued difficulty in meeting ferry/seaplane demand due to reliability and availability issues	• Increased city service demand • Improved service capacity to meet aviation demand	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2
	Changes in transportation costs	• No change in current travel costs and airfare	• Less than 1 gallon of fuel (approximately $5) to drive to airport • Costs for passenger and cargo shipping may decrease	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2
	Changes in subsistence from a decrease or increase in acres of access	• No change	• 628 acres net gain	• 1,318 acres net gain	• 796 acres net gain	• 1,082 acres net gain	• 96 acres net decrease
	Changes in commercial land use from conversion of land to airport use (acres converted)	• No change to current land use	• 4	• 9	• 4	• 9	• 193
Summary of significance	**Would there be any significant effects?**	**Why would these effects not be significant?**					
	"No" for all alternatives	• Direct effects related to business relocation, traffic patterns, and tax base would not be significant because they would fall below the FAA's significance thresholds. Airport 12a would require long-term property acquisition for 37 parcels, but these effects would not be significant because of 1) the low number of affected parcels, 2) the availability of vacant homes in the town core, and 3) the FAA's adherence to the Uniform Relocation Assistance and Real Property Acquisition Act of 1970. The law was enacted to ensure fair and equitable treatment and moving assistance to all people whose property would be acquired. • For indirect effects, construction of the proposed airport and access road would result in short-term positive economic and employment effects for the Angoon community but these effects would not be significant. All other indirect effects—including changes in transportation costs, public service demand, subsistence, and population movement and growth—would also not be significant.					

Note: Supporting effects analysis and significance discussions can be found in section 4.12.3 in Socioeconomic Conditions. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT22. Subsistence Resources and Uses: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Summary of effects	**Change in abundance and availability**						
	Acres of land affected by construction	0	321	349	290	295	258
	Acres of use areas lost through vegetation clearing						
	Land mammals and upland birds	0	262 (7%)	246 (6%)	189 (5%)	170 (5%)	184 (5%)
	Land vegetation	0	68 (4%)	65 (4%)	58 (3%)	59 (3%)	138 (8%)
	Marine resources (mammals, vegetation, and invertebrates) and fish	0	0	0	0	0	0
	Acres of fish use areas affected by bridge construction	0	0.6 (<0.01%)	0.3 (<0.01%)	0.6 (<0.01%)	0.3 (<0.01%)	0
	Change in access						
	Acres of temporarily reduced access during airport, bridge, and access road construction	0	321	349	290	295	258
	Acres of long-term reduced access from perimeter fence	0	98	98	100	100	96
	Acres of new access	0	726	1,416	896	1,182	0
	Net effect to access during airport and access road operation for all use areas	0 acres	+628 acres (+4%)	+1,318 acres (+7%)	+796 acres (+5%)	+1,082 acres (+6%)	−96 acres (−0.5%)
	Change in competition						
	Qualitative change in local subsistence use patterns	No change	Decrease in competition for use areas; some localized increased competition along Favorite Bay	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Increase in competition due to decrease in access to use areas

Table ALT22. Subsistence Resources and Uses: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
	Qualitative change in nonlocal recreation use	No change	No anticipated change in hunting or other land-based subsistence use; slight increase in fishing and marine invertebrate harvest	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2
Summary of significance	**Would there be any significant effects?**	**Why would these effects not be significant?**					
	"No" for all alternatives *Note:* The FAA does not have established significance thresholds for subsistence, and does not set them in this EIS. For this EIS, significance has been determined based on criteria used by U.S. Forest Service, developed by the Bureau of Land Management, and confirmed by the U.S. District Court in Alaska.	• There would be no major reductions in abundance or availability of subsistence resources because less than 8% of land mammal and upland bird use areas would be affected by any airport and access road combination, which is assumed to directly correlate to less than an 8% reduction in total harvest for terrestrial species. Based on the significance criteria outlined in this EIS, a significant effect to abundance and availability would only occur if project-related effects resulted in a reduction of more than 16% in the total harvest of a resource. In addition, there would be no substantial interference in access of subsistence use sites, and, in the cases of the access roads to Airport 3a or Airport 4, access to surrounding use areas would increase. Finally, although there would be some increase in nonlocal use of the Angoon area, predominantly for recreational fishing and marine invertebrate harvest, reported visitor levels are low and are not likely to substantially rise above existing nonlocal use levels.					

Note: Supporting effects analysis and significance discussions can be found in section 4.13.3 in Subsistence Resources and Uses. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT23. Water Quality: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Summary of effects	Number of streams with turbidity increases (up to the 5-NTU threshold)	2*	13	13	8	8	2
	Effectiveness value for best management practices to avoid exceeding the 5-NTU threshold	NA	86%	Same as Airport 3a with Access 2	74%	Same as Airport 4 with Access 2	80%
	Contaminant runoff: Largest percentage of watershed paved	0%	7%	Same as Airport 3a with Access 2	3%	Same as Airport 4 with Access 2	5%
	Contaminant runoff: Number of streams affected by paved surfaces and in-stream construction	0	15	8	9	7	1
	Number of temporary bridge support piers in Favorite Creek during construction	0	3–10	3–10	2–5	2–5	0
	*The existing materials source and BIA Road to Auk'Tah Lake currently contribute some sediment to nearby streams.						

	Would there be any significant effects?	Why would these effects not be significant?
Summary of significance	"No" for all alternatives	As stated in section 4.14.3.6 in Water Quality, none of the alternatives would threaten a public drinking water supply, sole source aquifer, or waters of national significance, and no difficulty is expected in obtaining a Storm Water Construction General Permit if an action alternative is selected. In this EIS, the significance of water quality effects is therefore based on the State of Alaska's standards and beneficial uses of the surface water affected. As described in section 4.14.3.2.1, construction best management practices would be implemented to avoid turbidity increases in excess of 5 NTUs, thereby protecting beneficial uses. Through proper application of best management practices and spill prevention measures during construction, operation, and maintenance, there would be no significant effects to water quality from any alternative.

Note: Supporting effects analysis and significance discussions can be found in section 4.14.3 in Water Quality. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT24. Wetlands: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Summary of effects	Wetland fill and changes to wetland hydrology	0 acres	112 acres	99 acres	51 acres	43 acres	78 acres
	Wetland alteration	0 acres	86 acres	80 acres	43 acres	60 acres	99 acres
	Note: Gray shading denotes significant effects.						
Summary of significance	**Would there be any significant effects?**	**Why would these effects be significant?**					
	"Yes" for all action alternatives	• Development of any of the airport and access alternatives would convert wetlands to uplands and result in the loss of all wetland functions and services in areas where wetlands were filled. • Reductions in wetland functions and services would occur as a result of wetland alteration due to vegetation clearing and tree felling. • Wetland functions and services would be reduced in areas where the loss of a portion of a wetland or of adjacent wetlands resulted in modifications to wetland hydrology and associated wetland functions and services. • The magnitude and extent of activities under all action alternatives would be considered significant under NEPA according to the significance criteria described in section 4.15.3.5 in Wetlands.					

Note: Supporting effects analysis and significance discussions can be found in section 4.15.3 in Wetlands. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT25. Wilderness: Summary of effects and significance

	Quality or resource contributing to public purposes	Specific action causing effects	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12
Summary of effects to wilderness qualities	Untrammeled	• Construction actions and operations and maintenance actions	• Seven construction actions and eight operations actions	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• 0 construction or operations actions
	Natural	• Construction actions and operations actions, and the downstream or watershed effects of those actions	• 791 acres degraded	• 817 acres degraded	• 1,402 acres degraded	• 1,418 acres degraded	• 0 acres degraded
		• Isolation of wilderness	• 126 acres isolated	• 679 acres isolated	• 219 acres isolated	• 374 acres isolated	• 0 acres isolated
	Undeveloped	• Presence of developments	• Eight types of developments introduced • 22 acres of developments introduced • Visibility of vehicles and maintenance equipment	• Eight types of developments introduced • 28 acres of developments introduced • Visibility of vehicles and maintenance equipment	• Same as Airport 3a with Access 2	• Eight types of developments introduced • 25 acres of developments • Visibility of vehicles and maintenance equipment	• No developments
		• Presence of motorized equipment	• Motorized equipment for maintenance of vegetation, pavement, snow removal, aircraft operations, public vehicular access, and for electrical generation	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• No motorized equipment

Table ALT25. Wilderness: Summary of effects and significance

	Quality or resource contributing to public purposes	Specific action causing effects	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12
Summary of effects to wilderness qualities	Opportunities for solitude	• New or improved access to the wilderness area					• 0 acres of new or improved access
		• Light emissions from construction					• Skyglow would be visible from adjacent portions of the wilderness area for up to three construction seasons
		• Light emissions during operation					• Intermittent, brief, and low-intensity skyglow from the airport's upward-directed runway lights and navigational aids in portions of the wilderness near the runway during approaches and takeoffs

Table ALT25. Wilderness: Summary of effects and significance

	Quality or resource contributing to public purposes	Specific action causing effects	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12
Summary of effects to wilderness qualities		• Presence of developments and motorized equipment	• 502 acres where developments or motorized equipment would be visible • Exceedance of recommended encounter rates for Recreation Opportunity Spectrum (ROS) classes • Unquantifiable use of airport access road for subsistence, recreation, and maintenance	• 735 acres where developments or motorized equipment would be visible • Exceedance of recommended encounter rates for ROS classes • Unquantifiable use of airport access road for subsistence, recreation, and maintenance	• 528 acres where developments or motorized equipment would be visible • Exceedance of recommended encounter rates for ROS classes • Unquantifiable use of airport access road for subsistence, recreation, and maintenance	• 630 acres where developments or motorized equipment would be visible • Exceedance of recommended encounter rates for ROS classes • Unquantifiable use of airport access road for subsistence, recreation, and maintenance	• No developments or motorized equipment in or visible from wilderness • Exceedance of recommended encounter rates for ROS classes

Table ALT25. Wilderness: Summary of effects and significance

	Quality or resource contributing to public purposes	Specific action causing effects	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12
Summary of effects to wilderness qualities	Opportunities for solitude	• Noise from aircraft	• Maximum of 26 additional minutes per day time above ambient (TAA) from existing conditions in wilderness boundary • 186,551 acres of wilderness where aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period	• Same as Airport 3a with Access 2 186,551 acres of wilderness where aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period	• Maximum of 31 additional minutes per day TAA from existing conditions in wilderness boundary • 272,802 acres of wilderness where aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period	• Same as Airport 4 with Access 2 • 272,802 acres of wilderness where aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period	• Fewer than 10 additional minutes per day TAA from existing conditions within the wilderness boundary • 270,262 acres of wilderness where aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period

Table ALT25. Wilderness: Summary of effects and significance

	Quality or resource contributing to public purposes	Specific action causing effects	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12
Summary of effects to wilderness qualities		• Noise from construction equipment and motor vehicles • Noise from vehicles and maintenance equipment	• Temporary increases in noise from construction equipment and worker vehicles in localized areas near this alternative only during construction • During operation, wilderness users near the airport would be able to hear vehicles and maintenance equipment. Because there would be an unquantifiable public use of motorized vehicles and equipment associated with subsistence, recreation, and maintenance along the airport access road, it is not possible to quantify noise levels.	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Temporary increases in noise from construction equipment and worker vehicles in parts of the wilderness area closest to this alternative only during construction
	Opportunities for primitive and unconfined recreation	• Presence of perimeter fence (restricting access) or pavement (hindering primitive and unconfined recreation)	• 101 acres where primitive and unconfined recreation could no longer occur	• 106 acres where primitive and unconfined recreation could no longer occur	• 105 acres where primitive and unconfined recreation could no longer occur	• 107 acres where primitive and unconfined recreation could no longer occur	• 0 acres where primitive and unconfined recreation could no longer occur

Table ALT25. Wilderness: Summary of effects and significance

	Quality or resource contributing to public purposes	Specific action causing effects	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12
Summary of effects to resources that contribute to public purposes	Unspoiled natural ecosystem	NA					0 acres degraded
	Brown bears	NA					0 acres degraded
	Eagles	NA					0 acres degraded
	Cultural resources	NA					0 acres degraded
	Customary and traditional subsistence uses	NA					0 acres degraded
	Visual resources	NA					0 acres degraded
	Note: Gray shading denotes significant effects. *TAA = time above ambient. See section 4.11.2.1.2 in Noise for more information.						
Summary of significance	**Would there be any significant effects?**		**Why would these effects be significant or not significant?**				
	"No" for Airport 12a with Access 12a		• Airport 12a with Access 12a would be compatible with the desired conditions of the Kootznoowoo Wilderness Area and therefore would have no significant effect on wilderness qualities and public purposes.				

Note: Supporting effects analysis and significance discussions can be found in section 4.16.3 in Wilderness Character. Gray shading denotes significant effects. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT26. Climate Change and Greenhouse Gas Emissions: Summary of effects and significance

Summary of effects	**Effects**	**No action**	**Airport 3a with Access 2**	**Airport 3a with Access 3**	**Airport 4 with Access 2**	**Airport 4 with Access 3**	**Airport 12a with Access 12a**
	Emissions of greenhouse gas during construction	No new construction-related CO_2e emissions	Increased emissions would be short in duration and negligible in quantity compared to U.S. and world greenhouse gas emissions	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2
	Emissions of greenhouse gas during operation and maintenance	1,645 metric tons of CO_2e	829 metric tons of CO_2e	829 metric tons of CO_2e	829 metric tons of CO_2e	829 metric tons of CO_2e	829 metric tons of CO_2e
	Note: CO_2e stands *for* carbon dioxide equivalent, a unit of measurement that allows the effects of different greenhouse gases to be compared using carbon dioxide as a standard unit for reference.						
Summary of significance	**Would there be any significant effects?**	**Why would these effects not be significant?**					
	The FAA does not have established significance thresholds for climate change and greenhouse gas emissions, and does not set them in this EIS.	• Although the FAA does not have established significance thresholds for climate change and greenhouse gas emissions, it should be noted that greenhouse gas emissions would be short in duration and negligible in quantity during construction. Operation and maintenance of a land-based airport would reduce greenhouse gas emissions by approximately 50%, as compared to the no action alternative.					

Note: Supporting effects analysis and significance discussions can be found in section 4.17.3 in Climate Change and Greenhouse Gas Emissions. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT27. Environmental Justice and Children's Health and Safety: Summary of effects and significance

	Effects	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Summary of effects	Cultural resources Table ALT14						
	Light Emissions and Visual Resources Table ALT15						
	Subsistence Resources and Uses Table ALT19						
	Wetlands Table ALT21						
	Wilderness Character Table ALT22						
	Children's health and safety	No effect	No disproportionate risk to children's health and safety	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2
Summary of significance	**Would there be any significant effects?**	**Why would these effects not be significant?**					
	"No" for all alternatives	• There would be no disproportionately high and adverse effects to low-income or minority residents as a result of the proposed project. For this reason, none of the action alternatives would have a significant effect on the environmental justice population. • There would be no disproportionately high and adverse health and safety risks to children from any of the action alternatives.					

Note: Supporting effects analysis and significance discussions can be found in section 4.18.3 in Environmental Justice and Children's Health and Safety. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT28a. Admiralty Island National Monument: Summary of effects and significance

	Resource contributing to monument purposes	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12
Summary of effects	Cultural history of the Tlingit Indians Archaeological and historical resources	• 575 acres (cultural) • 203 acres (subsistence)	• 635 acres (cultural) • 171 acres (subsistence)	• 377 acres (cultural) • 127 acres (subsistence)	• 386 acres (cultural) • 109 acres (subsistence)	• No effects
	Unspoiled coastal island ecosystem, including brown bears and bald eagles	• 923 acres (actions, watershed, and downstream) • 288 acres (isolation) • 718 acres (scenery) • Night and low-light skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.	• 925 acres (actions, watershed, and downstream) • 945 acres (isolation) • 802 acres (scenery) • Night and low-light skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.	• 1,473 acres (actions, watershed, and downstream) • 347 acres (isolation) • 624 acres (scenery) • Night and low-light skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.	• 1,477 acres (actions, watershed, and downstream) • 544 acres (isolation) • 665 acres (scenery) • Night and low-light skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.	• Night and low-light skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.
	Note: Gray shading denotes significant effects.					
Summary of significance	**Would there be any significant effects?**	**Why would these effects not be significant?**				
	"Yes" for Airport 3a and Airport 4 with either access. *Note*: The FAA does not have established significance thresholds for monument purposes and does not set them in this EIS. Because Airport 3a and Airport 4 are on lands managed by the U.S. Forest Service, the FAA consulted with them and used their guidance to make determinations of significance.	• The FAA finds that both Airport 3a and Airport 4 with either access would be incompatible with the desired conditions set forth in the enabling legislation and the land management plan (U.S. Forest Service 2008a). By extension, the FAA therefore finds that the effects from any of the monument alternatives to monument purposes would be significant.				
	"No" for Airport 12a with Access 12a	• Airport 12a with Access 12a would be compatible with the desired conditions of the Kootznoowoo Wilderness Area and therefore would have no significant effect on monument purposes.				

Note: Supporting effects analysis and significance discussions can be found in section 4.19 Admiralty Island National Monument. Gray shading denotes significant effects. Definitions for resource-specific terms can be found in the resource section or glossary.

Table ALT28b. Kootznoowoo Corridor Lands federal reserved rights: Summary of effects and significance

	Federal reserved right	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12
Summary of effects	Right of public access and use	• 3 acres enclosed by perimeter fence	• 3 acres enclosed by perimeter fence	• 0 acres enclosed by perimeter fence	• 0 acres enclosed by perimeter fence	• No effect
	Right of quiet enjoyment	• Up to 26 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer	• Up to 26 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer	• Up to 30 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer	• Up to 30 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer	• Up to 31 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer
		• Temporary localized increases from construction and vehicles	• Temporary localized increases from construction and vehicles	• Temporary localized increases from construction and vehicles	• Temporary localized increases from construction and vehicles	• No effect
		• Permanent localized increases from motorized equipment	• Permanent localized increases from motorized equipment	• Permanent localized increases from motorized equipment	• Permanent localized increases from motorized equipment	• No effect
	Development rights	• 55 acres of developments	• 22 acres of developments	• 23 acres of developments	• 3 acres of developments	• No effect
	Note: Gray shading denotes significant effects.					
Summary of significance	**Would there be any significant effects?**	**Why would these effects be significant or not significant?**				
	"Yes" for Airport 3a and Airport 4 with either access *Note*: The FAA does not have established significance thresholds for federal reserved rights and does not set them in this EIS. Because the U.S. Forest Service has management jurisdiction over the federal lands (including the Kootznoowoo Corridor Lands), the FAA consulted with them and used their guidance to make determinations of significance.	• The FAA finds that both Airport 3a and Airport 4 with either access road would be incompatible with the desired conditions for federal reserved rights. By extension, the FAA therefore finds that the effects to the federal reserved rights would be significant.				
	"No" for Airport 12a with Access 12a					• Airport 12a with Access 12a would not affect any of the federal reserved rights within the boundaries of the Kootznoowoo Corridor Lands, and its effects would therefore be compatible with the provisions and desired conditions as outlined in the enabling legislation.

Note: Supporting effects analysis and significance discussions can be found in section 4.19 Admiralty Island National Monument. Definitions for resource-specific terms can be found in the resource section or glossary.

4. Existing Conditions and Project Effects

4.1. Introduction: What information is provided in Chapter 4?

In an environmental impact statement (EIS), the natural, cultural, and social environment is examined in terms of ***resource*** categories. The EIS must describe each resource's current state—its existing condition—before any action related to a project is undertaken. It must also describe how each ***alternative*** would affect each resource—the project effects.

Chapter 4 addresses existing conditions and project effects by resource. Each resource section introduces the resource, describes its current condition, and ***analyzes*** the anticipated effects from each alternative and whether those effects would be significant.

What is discussed in this section?

Terms to know

Alternative: A term used in the National Environmental Policy Act (NEPA) of 1969 (Public Law [PL] 91-190) that refers to a required option for a project. Alternatives must meet the goals of the project while providing different possibilities for how the project would affect the environment.

Analyze: Used here, to assess or study something to answer a question. EIS analyses identify similarities or differences among the various alternatives' effects on the environment. This allows comparison of the alternatives to each other and to the no action alternative.

Resource: A natural, cultural, or social feature that is valued for its role in the human environment, economy, or society. Examples include archaeological sites, vegetation and wildlife, visual resources (how the land appears), and water bodies such as streams and wetlands.

4.1.1. What resources are discussed in this EIS?

This EIS covers the resource categories defined in Appendix A of *Order 1050.1E, Chg1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a), which is the Federal Aviation Administration (FAA) policy for implementing the National Environmental Policy Act (NEPA) of 1969 (Public Law [PL] 91-190). (For more information on NEPA, see section 1.2 in Chapter 1: Project Background – Planning for a Land-Based Airport at Angoon, and section 3.2 in Chapter 3: Alternatives.) Additionally, this EIS contains sections on ***subsistence use*** and ***wilderness character***. Although the FAA order does not specifically call for a section on subsistence, this EIS includes it because subsistence is an integral part of many Angoon residents' lifestyle and economy (see section 4.13 Subsistence Resources and Uses). A section on wilderness character section is included because four of the five action alternatives are located on land federally designated as a wilderness area (see section 4.16 Wilderness Character). See the blue sidebar at right titled "Resources not addressed in this EIS" for other resource categories the FAA typically analyzes as part of an EIS.

The federal Coastal Zone Management Act of 1972 (Public Law [PL] 92-583) requires states to assess effects to coastal resources. In Alaska, the Division of Coastal and Ocean Management enforces the Coastal Zone Management Act through the Alaska Coastal Management Program; however, on June 30, 2011, the Alaska Coastal Management Program expired. With the Angoon Coastal District plan also having expired, there are no longer any specific enforceable policies applicable to the coastal zone in the proposed locations of the alternatives. Therefore, there will be no formal Coastal Zone Consistency Determination.

However, because each alternative could affect resources in coastal areas, the FAA has analyzed and disclosed those effects in this EIS despite the lack of enforceable policies. This analysis can be found in the individual resource sections of Chapter 4.

Terms to know

Subsistence use: According to Section 803 of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 (PL 96-487), "the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade." See section 4.13 Subsistence Resources and Uses for more information.

Wilderness character: The term "wilderness character" comes from the definition of "wilderness" in the Wilderness Act (Public Law 88-577). It describes an area where the earth and its community of life are untrammeled by humans, that is managed for natural conditions, that has no permanent improvements or human habitation, and that has outstanding opportunities for solitude or a primitive and unconfined type of recreation.

Resources not addressed in this EIS

Potentially affected soils and geology resources are discussed in *Construction Methods and Issues* (DOWL HKM 2013, included as Appendix C). Other resources listed in the FAA orders are not included in this EIS. For example, farmlands and wild and scenic rivers are resources listed in FAA Order 1050.1E that do not exist in the areas that could be affected by the alternatives, and are therefore not addressed in this EIS.

Table INT1 lists the resources analyzed in this chapter. Technical reports addressing many of these resources are provided as appendices; each is cited where appropriate and provides details in support of the discussion in this EIS.

Table INT1. Resource sections

Section	Resource Category	Section	Resource Category
4.2	Air Quality	4.10	Energy Supply, Natural Resources, and Sustainable Design
4.3	Compatible Land Use	4.11	Noise
4.4	U.S. Department of Transportation Act Section 4(f) Evaluation Summary	4.12	Socioeconomic Conditions
4.5	Biological Resources Introduction	4.13	Subsistence Resources and Uses
4.5.1	Terrestrial Habitats and Associated Species	4.14	Water Quality
4.5.2	Aquatic Habitats and Associated Species	4.15	Wetlands
4.5.3	Special Status Species	4.16	Wilderness Character
4.6	Floodplains, Stream Geomorphology, and Hydrology	4.17	Climate Change and Greenhouse Gas Emissions
4.7	Hazardous Materials, Pollution Prevention, and Solid Waste	4.18	Environmental Justice and Children's Health and Safety
4.8	Cultural Resources	4.19	Admiralty Island National Monument
4.9	Light Emissions and Visual Resources		

4.1.2. How are construction and operation of the airport and access road analyzed for their effects on the environment?

To analyze a project's effects to the environment, a specialist must know the particular actions that would occur for the project. For this EIS, the actions fall into two categories: 1) actions related to construction of the airport and access road, and 2) actions related to their operation and maintenance, once built.

4.1.2.1. What are the construction actions?

For most resources, effects analysis begins with mapping the locations of the actions related to construction. To do this, the actions are lumped into several general categories that reflect the kind of change they would have on the landscape, namely the following (see Figure INT1):

- Vegetation removal related to the airport, road, and certain ***avigation easements*** (clearing of all vegetation for construction, line of sight, and open areas for flight approach and takeoff).
- Tree felling in certain avigation easements (cutting down trees but not other vegetation). For the effects analysis, where tree felling is identified in certain avigation easements, it is assumed that all trees in these easements would be felled (cut down). Therefore, this action is often grouped with vegetation removal in the analysis of potential effects.
- Terrain disturbance related to the airport, airport access road, and access roads to avigation easements (cutting and filling of soil or blasting of bedrock to level the ground).
- Terrain disturbance from potential extraction of construction materials such as gravel, soil, and rock from an on-island materials source
- Pavement related to the airport and road (creating ***impervious*** surfaces).
- Bridge construction for Airports 3a and 4 (temporary staging areas for construction and permanent and temporary bridge ***piers*** placed in or alongside Favorite Creek). This could involve soil compaction and vegetation removal throughout the construction period. Cleared areas would be revegetated at the end of construction.
- ***Culverting***, re-routing, or filling of streams.

What is discussed in this section?

Terms to know

Avigation easements: A right-of-way tool used in airport planning to grant certain rights to the holder of the easement. For this EIS, avigation easements outside of airport property would provide DOT&PF the right to access areas to clear them of obstructions and maintain that clearance.

Culverting: The creation of a drain or pipe that allows water to flow under a road, runway, or similar structure.

Impervious: The quality of not allowing water to pass through. Instead, water collects and can create runoff.

Pier: Upright support for a structure.

In some resource sections, these actions were grouped together into one or a few combined actions based on the nature of the effects they would cause. For example, in section 4.9 Light Emissions and Visual Resources, all these actions were grouped into a single action called "landscape disturbance" because all would create visually apparent changes to the landscape, affecting its appearance and changing its baseline scenic quality.

Other construction actions that would cause effects for certain resources consist of the following:

- Movement of construction equipment and vehicles along roads
- Construction activity and equipment in work areas, including bridge construction equipment that may be taller than the surrounding trees
- Illumination of construction areas and some equipment for low-light daytime and nighttime construction
- Barging of construction materials to the island and unloading of barged materials at the ferry terminal
- Construction of airport perimeter fence

In this EIS, the construction season is assumed to run from May through October. Because Airport 12a with Access 12a would be closer to town and have a shorter access road, the construction period is assumed to be two seasons. Airport 3a and Airport 4 with either access road would be farther from town and require more materials; the construction period for these alternatives is assumed to be three seasons. Actual construction seasons would be determined after a build alternative is selected in the record of decision, the airport is designed, and a construction bid is accepted. Due to the mild climate in Angoon, construction could occur year-round, depending on weather conditions.

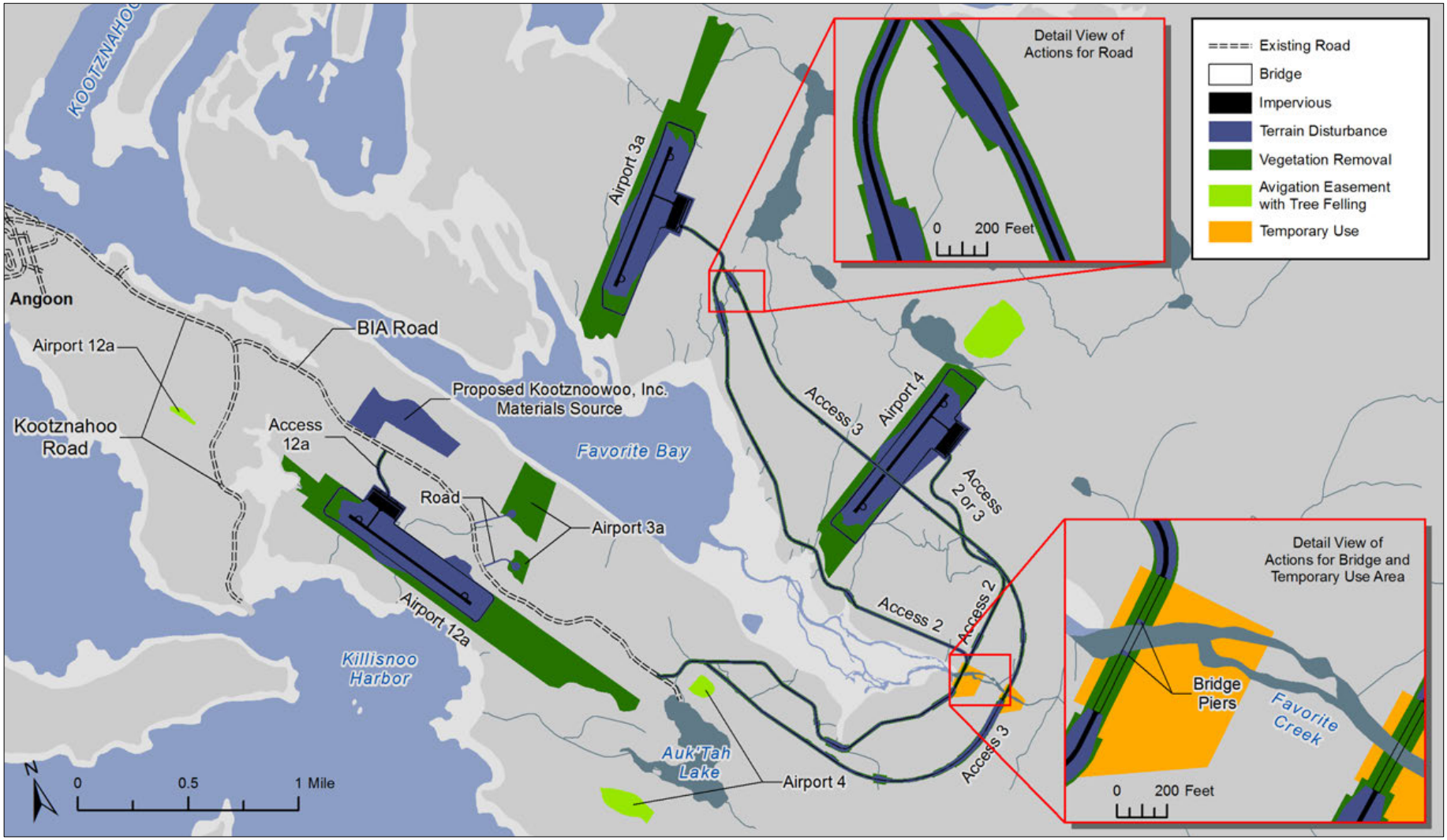


Figure INT1. Construction-related actions that are mapped for effects analysis in most resource sections.

4.1.2.2. What are the operations actions?

Actions related to operation and maintenance of an airport and access road are described but not usually mapped, and they are specified in each resource section as they relate to that resource. Such actions generally consist of the following:

- Arrival and departure of airplanes
- Maintenance of cleared areas, including cutting back vegetation along access roads as well as the airport perimeter, and tree felling in avigation easements for trees that could cause obstructions
- Periodic maintenance of road and airport pavement
- Vehicles traveling on access roads
- Increased presence and activities of humans, sometimes in previously remote areas
- Noxious weed treatments, as required
- Operation of radio-controlled lights during flight arrival and departure
- Airport generator refueling and aircraft refueling
  (*Note*: Aviation Fuel would not be provided by DOT&PF at the airport. Future development of lease lots could include fueling facilities, but those would be permitted at that time.)

4.1.2.3. How are the effects of project-related actions analyzed?

Actions related to construction as well as operation and maintenance can affect resources differently, and therefore may be presented and described differently in each resource section. For example, wildlife would be equally affected by terrain disturbance and vegetation removal; in other words, a cleared area—some of it with cutting and filling of soil or rock and some of it with only vegetation removed—changes the suitability of the habitat for most wildlife. For this reason, in section 4.5.1 Terrestrial Habitats and Associated Species, these two actions are combined for analysis because they have the effect of long-term habitat removal for wildlife.

For each resource, mapped locations of the actions and effects are quantified (in other words, calculated in units like acres) and compared across alternatives, revealing which alternatives affect larger or smaller areas. These quantitative changes are also qualitatively assessed (analyzed in terms of qualities that cannot be counted or measured) to provide a

complete picture of the effects to a given resource. For example, knowing how many acres would be cleared of vegetation may not be enough information to analyze the effects of that clearing. Knowing something qualitative about those acres—for example, that they represent foraging or nesting habitat for a particular species—provides a more meaningful and complete picture of the area and an alternative's effect on it.

It is important to understand that the presence of some actions is implied within other actions. In the example above (effects to wildlife as discussed in section 4.5.1 Terrestrial Habitats and Associated Species), the area of long-term habitat removal would also include areas of pavement. This is because pavement cannot go in until the vegetation has been removed and the terrain has been disturbed. Therefore, the acres of long-term habitat removal include acres where pavement has been put in, even though the pavement action and its acreage are not specifically listed or shown. On the other hand, in section 4.6 Floodplains, Stream Geomorphology, and Hydrology, a new area of pavement must be analyzed separately from areas of vegetation removal because water acts differently on an impervious surface than it does on natural ground, and the resulting effects are different. In this case, the pavement action and its acreage are specifically listed and shown.

This quantitative and qualitative information is considered together to present a comprehensive picture of each alternative's effects on the resource. Each resource section provides a summary to allow for comparison of all alternatives. Note that quantitative calculations presented for each action alternative are based on preliminary engineering designs.

4.1.3. What common terms are used in the Chapter 4 sections?

Discussions of existing conditions and effects analysis use many standard terms and concepts:

Effects: Potential changes to the environment from alternatives. Effects are described in many ways, as detailed in this list.

Adverse effects: In general, an adverse effect is one that is negative, detrimental, or unfavorable. An effect that is generally adverse is not necessarily "significant" under the Council on Environmental Quality's guidance for implementing the National Environmental Policy Act (see "significance" below).

Direct effects: Effects caused by an alternative-related action that occur in the same time and place as the action (per the Council on Environmental Quality's guidance for implementing NEPA at 40 Code of Federal Regulation [CFR] 1508.8). For example, the loss of wildlife habitat in an area cleared for runway construction is a direct effect.

Indirect effects: Effects caused by an alternative-related action that occur later in time or farther away from the action but that are still reasonably foreseeable (40 CFR 1508.8). For example, noise and human activity adjacent to wildlife habitat may make it less desirable for the species that would normally use it even though the habitat has not been directly removed. This is an indirect effect because of the distance between action and effect.

Long-term effects: Effects that will last for a long time, possibly years, decades, or longer. An example would be the loss of habitat where pavement has been put down for a runway or road.

Short-term effects: Effects that extend beyond construction but that are not long term. An example would be vegetation clearing in the temporary use area for bridge construction. This area would be revegetated when construction is complete, and once revegetation is successful, this effect would end.

Temporary effects: Effects that end as soon as construction ceases. An example would be the displacement of wildlife caused by construction noise. Once construction noise stopped, the effect would end.

Irreversible and irretrievable effects: An irreversible effect means the resource is permanently lost and can never be regained, replaced, or recovered. Examples are the extinction of a species or the removal and use of fossil fuels. Similarly, funding, labor, and construction materials would be irreversibly expended in airport and access road construction.

An irretrievable effect means the resource is gone and impossible to retrieve or recover during the life of the project. An example of an irretrievable effect is the loss of a forest as habitat. If a forest is committed to an airport project and cleared, its use as habitat is impossible to retrieve or recover while the area is an airport. This use is reversible, however, because over time the airport could conceivably be converted back into forest.

Significance: Once an effect has been identified and described, its significance is determined through consideration of its context and its intensity. Context is the area, time, and conditions that matter for a given resource. Intensity is the severity of the effect, and it is evaluated through considerations like effects to public health and safety, effects to unique characteristics of the area, public controversy, uncertainty or unknown risks, and effects to endangered species. In many resource sections, significance is discussed in terms of the thresholds established in FAA Order 1050.1E.

Mitigation: Mitigation is a process involving steps to avoid, minimize, remedy, reduce, or compensate for adverse effects. If there are significant adverse effects, the FAA may be required to implement mitigation measures to address those effects. Each resource section in Chapter 4 discusses potential mitigation measures if there would be significant adverse effects on that resource. A more comprehensive discussion of potential mitigation measures applicable to the project as a whole, and the process by which those measures were determined can be found in Chapter 7: Mitigation.

4.2. Air Quality

This section addresses existing air quality conditions in the area of the airport and access road alternatives. It also addresses the potential changes to those conditions from construction and operation of the proposed land-based airport.

What is discussed in this section?

4.2.1. Background information

4.2.1.1. What does the term "air quality" mean?

"Air quality" is generally considered a measure of pollutants present in the air in quantities that can be harmful to the health and welfare of people. Air pollutants are chemicals such as carbon monoxide and small particles such as dust and soot that can be carried by or suspended in the air and inhaled. These pollutants can contribute to human health problems, particularly respiratory disorders such as asthma. The effects of poor air quality are often most pronounced in young children and the elderly.

4.2.1.2. What laws or regulations guide how air quality is addressed in this EIS?

The ***Clean Air Act*** (42 United States Code [USC] 7401 et seq.) outlines a comprehensive strategy to maintain air quality standards that provide the general population with a basic level of protection against air pollutants. Typical air pollutants regulated by the Clean Air Act are industrial, natural, combustible, and organic ***compounds***.

The Environmental Protection Agency is responsible for implementing the Clean Air Act, and has established national thresholds—or maximum allowable amounts—for six common air pollutants. These pollutants are known to have environmental and health effects and are referred to as "criteria pollutants" (see the sidebar below titled "Federal criteria pollutants regulated under the NAAQS"). The thresholds for these criteria pollutants are collectively known as the National Ambient Air Quality Standards (NAAQS). The FAA is required to demonstrate that projects conform to the Clean Air Act, which includes following ***General Conformity*** regulations for pollutant emissions levels in ***nonattainment areas*** and ***maintenance areas***.

Terms to know

Clean Air Act: Federal legislation originally passed in 1970 to regulate air pollution.

Compound: A substance formed by the chemical union of two or more elements or ingredients.

General Conformity: The General Conformity regulations set forth in 40 Code of Federal Regulations (CFR) 93.153 define *de minimis* levels—or maximum thresholds—for emissions of criteria pollutants in nonattainment and maintenance areas.

Maintenance area: An area that has a history of nonattainment but currently meets the NAAQS.

Nonattainment area: An area where one or more criteria pollutants persistently exceeds NAAQS.

Angoon is in an attainment area, and project air emissions would be minimal; therefore, a general conformity analysis is not required for this environmental impact statement (EIS). An air quality analysis was done for National Environmental Policy Act disclosure purposes only.

The Clean Air Act also established a national goal that called for "the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution" (42 USC 7401 et seq.). Class I areas, which include designated national parks and wilderness areas, require special consideration for project effects to visibility and air quality. However, Admiralty Island is not classified as a Class I area (Environmental Protection Agency 2013a), and therefore this issue is not applicable for this EIS. The closest federally designated Class I areas in Alaska are Tuxedni Wilderness Area and Denali National Park.

Federal criteria pollutants regulated under the NAAQS

- Carbon monoxide: Formed from the combustion of carbon-based products.
- Lead: A metal found naturally in the environment as well as in manufactured products. The highest current emissions sources are ore or metal processing and piston-engine aircraft using leaded aviation gasoline.
- Nitrogen dioxide: One of the nitrogen oxides, nitrogen dioxide is a gas that forms primarily when fuel is burned at high temperatures; common sources include vehicle exhaust and industry and power plant emissions.
- Ozone: A very reactive form of oxygen with a bluish tinge and a pungent odor. It is an air pollutant in the lower atmosphere but a beneficial component of the upper atmosphere. It occurs naturally, but it can also be formed from the reaction of volatile organic compounds and nitrogen oxides in the presence of heat and sunlight. For this EIS, two ozone precursors (volatile organic compounds and nitrogen oxides) are reported instead of ozone.
- Particulate matter: Occurs from a variety of activities such as construction, agriculture, industrial processes, vehicular travel, and wind erosion. Also referred to as "particle pollution," particulate matter is a mixture of liquid droplets and extremely small particles of chemicals, metals, dusts, and soils that are suspended in the air and available to be inhaled by humans and animals. Inhalation of these particles can lead to or worsen health conditions.
  - Particulate matter ($PM_{2.5}$): Fine particles measuring less than 2.5 microns in diameter. (A micron is a unit of length equal to one millionth of a meter.) Typically found in smoke and haze.
  - Particulate matter (PM_{10}): Coarse particles measuring less than 10 microns in diameter. Typically found in dusty conditions.
- Sulfur dioxide: Exists as a gas associated with the burning of sulfur-bearing coal, oil, or diesel fuel. In the atmosphere, it can combine with water vapor and oxygen to form acid rain, which can adversely affect the environment.

4.2.2. Existing conditions

4.2.2.1. How did the FAA determine the existing condition of air quality in the Angoon area?

Information on current air quality in the Angoon area was gathered from existing data sources and air quality modeling output. Existing data sources that were specifically consulted include Environmental Protection Agency air quality data (Environmental Protection Agency 2013b, 2013c) and estimated criteria pollutant emissions from 2011 Angoon seaplane operations reported in the *Angoon Airport Environmental Impact Statement Air Quality Memorandum* (BridgeNet International 2013a, included as Appendix E).

4.2.2.2. What is air quality in the Angoon area like?

The State of Alaska does not monitor air quality in Angoon. Most places in Alaska, including the Angoon area, however, are currently in attainment of air quality standards (see the sidebar at right). Sources of criteria air pollutants do exist in Angoon, but they are limited to the following:

- Mobile emissions (residents' cars and the occasional presence of seaplanes and ferries)
- Blowing dust
- Heating and electrical sources (diesel generators, wood-burning fireplaces and stoves, and the diesel-burning Angoon Power Plant used to produce electricity)
- Open pit burning of garbage at the community landfill

There are currently no industrial or manufacturing sources of air pollutants in Angoon.

4.2.2.2.1. Mobile emissions

There are an estimated 200 or fewer resident vehicles in the community. Additionally, weather permitting, seaplanes typically arrive two to four times per day and the ferry docks in Angoon two to four times per week.

What is discussed in this section?

Air quality attainment in Alaska

The Environmental Protection Agency cooperates with state governments to monitor air quality at many different geographic levels—from individual cities to entire states. In each geographic area, evaluations are conducted to determine if criteria pollutants are above, below, or on target with the NAAQS thresholds. If criteria pollutants measured in the air meet or fall below the NAAQS thresholds, the area is said to be "in attainment" of air quality standards. If criteria pollutants measured in the air are above the NAAQS thresholds, the area is said to be "in nonattainment" of air quality standards. For areas in nonattainment, measures to reduce criteria pollutants to meet standards must be implemented. Currently, the cities of Fairbanks and Juneau are in nonattainment for particulate matter, whereas Anchorage, Fairbanks, and Eagle River are designated maintenance areas for carbon monoxide or particulate matter. All other locations in the state, including Angoon, are in attainment (Alaska Department of Environmental Conservation 2013).

4.2.2.2.2. Blowing dust

According to the Alaska Department of Environmental Conservation, Angoon experiences problems with blowing dust, often referred to as ***fugitive dust***, from vehicles traveling on unpaved roads during periods of little or no rainfall. Fugitive dust falls in the criteria pollutant category of PM_{10}. Fugitive dust is not a chronic or continuous problem in Angoon due to snow in the winter and the amount of rain and moist conditions present during other times of the year. When fugitive dust does occur, it is usually only occasionally and for short periods of time.

Terms to know

Fugitive dust: Small dirt or soil particles coming from a general source, such as a dirt road, and suspended in the air by the wind or human activities, such as driving on a dirt road when it is dry.

4.2.2.2.3. Heating and electrical sources

Diesel generators are the source of 100% of the community's electrical generation and 80% of its residential and commercial heating (Alaska Industrial Development and Export Authority 2011). The remainder of heating in Angoon comes from wood-burning stoves or fireplaces. The Angoon Power Plant, operated by the Inside Passage Electric Cooperative, has three diesel generators that produced 1,934.2 megawatt hours in energy sold to the community in 2008. Annual diesel fuel consumption for power generation in 2008 was estimated at 147,994 gallons (Alaska Industrial Development and Export Authority 2011).

4.2.2.2.4. Open pit burning

Garbage and other waste are disposed of in a small City-operated landfill located approximately 1 mile southeast of the developed community. In addition to burying refuse, landfill operators burn garbage in an open pit. Open pit garbage burning produces both chemical pollutants and particulate matter.

4.2.3. Project effects

What is discussed in this section?

Construction, operation, and maintenance of an airport and access road under each action alternative would affect air quality. Although the nature of the effects would be the same for all action alternatives, the magnitude of effects would differ per alternative. The sections below describe the actions causing the effects; the nature of the effects; the methods for analyzing effects; any assumptions used in the analysis; and the magnitude of effects for each alternative.

4.2.3.1. How did the FAA determine the effects of the alternatives on air quality?

The Federal Aviation Administration (FAA) guidelines for evaluating air quality relative to aviation projects can be found in *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) and *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b) as well as the FAA's air quality handbook, *Air Quality Procedures for Civilian Airports and Air Force Bases* (FAA 1997). According to these guidelines, air quality analysis should consider contributions from construction and operations actions to criteria pollutant concentrations, as well as assess general conformity under the Clean Air Act.

An emissions inventory for air quality has been provided for disclosure purposes in this EIS. However, for proposed airport projects in attainment areas, such as Angoon, a quantitative assessment of criteria pollutant emissions is not required by the FAA.

The FAA considered both construction and operation effects in the following analysis. Construction effects are considered temporary effects and would end as soon as construction ceases. Operation effects are considered long term and would continue throughout operation of the airport.

4.2.3.1.1. Construction actions

For each of the action alternatives, construction activities—removing vegetation, grading and recontouring the ground surface, paving runways and roads, and constructing a bridge across Favorite Creek—would require fuel-burning construction machinery, an increase in construction-related traffic, and two or three seasons of construction. These construction actions

would temporarily increase emissions of criteria pollutants due to diesel fuel combustion and fugitive dust from construction equipment and the vehicles of construction crews.

This EIS assumes that construction would not affect emissions from open pit burning at the local landfill or substantially change emissions associated with residential and commercial energy consumption because emissions that include waste disposal represent only 1% of the total emissions generated within the Hoonah-Angoon Census Area (Environmental Protection Agency 2013b, 2013c). Based on 2008 population numbers, Angoon consumed approximately 3.8 megawatt hours of energy per person in 2008 (Alaska Industrial Development and Export Authority 2011). Based on this rate, up to 100 temporary construction workers in Angoon could consume an estimated 380 megawatt hours of diesel fuel, which represents less than 2 tons of nitrogen oxides, carbon monoxide, and sulfur dioxide emissions based on reported Environmental Protection Agency criteria pollutant emissions rates for large stationary diesel engines (Environmental Protection Agency 1996). For this reason, air quality effects from these sources are not evaluated in this EIS.

Construction-based emissions of criteria pollutants were calculated using the Environmental Protection Agency's non-road diesel emissions rates and are shown in Table AQ1. Calculations assume up to 50 construction vehicles and machinery operating for two to three seasons (1,320 total construction hours).

4.2.3.1.2. Operations actions

During airport operations, aviation fuel combustion associated with flight takeoffs and landings would create emissions of criteria pollutants. The land-based airport would also increase the distance vehicles travel to and from the airport, as well as the number of trips taken per year for air travel. Both of these changes would increase long-term emissions of criteria pollutants through additional fuel consumption. Pollutant emissions would also be generated from private aircraft refueling at the Angoon Airport or from generator operation for runway lighting. However, the extent of potential emissions from generator use and aviation refueling is unknown at this time, and cannot be quantitatively reported. Based on the size of Angoon and the frequency of forecasted flights, it is expected that these emissions would be limited.

Annual emissions of criteria pollutants from flight takeoffs and landings were estimated in accordance with the FAA's air quality assessment guidelines, using the latest version of the FAA's Emissions and Dispersion Modeling System. Detailed discussion of the modeling approach, assumptions, and methodology are provided in Appendix E.

Because the proposed airport is in an attainment area and would have less than 180,000 annual flights (see section 2.5.2 in Chapter 2: Purposed and Need for a Land-Based Airport at Angoon for estimates of future flights), a ***NAAQS assessment*** is not needed to fully disclose effects, as discussed further in section 4.2.3.2.

Annual emissions of criteria pollutants from personal vehicles traveling to and from the airport during operations were estimated based on federal emissions standards for light-duty gasoline vehicles. These emissions standards are provided in Table AQ1.

Terms to know

NAAQS assessment: In air quality studies, a comparison of estimated pollutant concentrations with the NAAQS for each criteria pollutant.

Table AQ1. Federal emissions standards

Criteria pollutant	Non-road diesel engine emissions rate (for construction equipment)*	Light-duty vehicles gasoline emissions rate (for personal vehicles)†
Carbon monoxide	3.5 grams/kilowatt-hour	4.2 g/mile
Nitrogen oxides‡	6.6 grams/kilowatt-hour	0.6 g/mile
Particulate matter	0.2 grams/kilowatt-hour	0.1 g/mile

* *Source:* Environmental Protection Agency 2013d. Based on 2003 and newer equipment models with the exception of NO_x.

† *Source:* 40 CFR 86.708-98. Based on 1998 and newer model cars full useful life standards.

‡ In 2008, the Environmental Protection Agency changed their emissions standards to combine nitrogen oxides and non-methane hydrocarbon emissions for all non-road diesel engines with a model year of 2003 or more recent. Tier 2 standards were set at 6.6 grams/kilowatt-hour for vehicles with a model year of 2003–2006. Tier 3 standards were set at 4.0 grams/kilowatt-hour for vehicles with a model year of 2007–2011. Prior to that change, the Environmental Protection Agency's emissions standard for nitrogen oxides was 9.2 grams/kilowatt-hour. Because the age of vehicles that would be used for the Angoon Airport project is unknown, Tier 2 emissions rates are used as a conservative estimate of nitrogen oxides emissions for this project.

4.2.3.2. How did the FAA determine the significance of the anticipated effects from the alternatives?

Per FAA Order 1050.1E, exceeding one or more of the NAAQS would constitute a significant effect. However, for small general aviation projects that do not require a NAAQS assessment, such as the proposed Angoon Airport, FAA guidance also states that if "total ***net emissions*** of the proposed airport are below ***de minimis thresholds***…no further air quality analysis is needed." In this case, the FAA can conclude that "the action and/or alternatives (if alternatives were analyzed) will not cause a significant air quality impact, since it is unlikely the pollutant concentration analyzed would exceed a NAAQS" (FAA 2007b:14).

Terms to know

de minimis thresholds: de minimis thresholds are the minimum emission levels for which a conformity determination must be performed. For the Angoon area, which currently meets all air quality standards, the threshold is set at 100 tons per year for all criteria pollutants except lead, which has a threshold of 25 tons per year.

Net emissions: Potential emissions from the airport action minus potential emissions from the no action alternative.

4.2.3.3. How would each alternative affect air quality?

The no action alternative would not include any construction, and therefore would not generate construction-related air emissions. Under the no action alternative, however, emissions of criteria pollutants would continue from ongoing ferry, seaplane, and vehicular traffic in Angoon as well as from fugitive dust, burning of fuel for heat and power, and burning of landfill waste.

4.2.3.3.1. Effects from construction

Estimated construction-related emissions associated with all action alternatives are summarized in Table AQ2 and broken out by type of criteria pollutant. Reported emissions represent the highest amount of emissions likely for the maximum amount of construction time (up to three seasons). Alternatives that require less construction time could result in lower emissions than reported. The Environmental Protection Agency does not provide heavy duty nonroad engine emission standards for all criteria pollutants; only those with standards are reported and discussed in this EIS.

Compared to the no action alternative, any of the action alternatives would increase construction-related emissions for carbon monoxide, nitrogen oxides and non-methane hydrocarbon, and particulate matter. However, construction emissions from any action alternative would be temporary and end immediately upon the completion of airport and access road construction. Minimization measures would also be employed during the construction period to reduce emissions; such measures include preventing vehicles from idling during periods of inactivity and implementing soil erosion or stabilization controls (see Chapter 7: Mitigation).

Table AQ2. Air emissions for airport construction

	Carbon monoxide (tons)	Nitrogen oxides and non-methane hydrocarbon (tons)	Particulate matter (tons)
No action alternative	0	0	0
Any action alternative	57.04*	107.55*	3.25*

* Calculations based on emissions rates and sources listed in Table AQ1. Emissions calculations assume 907,184.7 grams/ton and an average 300-horsepower (224-kilowatt) diesel engine on construction equipment for 50 construction vehicles during the two to three construction seasons.

4.2.3.3.2. Effects from operations

Operational aviation-based emissions for the no action alternative are presented in Table AQ3. For each of the action alternatives, operation of a land-based airport would roughly double carbon monoxide emissions and roughly triple volatile organic compound emissions from existing conditions, whereas emissions of the other criteria pollutants (nitrogen oxides, sulfur oxide, and particulate matter [PM_{10} and $PM_{2.5}$]) would all decrease by approximately 50%–75%. This reduction would be due to the reduction in the number of seaplane flights; the types of seaplanes that operate at Angoon primarily use radial engines, whereas more of the aircraft using the land-based airport would use higher-efficiency in-line or horizontally opposed engines.

Table AQ3. Air emissions inventory for airport operation

	Carbon monoxide (tons/year)	Nitrogen oxides (tons/year)	Sulfur oxide (tons/year)	Particulate matter [PM_{10}] (tons/year)	Particulate matter [$PM_{2.5}$] (tons/year)	Volatile organic compounds (tons/year)
No action alternative	8.71	8.96	0.67	0.32	0.32	1.20
Any action alternative*	18.02	2.84	0.35	0.09	0.08	3.62

Note: Lead emissions are not calculated by the Emissions and Dispersion Modeling System, which was used to calculate aviation air quality emissions. Additionally, given the relatively low number of aircraft that would use the airport and the very low levels of lead potentially emitted by small aircraft, there is no potential for exceeding the NAAQS for that pollutant. Therefore, lead emissions are not reported in this EIS.

* Includes only aviation-based emissions. Vehicle travel during operation is not included because its contribution is negligible.

Any of the action alternatives would generate less than 0.4 tons per year of carbon monoxide, nitrogen oxides, and particulate matter emissions based on resident travel to and from the airport, assuming up to 3,699 additional vehicle trips per year with a 17.2-mile round-trip commute per trip. Consequently, operations-based emissions of criteria pollutants would fall well below *de minimis* levels.

4.2.3.4. Would any effects be irreversible or irretrievable?

There would be irreversible and irretrievable negative effects to air quality under all action alternatives due to the generation of additional carbon monoxide and volatile organic compound emissions during airport construction and/or operation. However, the reduction in nitrogen oxides, sulfur oxide, and particulate matter (PM_{10}, and $PM_{2.5}$) emissions under all action alternatives would also provide a beneficial irreversible and irretrievable effect to air quality for the duration of the airport's operation.

4.2.3.5. Would any of the action alternatives have a significant effect on air quality?

Construction-related emissions would be temporary and would be minimized through best management practices. All operations-related emissions for the airport and access road alternatives would be below *de minimis* thresholds. Therefore, no significant air quality effects are expected if the project is implemented.

4.2.3.6. How could the effects described above be avoided, minimized, or mitigated?

Because no significant effects are anticipated for air quality, no additional mitigation measures beyond those discussed in Chapter 7: Mitigation would be implemented under any action alternative. Chapter 7 describes best management practices that would be implemented during construction. Best management practices are relatively common activities in construction and are intended to prevent pollution, minimize environmental harm, and assure that appropriate response action is taken if unacceptable environmental effects occur. Through the use of best management practices, effects are reduced during construction. The best management practices described in Chapter 7 were considered during effects analysis for this resource.

4.3. Compatible Land Use

This section addresses existing land use in the area of the proposed airport and access alternatives. It also analyzes the compatibility of an airport with existing uses and potential changes to those uses from construction and operation of the proposed land-based airport. For airport projects, the Federal Aviation Administration (FAA) emphasizes consideration of effects from airport noise on land uses adjacent to an airport.

What is discussed in this section?

4.3.1. Background information

4.3.1.1. What do the terms "land use," "compatible," and "compatible land use" mean?

The term "land use" refers to the ways that land in a given area is used for different purposes, such as residential, commercial, recreational, and government services. In general, the term "compatible" describes actions or characteristics that do not conflict with each other. In this environmental impact statement (EIS), the FAA uses the term "compatible land use" to mean that there are laws or land management plans in place that could allow for an airport to be located on private, Alaska Native Claims Settlement Act (ANCSA), or wilderness lands. Although other agencies use the term "compatible" differently—for example, the U.S. Forest Service uses "compatible" to describe an action as being consistent with its forest land management plan—it is the FAA's definition that guides this analysis of compatible land use.

4.3.1.2. What laws and regulations apply to land use?

4.3.1.2.1. FAA orders

The FAA, the lead federal agency for this EIS, has issued specific guidance in *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) and *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b) about how compatible land use should be addressed, including the types of land uses and areas that must be described and the ways that effects to these land uses must be analyzed. This guidance shaped the approach found in the sections below (sections 4.3.2 and 4.3.3) to identifying existing land uses and assessing the effects of the airport alternatives on those land uses.

4.3.1.2.2. Alaska Native Claims Settlement Act of 1971 and Alaska National Interest Lands Conservation Act Title XI

In addition to the two FAA orders, ANCSA and the Alaska National Interest Lands Conservation Act (ANILCA) provide overarching guidance for landownership and management in Alaska.

As described in section 1.6.2 of Chapter 1: Project Background – Planning for a Land-Based Airport at Angoon, ANCSA established a series of Alaska Native corporations at the regional and village levels, and these corporations were permitted to select land in regions and near village locations that form part of their cultural affiliation and heritage. Individual Alaska Natives became shareholders in these corporations, and the corporations were required by ANCSA to deed some of the lands they selected to the corporations' shareholders and to the associated village governments (under Section 14(c)(3) of ANCSA); these lands are referred to in this section as 14(c)(3) parcels. The remaining lands were to be managed by the corporations for the benefit of their shareholders. In short, ANCSA established ways for Alaska Natives to have access to lands and resources to meet their economic and social needs.

ANILCA, in Title XI (Transportation and Utility Systems in and Across, and Access into, Conservation System Units in Alaska), regulates how certain lands in Alaska may be developed (Public Law [PL] 96-487). The Admiralty Island National Monument and Kootznoowoo Wilderness Area (referred to in this EIS as the Monument–Wilderness Area) (see Figure LU1) is considered a ***conservation system unit***. As such, ANILCA Title XI applies to it. The placement of an airport, which is considered a ***transportation and utility system***, in the Monument–Wilderness Area, therefore requires that Section 1106(b) of ANILCA Title XI be followed.

Terms to know

Conservation system unit: Per the Alaska National Interest Lands Conservation Act (Section 102(4)), "any unit in Alaska of the National Park System, National Wildlife Refuge System, National Wild and Scenic Rivers System, National Trails System, National Wilderness Preservation System, or a National Forest Monument."

Transportation and utility system: As defined in ANILCA Section 1102(4)(A), the term "transportation or utility system" is any system—such as roads, transmission lines, or airports, as defined in ANILCA 1102(4)(B)—where any portion of that system is located in a conservation system unit.

Figure LU1. Kanalku Lake, part of the Monument–Wilderness Area, which is a Section 4(f) property and a conservation system unit.

4.3.1.2.3. Section 4(f)

Because the federally managed Monument–Wilderness Area and other public lands could be affected by one or more of the airport and access road alternatives, Section 4(f) of the Department of Transportation Act of 1966 (as amended) (49 United States Code [USC] 303c) also must be followed for this EIS. Section 4(f) is a federal law that prohibits the use of a ***publicly owned*** park, recreation area, wildlife or waterbird refuge, or ***historic property*** for federal transportation actions unless

- there is no ***feasible*** and ***prudent*** alternative to using those lands,
- the transportation action includes all possible planning to minimize harm to the property from that use, or
- the use of those lands would have a ***de minimis impact*** on the key functions and values of those lands as they relate to the uses that qualify those lands for consideration under Section 4(f).

Discussion on Section 4(f) properties and analysis of effects to those properties is provided in section 4.4 U.S. Department of Transportation Act Section 4(f) Evaluation Summary.

Terms to know

De minimis impact: In the context of Section 4(f), a "*de minimis* impact" is an effect on a public park, recreation area, wildlife refuge, or historic site that will not adversely affect the property's important activities, features, or attributes.

Feasible: In a Section 4(f) context, a feasible alternative is one that can be built as a matter of sound engineering judgment.

Historic property: An archaeological, cultural, or historical site that is listed on or eligible for the National Register of Historic Places.

Prudent: In a Section 4(f) context, a prudent alternative is one that does not compromise the project to an extent that it

- is unreasonable to proceed, given the project's purpose and need;
- results in unacceptable safety or operational problems;
- even with mitigation, still causes severe social, economic, or environmental impacts, disruption of established communities, disproportionate impacts to minority or low-income populations, or impacts to environmental resources protected under other federal statutes;
- results in extraordinary additional construction, maintenance, or operational costs;
- causes other unique problems or unusual factors; or
- causes cumulative impacts of an extraordinary magnitude.

Publicly owned: Owned by a local, state, or federal governmental agency and available to the general public most of the time.

4.3.2. Existing conditions

This section describes current land use and land management–related activities in the Angoon area.

4.3.2.1. Which factors did the FAA study to determine Angoon's existing land use and management?

Consideration of existing land use in the Angoon area requires an understanding of

- ***noise-sensitive area***;
- landownership;
- land management plans, policies, and ordinances established for the area; and
- the types of land uses currently taking place (per FAA Orders 1050.1E and 5050.4B).

These factors are described in the subsections that follow. The locations of these factors (those that can be shown on a map) are depicted on Figures LU2, LU3, LU6, and LU8. The summary of current land uses and land management plans, policies, and ordinances that follows was prepared through examination of existing data from standard sources, including federal, state, and regional government databases and planning documents (Tables LU1 and LU2). In some cases, such as with the local municipal government (in other words, the City of Angoon), written land use plans are old enough that they do not reflect existing conditions. In these cases, interviews with government and agency representatives and local residents were used to supplement documentation.

Detailed findings related to compatible land uses and existing land uses and polices are reported in the *Land Use Resources Existing Conditions Technical Report for Angoon Airport Environmental Impact Statement* (Southeast Strategies 2012, included as Appendix F). The information from this report is summarized below.

What is discussed in this section?

Terms to know

Noise-sensitive area: Used here, an area where noise would interfere with the area's normal activities.

Table LU1. Management plans or policies directing use

• Angoon Comprehensive Development Plan (Alaska Consultants 1976)
• Angoon Land Use Plan (CH2M Hill 1982)
• City of Angoon General Code Title 18, Zoning (City of Angoon 2009)
• Draft 14(c)3 Reconveyance Plan (Sheinberg Associates 1997)
• Tongass Land and Resource Management Plan (U.S. Forest Service 2008a)
• Northern Southeast Area Plan (Alaska Department of Natural Resources 2002)
• Kootznoowoo, Inc. strategic goals and deed covenants (payment agreements) (Kootznoowoo, Inc. 2009, 2012)

Table LU2. Other sources of land use information

• Angoon Airport Master Plan (Alaska Department of Transportation and Public Facilities 2007)
• Sport fisheries data from Alaska Department of Fish and Game
• Interviews with representatives of the City of Angoon, federal agency staff, and local residents
• Mitchell Bay Watershed Landscape Assessment (U.S. Forest Service 2002)
• Community databases from the Alaska Department of Commerce, Community, and Economic Development

4.3.2.2. Do noise-sensitive areas exist in the Angoon area?

FAA policy requires special consideration of the effects from airport-related noise on land uses that are more sensitive to noise disturbance than other types of uses. Typical noise-sensitive areas include residences, schools, health or medical facilities, religious properties, designated wilderness areas, and certain cultural and historical sites. A certain level of quiet is both desired and necessary for the intended use of all such properties. For example, excessive nighttime noise can disrupt sleep at residential properties, and excessive daytime noise can disrupt learning in schools.

Based on local land use information and federal guidance (FAA Order 1050.1E), the FAA identified several areas on the Angoon peninsula as being noise-sensitive. These noise-sensitive areas are shown in Figure LU2, below, and include the following:

- Two schools
- Four churches
- The Angoon medical clinic
- The Angoon Senior Center
- The Angoon Community Center
- Three clan houses
- Three lodges and one bed and breakfast
- Residential areas, including existing homes and subdivisions planned for future residential use

Terms to know

A-weighted decibel (dBA): An adjusted unit of measure for noise within the range that humans hear.

The entire Monument–Wilderness Area and adjacent Kootznoowoo Corridor Lands are also considered noise-sensitive. See section 4.11 Noise for more information on how noise is measured as well as the existing noise conditions in the Angoon area and the Monument–Wilderness Area. In general, Angoon and the surrounding area are considered quiet, with ambient (background) noise levels at 27 ***A-weighted decibels (dBA)***, the equivalent to rustling leaves in an outdoor setting.

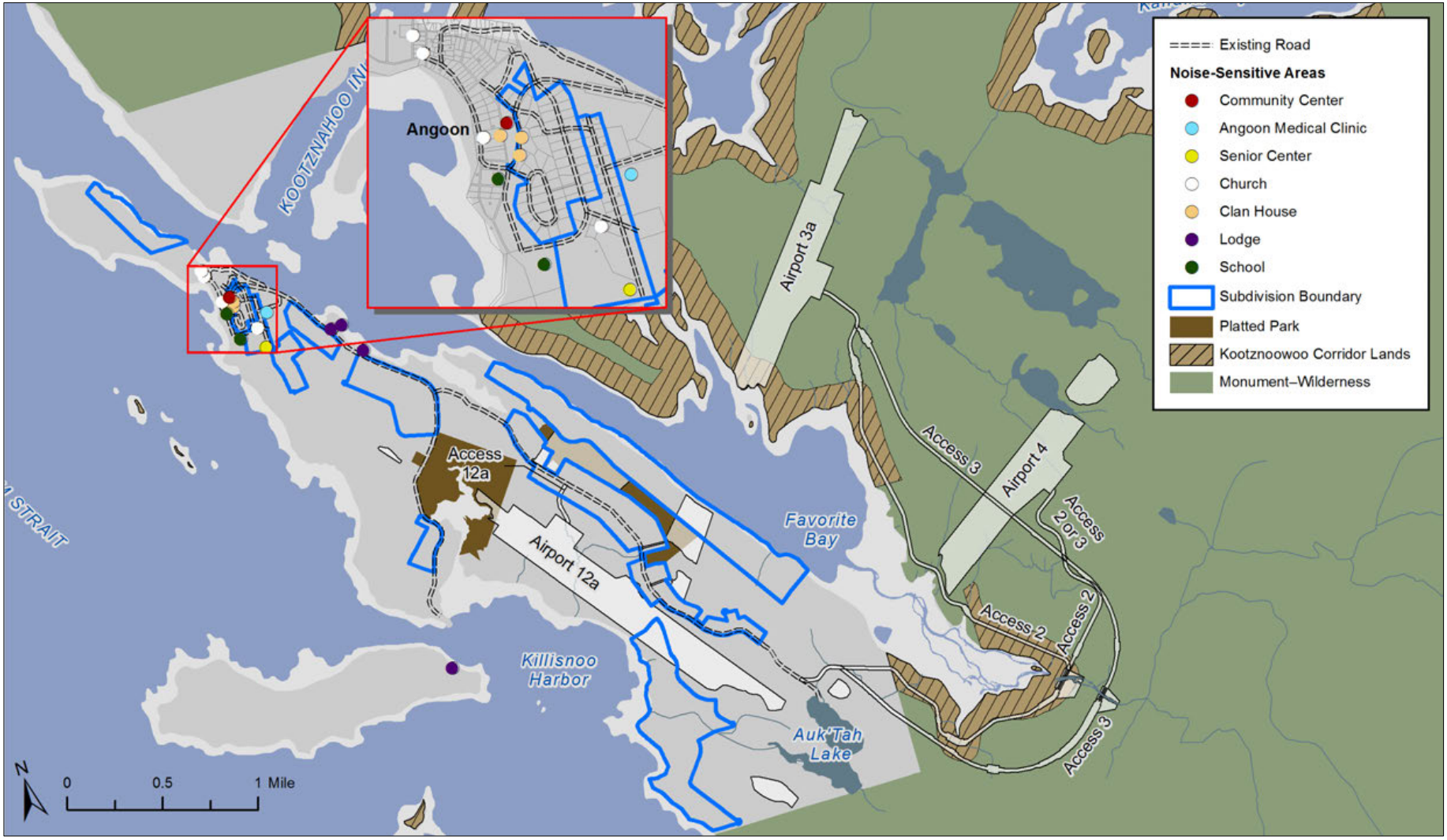


Figure LU2. Noise-sensitive areas in and around Angoon.

4.3.2.3. What is landownership like in the Angoon area?

Lands on the Angoon peninsula are owned by Kootznoowoo, Inc., the City of Angoon, the State of Alaska, and individual private landowners. Lands that make up the Monument–Wilderness Area are public lands managed by the U.S. Forest Service. Additionally, Kootznoowoo, Inc. was granted the ***surface rights*** under ANILCA for shoreline lands adjacent to the Monument–Wilderness Area. Figure LU3 shows the landownership in the area, including areas subject to ***conveyance*** under the Alaska Native Claims Settlement Act of 1971 (ANCSA; 43 USC 1601 et seq.) (see the sidebar at right for more on ANCSA and landownership).

4.3.2.3.1. Kootznoowoo, Inc.

Kootznoowoo, Inc. is the for-profit Alaska Native (village) corporation for the community of Angoon. The corporation is the single largest non-federal landowner in the Angoon area. Kootznoowoo, Inc. was initially granted surface rights to approximately 2,772 acres of land in the Angoon area through ANCSA. Some of these lands were recently reconveyed as zoned or planned residential areas to Kootznoowoo, Inc.'s shareholders, as public lands to the City of Angoon, or as personal use sites to long-time users. Kootznoowoo, Inc. also owns all ***subsurface estate*** on the Angoon peninsula east of the Kootznahoo Road (Naoroz 2014).

In addition, through ANILCA Section 506, Kootznoowoo, Inc. was granted ownership of the surface rights within a 660-foot-wide corridor along most of the shore lands of Favorite, Kanalku, and Mitchell Bays. These lands are typically referred to as the Kootznoowoo Corridor Lands. They are located between the Kootznoowoo Wilderness Area and the shores of the bays. The Kootznoowoo Corridor Lands are exempt from the Wilderness Act (ANILCA section 506(a)(3)(D)), but are managed as part of the Admiralty Island National Monument. The property interests reserved to the United States in the Kootznoowoo Corridor Lands are managed as part of the Admiralty Island National Monument CSU (ANILCA section 506(a)(3)(C)(iv).

Terms to know

Conveyance: Used here, the legal transfer of property from one person or organization to another.

Subsurface estate: A real estate term meaning ownership or controlling interest in the resources below the surface of a parcel of land; subsurface rights.

Surface rights: Property rights conferred to a landowner providing the right to use and modify a property's surface area.

ANCSA and landownership

ANCSA became law in 1971 as a way of resolving long-standing land claims by Alaska Natives. Unlike the Lower 48 states, Alaska did not have a reservation system to cede ownership of federal lands to tribal groups. This resulted in many disputes over legal ownership of lands that had been long occupied by Alaska Native villages or individuals. Under ANCSA, 44 million acres of land in Alaska were made available for selection by for-profit corporations that were established under the act. These corporations consist of 12 Alaska Native regional corporations, one "roving" regional corporation for Alaska Natives out of state, and more than 200 village corporations. The corporations were allowed to select a certain amount of land out of the total lands made available.

Regional corporations received title to the subsurface estate, whereas village corporations received title to the surface rights. In turn, the village corporations were required to reconvey a portion of their surface estate to individuals (corporation shareholders or others) and non-profit organizations who occupied those lands as of December 18, 1971, and to the city government of the associated Alaska Native village for present and future public land uses. The nature and requirements of the different conveyances are outlined in Section 14(c) of ANCSA.

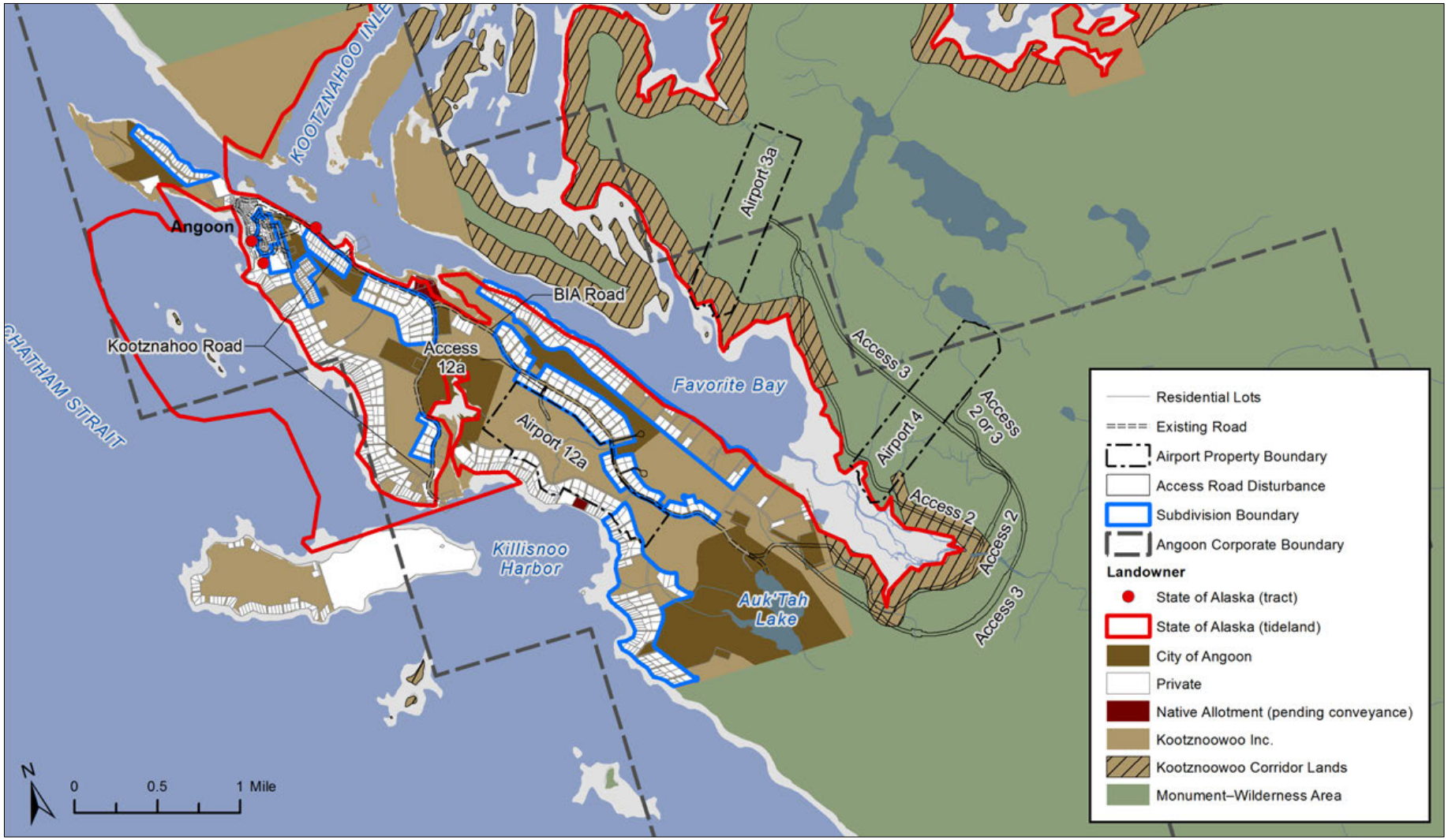


Figure LU3. Landownership in the Angoon area.

4.3.2.3.2. City of Angoon

Angoon is the only permanently inhabited community on Admiralty Island. City of Angoon–owned lands are limited to approximately 260 acres that were conveyed to the City by Kootznoowoo, Inc. under ANCSA (see Figure LU3). However, the City of Angoon's corporate boundary encompasses 38.6 square miles (Bitzer 2009), and it overlaps lands managed by other landowners in the area. These overlapping lands are subject to City of Angoon policies and zoning, but the City does not have jurisdiction over the use or development of those lands.

Figure LU4. An Angoon tidal zone.

4.3.2.3.3. Private landowners

According to the *Angoon Airport Master Plan* (Alaska Department of Transportation and Public Facilities 2007), approximately 869 land parcels near Angoon are privately owned (see Figure LU3). Public land records for Angoon are incomplete, however, leaving the exact number of parcels unclear. Of these parcels, 629 private lots were established in 10 subdivisions through a home site program authorized under ANILCA, and titles to these lots were conveyed to the private owners from Kootznoowoo, Inc. in 1997.

The Angoon peninsula also contains an estimated 13 acres of Alaska Native allotments. These allotments were made available to individual Alaska Natives under the Alaska Native Allotment Act of 1906, but have not yet been conveyed. Allotments would not be acquired under any action alternative and are not further considered in this analysis.

4.3.2.3.4. State of Alaska

The State of Alaska owns approximately 11,750 acres around Angoon. These lands include small, state-owned upland tracts and most submerged lands and tidelands below mean high water (approximately 15 feet above mean sea level) around Admiralty Island (see Figure LU3 for their locations and Figure LU4 for an example of a tidal zone).

4.3.2.3.5. U.S. Forest Service

The Kootznoowoo Wilderness Area was established in 1978 as a means of providing protection to the lands of Admiralty Island while the passage of ANILCA was being debated. When ANILCA was enacted in 1980, it established the Admiralty Island National Monument and designated the Kootznoowoo Wilderness Area as part of the National Wilderness Preservation System. The combined Monument–Wilderness Area incorporates approximately 90% of Admiralty Island (nearly 1 million acres) and is currently managed by the U.S. Forest Service as part of the Tongass National Forest. The U.S. Forest Service also maintains the subsurface rights on Kootznoowoo Corridor Lands. Figure LU3 shows the portion of the Monument–Wilderness Area that overlaps with the area of the alternatives, and Figure LU5 illustrates what the forest is like in the Angoon area.

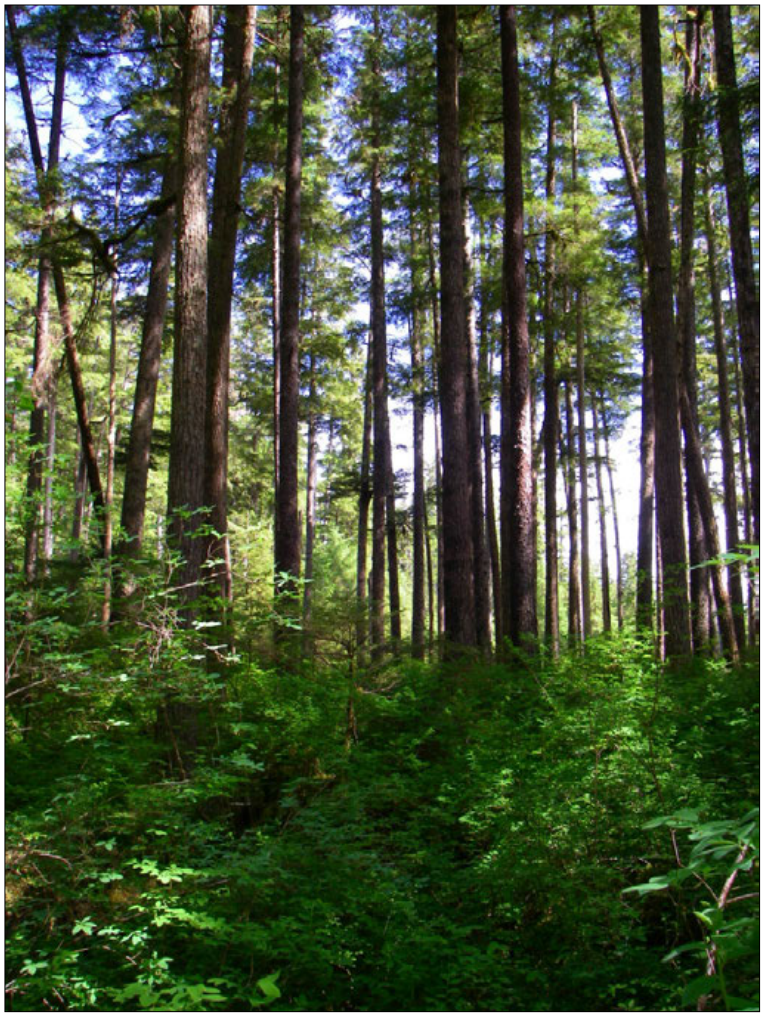


Figure LU5. Forest in the Angoon area.

4.3.2.4. What management plans direct land use in the Angoon area?

Local, state, and federal policies and plans apply to lands that could be affected by the airport and access alternatives. Table LU3 lists local government directives, and Figure LU6 shows land zoning in the Angoon corporate boundary. Other policies and plans are provided in Table LU4.

Table LU3. City of Angoon land use policies and plans

Comprehensive Development Plan (Alaska Consultants 1976)	• Has not been updated since completion in 1976 • Expresses the need for available land for commercial, industrial, residential, and community facilities, and for recreation development • Expresses an "eventual" need for an airport without identifying a specific location other than to note the airport discussed at that time was on lands selected by Kootznoowoo, Inc. • Expresses concern that the Alaska Department of Transportation and Public Facilities clearly define the boundaries of a proposed airport site, if within the city boundaries, so that other development will not impair a future airport
Land Use Plan (CH2M Hill 1982)	• Provides issues, goals, and objectives to guide land use planning and development in the Angoon area • Establishes future land needs, including lands that provide residential housing, recreation, community facilities, and economic development • States that a careful consideration of potential airport location for effects on ***subsistence use*** and future growth areas should occur, because it will influence the types of uses that can occur on adjacent lands
14(c)(3) Reconveyance Plan (Sheinberg Associates 1997) and deed of transfer of 14(c)(3) parcels	• Identifies land parcels to be reconveyed to the City of Angoon through ANCSA 14(c)(3) • Focuses on demand for future public land to meet legitimate projected access, utility, public facility and services, and recreation needs • The deed transferring 14(c)(3) parcels to the City of Angoon contains reversion clauses. If parcels are not used for the agreed-upon purpose listed in the deed, Kootznoowoo, Inc. has the option to have the title for the parcel revert back to the corporation.
City of Angoon General Code, Title 18 – Zoning (City of Angoon 2009)	• Codifies ***zoning ordinances*** (see Figure LU6 for a map of zoning within the Angoon corporate boundary) • Describes land use districts, permitted uses, ***accessory uses***, ***conditional uses***, and other regulations for each zoning district • States that not all lands within the City's corporate boundary are zoned. These unzoned lands (see gray areas in Figure LU6) are subject to the general municipal policies of the City of Angoon, but the City does not have direct jurisdiction over the use or development of those lands. • Prohibits uses not specifically provided for in zoning ordinances

Terms to know

Accessory use: A secondary use of a property that is incidental to its primary use.

Conditional use: A use of property that is legal only when certain conditions regulating that use are met.

Subsistence use: According to Section 803 of ANILCA, "the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade." See section 4.13 Subsistence Resources and Uses for more information.

Zoning ordinance: Municipal law establishing building codes and land use regulations for given zones or geographic areas of a community.

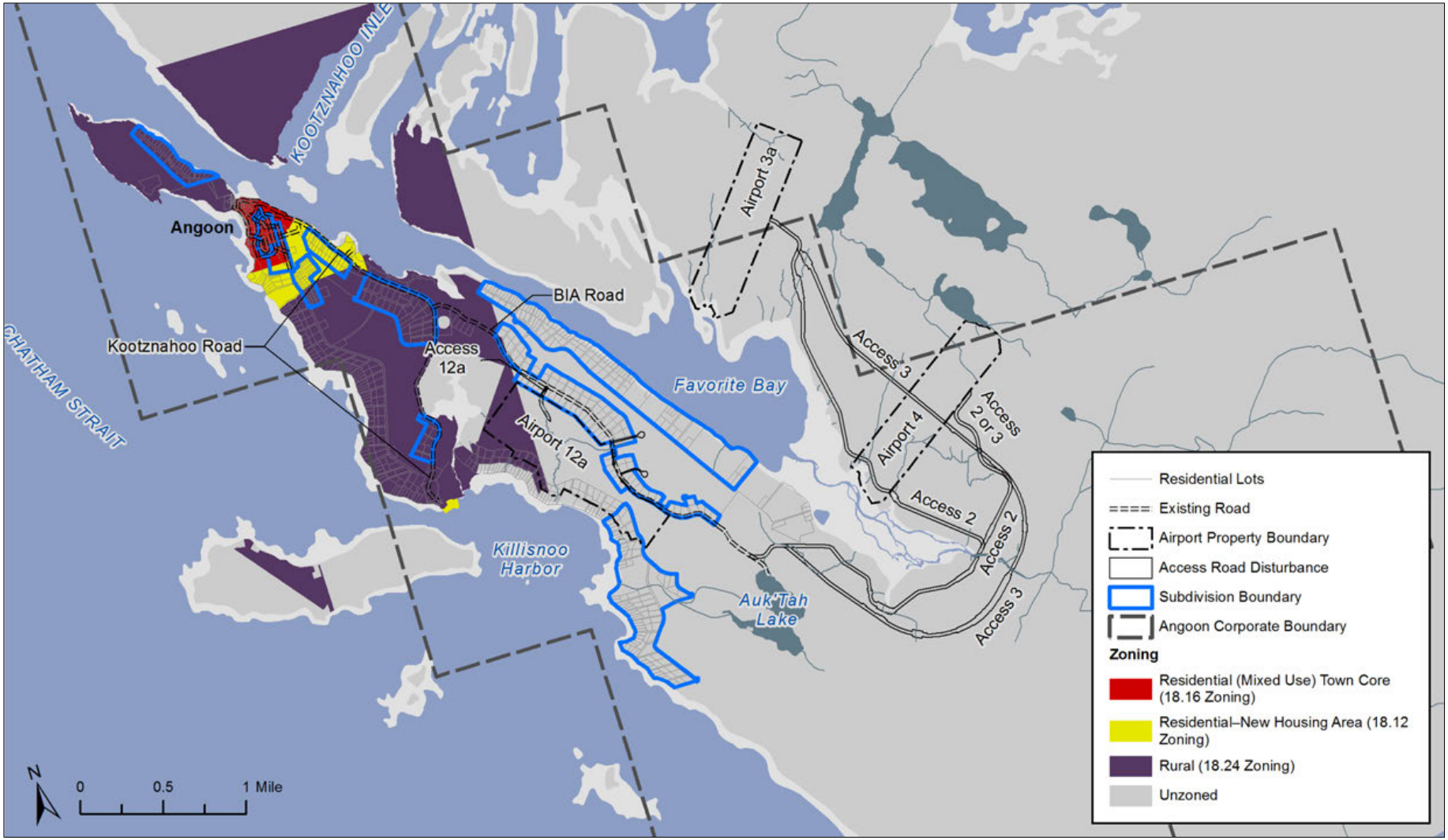


Figure LU6. Land zoning within the Angoon corporate boundary.

Table LU4. Other land use policies and plans

Kootznoowoo, Inc.	Strategic goals (2012)	• Most ANCSA conveyed lands on the Angoon peninsula are owned and managed by Kootznoowoo, Inc. Kootznoowoo, Inc. does not have a formal land management plan or guidelines intended to maintain specific purposes for their lands; however, the corporation does have strategic goals that include managing lands to maintain ownership for the benefit of the shareholders; providing profitability and financial stability; fostering cultural identity; and encouraging new business opportunities.
Kootznoowoo, Inc.	Residential covenants (2009)	• Restricts properties, for a period of 10 years from the date of the deed to the initial lot owner, to single-family (including traditional extended family customs) residential occupancy. This restriction expired in 2007. • Prohibits commercial natural resources development, subdividing lots within 10 years of the original deed, giving timber development rights to the City of Angoon, building on or occupying any lot prior to installation of a legal waste disposal system.

U.S. Forest Service	*Tongass National Forest Land and Resource Management Plan* (2008a)	• The approximately 1 million–acre Monument–Wilderness Area is managed by the U.S. Forest Service according to the criteria of the Wilderness Act of 1964 (PL 88-577), the provisions of ANILCA, and the guidelines of the *Tongass National Forest Land and Resource Management Plan* (U.S. Forest Service 2008a).
		  • The *Tongass National Forest Land and Resource Management Plan* does the following:
		  o Directs U.S. Forest Service to follow the requirements of ANILCA Title XI for the consideration of transportation and utility systems on monument and wilderness area lands.
		  o Establishes the land use designation for U.S. Forest Service lands in the Angoon area as "wilderness monument." In general, this land use designation promotes land management that maintains a wild, unspoiled, natural setting with little or no development except as prescribed by law under ANILCA.
		  o Provides management prescriptions for resources present on U.S. Forest Service lands in the Angoon area.

Alaska Department of Natural Resources	*Northern Southeast Area Plan* (2002)	• Prepared by the Alaska Department of Natural Resources for state-owned tidelands, submerged lands, and uplands. • Provides for land management to protect salmon and brown bear habitat, wetlands, and waterbird areas; maintain traditional uses by Angoon residents; and promote tideland and shoreline use and development.

4.3.2.5. What are existing land uses like in the Angoon area?

Land use in and around Angoon is largely dictated by the remoteness of the location, the mountainous and densely vegetated terrain, and the limited amount of non-federal land available for use and development. For these reasons, all residential, local government, and commercial land uses occur on private or ANCSA conveyed lands on the Angoon peninsula, whereas subsistence and recreation activities occur both on the peninsula and in the Monument–Wilderness Area.

4.3.2.5.1. Angoon peninsula

Lands on the Angoon peninsula are currently used for or are planned for a combination of purposes. These uses are described below.

Figure LU7. The Angoon town core area.

Residential use: At the time of the 2010 U.S. census, 256 housing units were located on the Angoon peninsula, 167 of which were occupied. Most of these existing residences were located in the town core (Figure LU7 shows an aerial view of the town core). However, the Angoon peninsula also includes lands recently conveyed through ANCSA by Kootznoowoo, Inc. to individual shareholders as home sites in planned subdivisions (see "Residential" areas on Figure LU8). To date, most of these home sites have not been developed. Nevertheless, the area has been platted for residential use. The 14(c)(3) reconveyance plan identified these home sites as the means to help alleviate current overcrowding in houses along Front Street in Angoon and to serve as sites for second homes for shareholders who live outside Angoon (Sheinberg Associates 1997).

Commercial use: Most existing commercial development on the Angoon peninsula is in the core area of the Angoon community. However, the Angoon peninsula also includes lands owned and managed by Kootznoowoo, Inc. for commercial activity and the profit of shareholders (see "Commercial" areas on Figure LU8).

Recreation: Local residents use the following areas for non-guided recreational hunting, fishing, and recreational activities on a limited but routine basis during non-winter months (see "Platted Recreation" areas on Figure LU8):

- A 73.18-acre area near Auk'Tah Lake off the Bureau of Indian Affairs (BIA) Road. This area was designated as a "central park" in the 14(c)3 reconveyance plan prepared for Kootznoowoo, Inc.
- A 111.36-acre area of Salt Lagoon uplands adjacent to Salt Lagoon and east of Kootznahoo Road. This area has been designated by the City as park lands, and was slated as a berry-picking area in the 14(c)3 reconveyance plan. However, this area has not been used for berry picking or other recreation in several years because runoff from the community's landfill and sludge lagoon drains here (Thompson and Thompson 2009).

- A 2.38-acre area northwest of the Salt Lagoon and along the west side of Kootznahoo Road. This area is currently used as a rifle range; however, it is very close to shareholder home sites and its use as a rifle range may not be compatible with adjacent home sites once they are developed. The 14(c)3 reconveyance plan describes this area as a potential site for a residential trailer park, a recreational vehicle park, boat storage or storage units, parking, or other commercial uses. However, Kootznoowoo, Inc. has no agreement with the City of Angoon that would allow this site to convert to other uses (Naoroz 2009).

Traditional cultural practices and religious activities: An estimated 20 small, historic, personal use sites (smokehouses and campsites, for example) on the peninsula have been transferred to individuals by Kootznoowoo, Inc. (Naoroz 2009). However, the locations of these sites have not been released due to confidentiality issues.

Subsistence: Angoon residents identified approximately 19,000 acres as subsistence use areas in and around Angoon for the harvest of fish, land mammals, upland birds, marine mammals, marine invertebrates, waterbirds, and land and marine vegetation (see section 4.13 Subsistence Resources and Uses, for more information). Most of these lands are outside the Angoon peninsula in the Monument–Wilderness Area, on Kootznoowoo Corridor Lands, and on state tidelands and submerged lands.

Public services and government: The City of Angoon provides water, sewer, electric, and waste collection and disposal services to the public. Electricity is produced at a single diesel-burning power plant. The Angoon peninsula also contains lands designated for roads (both existing and platted), current and future water tank siting, sewage treatment, water treatment, and a city landfill and recycling area. Most of this land was reconveyed to the City by Kootznoowoo, Inc. as 14(c)(3) parcels under ANCSA.

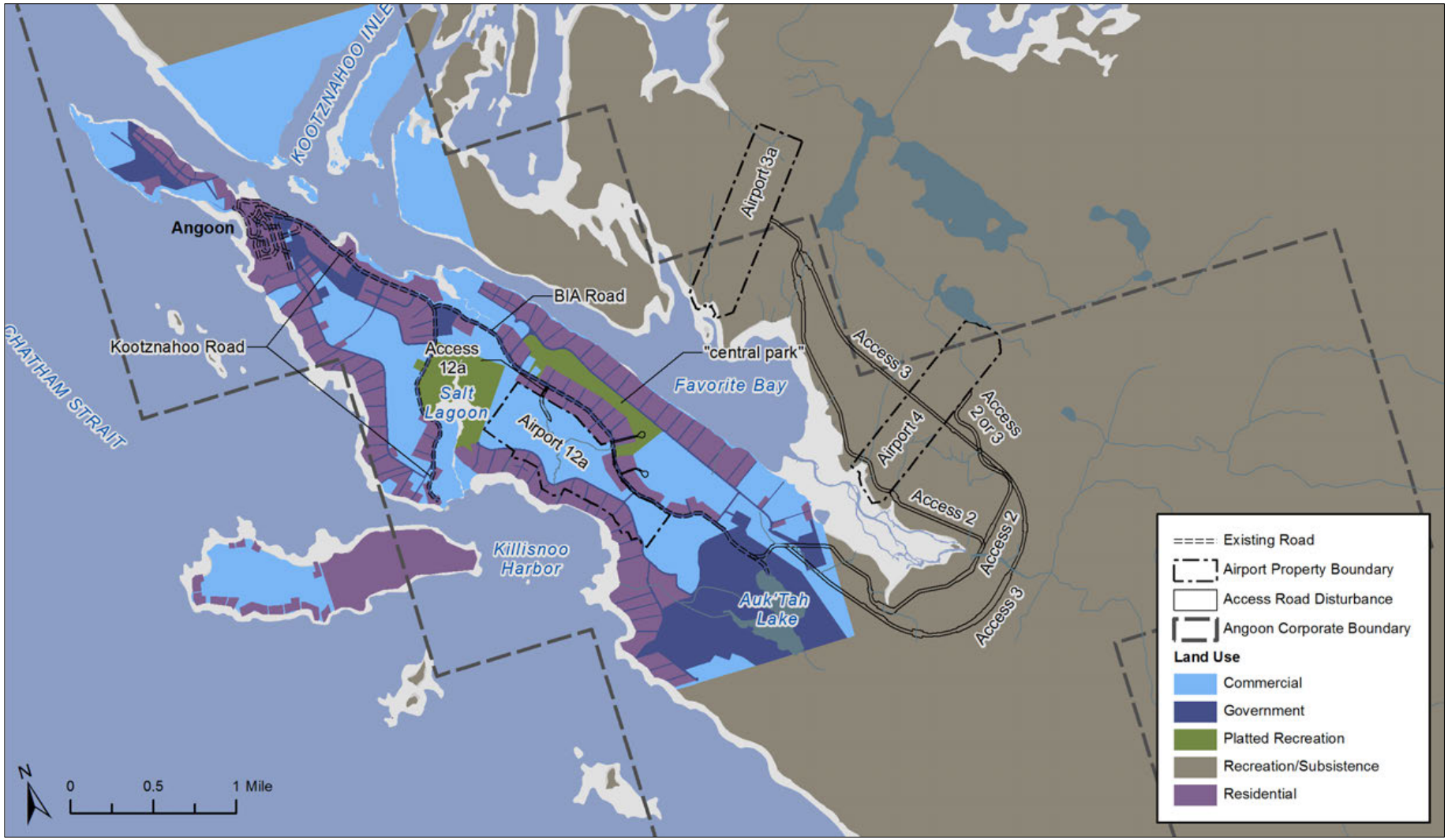


Figure LU8. Land use in the Angoon area.

4.3.2.5.2. Monument–Wilderness Area

Land uses in the Monument–Wilderness Area are regulated by the management of those lands as a national monument and wilderness area. Land uses in these areas are generally limited to subsistence uses (for detailed information, see section 4.13) and non-guided and commercially guided recreation such as hiking, camping, recreational fishing, and recreational hunting.

Figure LU9. Recreational fishing near Angoon.

Most guided and non-guided recreation occurs outside the Monument–Wilderness Area in Kootznahoo Inlet and Mitchell Bay as day trips for saltwater recreational fishing (U.S. Forest Service 2002). The Alaska Department of Fish and Game reported that 573 anglers fished along Admiralty Island streams for 788 days in 2011 (Alaska Department of Fish and Game 2013a). Figure LU9 shows a typical recreational fishing excursion in the area. Non-fishing recreational use of lands in the Monument–Wilderness Area is low. Based on the most recent data collected by the U.S. Forest Service, from 2010 to 2012, an average 1,575 additional people visited the Monument–Wilderness Area using local outfitters and guides (USFS 2014a). Some independent visitors also travel to Angoon to visit the Monument–Wilderness Area for canoeing, kayaking, camping, and other recreational activities, but no agency or other party tracks data about these visitors other than through Monument–Wilderness Area cabin reservations. For this reason, the number of independent tourists is not known but is estimated to be fewer than 600 per year (USFS 2014b). For comparison, based on U.S. Forest Service national visitor use monitoring, average annual visitation to the Juneau region of the Tongass National Forest was more than 100 times higher than visitation specifically to the Monument–Wilderness Area in 2010 (USFS 2014c).

4.3.3. Project effects

What is discussed in this section?

For all action alternatives, construction, operation, and maintenance of an airport and access road would affect land use compatibility. Although the nature of the effects would be the same for all action alternatives, the extent and magnitude of effects would differ. The sections below describe the actions causing the effects and the effects themselves; the methods for evaluating effects; and the similarities and differences in the magnitude and extent of effects between the alternatives.

4.3.3.1. How did the FAA determine the effects of the alternatives on compatible land use?

FAA Orders 1050.1E and 5050.4B require certain analyses related to compatible land use. These analyses fall into two overarching categories: 1) an analysis of effects from noise, and 2) a determination about whether there are laws or land management plans in place that allow an airport to be located on either wilderness or ANCSA lands for any given alternative. In this section, this is called "project compatibility."

In addition, these orders state that the compatible land use analysis may consider other effects that have land use implications. Therefore, this section also evaluates the effects of land acquisition, rights-of-way, permits, and/or leases on land use and landownership status in the Angoon area. For information on effects to land uses associated with community disruption, business relocations, and other socioeconomic factors, see section 4.12 Socioeconomic Conditions. For information on changes in lands that contain wetlands or critical habitat, see section 4.15 Wetlands and section 4.5 Biological Resources, respectively.

4.3.3.1.1. Analysis to determine the compatibility of future noise conditions with land uses

FAA-required noise analysis

FAA Order 1050.1E states that aviation-based noise is typically the action that most often changes land use compatibility near an airport. For that reason, the FAA examined existing noise conditions in and around Angoon and the airport alternatives and estimated future aviation noise conditions if any airport were to be built at any of the three locations assessed in this EIS. The FAA then calculated the number of acres of noise-sensitive lands that would be exposed to aviation noise.

> **Terms to know**
>
> *Day-night average sound level (DNL):* DNL is an average of noise levels experienced during an entire 24-hour day. It includes a penalty for nighttime operations in that noise occurring between the hours of 10:00 p.m. and 7:00 a.m. is increased by an additional 10 dBA to account for higher sensitivity to noise heard at night.

Table LU5, below, provides federal guidelines for compatibility of various land uses with aviation noise (measured as ***day-night average sound level [DNL]*** in dBA). As can be seen in the table, average noise levels no greater than DNL 65 dBA are considered compatible with all categories of land use. For this reason, the FAA used DNL 65 dBA as the standard against which future aircraft noise associated with the operation of an airport at any of the three alternative locations was evaluated. The methods used in this EIS to determine which areas are exposed to DNL 65 dBA or greater are discussed in section 4.11 and *Noise Analysis for Angoon Airport Environmental Impact Statement, Angoon, Alaska* (BridgeNet International 2013b, included as Appendix G). Readers are referred to these sections for additional details.

Table LU5. General land use compatibility with DNL levels

Yearly DNL in dBA	Residential	Public use				Commercial			Manufacturing			Recreational		
	Housing, other than transient or mobile homes	Schools	Hospitals; churches	Government services	Transportation	Retail; offices, business and professional	Utilities	Communication	Manufacturing, general	Mining and fishing	Agriculture (except livestock) and forestry	Outdoor sports arenas	Parks, resorts, and camps	Water recreation
<65	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
65–70	N*	N*	Y*	Y	Y	Y	Y	Y	Y	Y	Y	Y*	Y	Y
70–75	N*	N*	Y*	Y*	Y*	Y*	Y*	Y*	Y*	Y	Y*	Y*	Y	Y*
75–80	N	N	N	Y*	Y*	Y*	Y*	Y*	Y*	Y	Y*	N	N	Y*
80–85	N	N	N	N	Y*	N	Y*	N	Y*	Y	Y*	N	N	N
>85	N	N	N	N	Y*	N	N	N	N	Y	Y*	N	N	N

Source: FAA Order 1050.1E (2006a).

Y: Land use is compatible with noise level.

N: Land use is not compatible with noise level.

* Compatibility is based on incorporation of specific noise level reductions (see source for details).

Supplemental grid point analysis

> **Terms to know**
>
> *Metric:* Used here, an indicator of noise level or duration.

The FAA recognizes that the DNL 65 dBA threshold may not adequately reflect effects for certain noise-sensitive land uses that rely on a quiet setting and where quiet is part of a location's generally recognized purpose and features. Of the noise-sensitive land uses identified in this EIS, only the Monument–Wilderness Area relies on quiet as part of its purpose and features. Therefore, to determine noise effects on the Monument–Wilderness Area, the FAA used a supplemental noise analysis to assess change in noise at levels below the FAA's DNL 65 dBA noise threshold.

Readers are referred to section 4.11.2.1.2 in Noise for additional information about these supplemental ***metrics*** and findings.

4.3.3.1.2. Analysis to determine project compatibility

According to 49 USC 47106(a)(1), a project may not be approved unless it is shown to be consistent with applicable existing land use plans of other agencies. Project compatibility was assessed qualitatively for the EIS through consideration of local, state, and federal plans, policies, or laws that direct land use in the Angoon area.

4.3.3.1.3. Analysis to determine effects from land acquisition, rights-of-way, permits, and/or leases

Changes in landownership status and availability of, or access to, various land uses in and around Angoon were assessed by alternative based on the acres of land acquisition, rights-of-way, permits, and/or leases that would be required for the proposed airport and access road. This land would be converted to a transportation use. As described in section 4.3.1.2, potentially affected land uses and landowners were identified through examination of existing data from standard sources: federal, state, and regional government databases and planning documents (see Tables LU1 and LU2, above).

4.3.3.2. How did the FAA determine the significance of the anticipated effects from the alternatives?

In accordance with FAA Order 1050.1E, the primary significance threshold for effects to compatible land use is the same as the significance threshold for noise: "when an action, compared to the no action alternative for the same timeframe, would cause noise-sensitive areas located at or above DNL 65 dBA to experience a noise increase of at least DNL 1.5 dBA" (FAA 2006a).

The FAA has not established significance thresholds for 1) project compatibility or 2) land use and ownership changes associated with land acquisition, rights-of-way, permits, and/or leases. However, for this EIS and this analysis, the FAA used the following:

1. Project compatibility: 49 USC 47106(a)(1) requires project compatibility for grant approval. If there are laws or land management plans in place to allow for an airport to be placed on private, ANCSA, or wilderness lands, the proposed airport and access road would be considered compatible, and effects therefore would not be significant.

2. Land use and ownership changes associated with land acquisition, rights-of-way, permits, and/or leases: No significance thresholds have been developed for this EIS, but this topic is analyzed to provide the reader with context for the extent of land use and landownership change in and around Angoon that would result from the alternatives.

4.3.3.3. How would each alternative affect land use compatibility?

4.3.3.3.1. Compatibility of future noise conditions with land uses

Under the no action alternative, approximately 1.3 acres would continue to be exposed to average daily noise levels at or above DNL 65 dBA (Figure LU10). No noise-sensitive areas would be affected within this acreage, however, because noise levels at or above this threshold would be over water in the area used for seaplane takeoffs and landings (see Figure LU10).

Table LU6. Acres of land at or above DNL 65 dBA

Alternative	Affected Land Use	Acres
No action	Water	1.3
Airport 3a	Water, wilderness	4.0*
Airport 4	Water, wilderness	2.9*
Airport 12a	Water, residential, commercial**	4.0*

Source: BridgeNet International 2013b, included as Appendix G.

* Includes 0.3 acre of land for noise associated with the Angoon Seaplane Base operating under reduced capacity

**Designated commercial lands are currently unoccupied

Any one of the action alternatives would result in long-term aircraft noise levels at or above DNL 65 dBA (Table LU6 and Figure LU10) in areas over water above the existing seaplane base and at the location of the airport runway of each alternative. No noise-sensitive areas would be affected by noise levels at or above DNL 65 dBA for Airport 12a. Commercial lands generally are not considered noise sensitive and are currently unoccupied. Residential lots within the DNL 65 dBA noise contour would be acquired as part of airport and access road construction and converted to transportation use; therefore, they would no longer be considered noise-sensitive. In general, most of these lots are also unoccupied. For Airports 3a and 4, approximately 3–4 acres of Monument–Wilderness Area would be exposed to noise levels at or above DNL 65 dBA during airport operation. Although wilderness areas are generally considered noise sensitive, affected Monument–Wilderness Area lands would fall within the airport property, which, through the ANILCA process, would become a transportation and utility system and would therefore not be considered noise sensitive. This does not mean there are no noise effects to wilderness qualities outside the airport property. Those effects are discussed throughout section 4.16.3 of Wilderness Character.

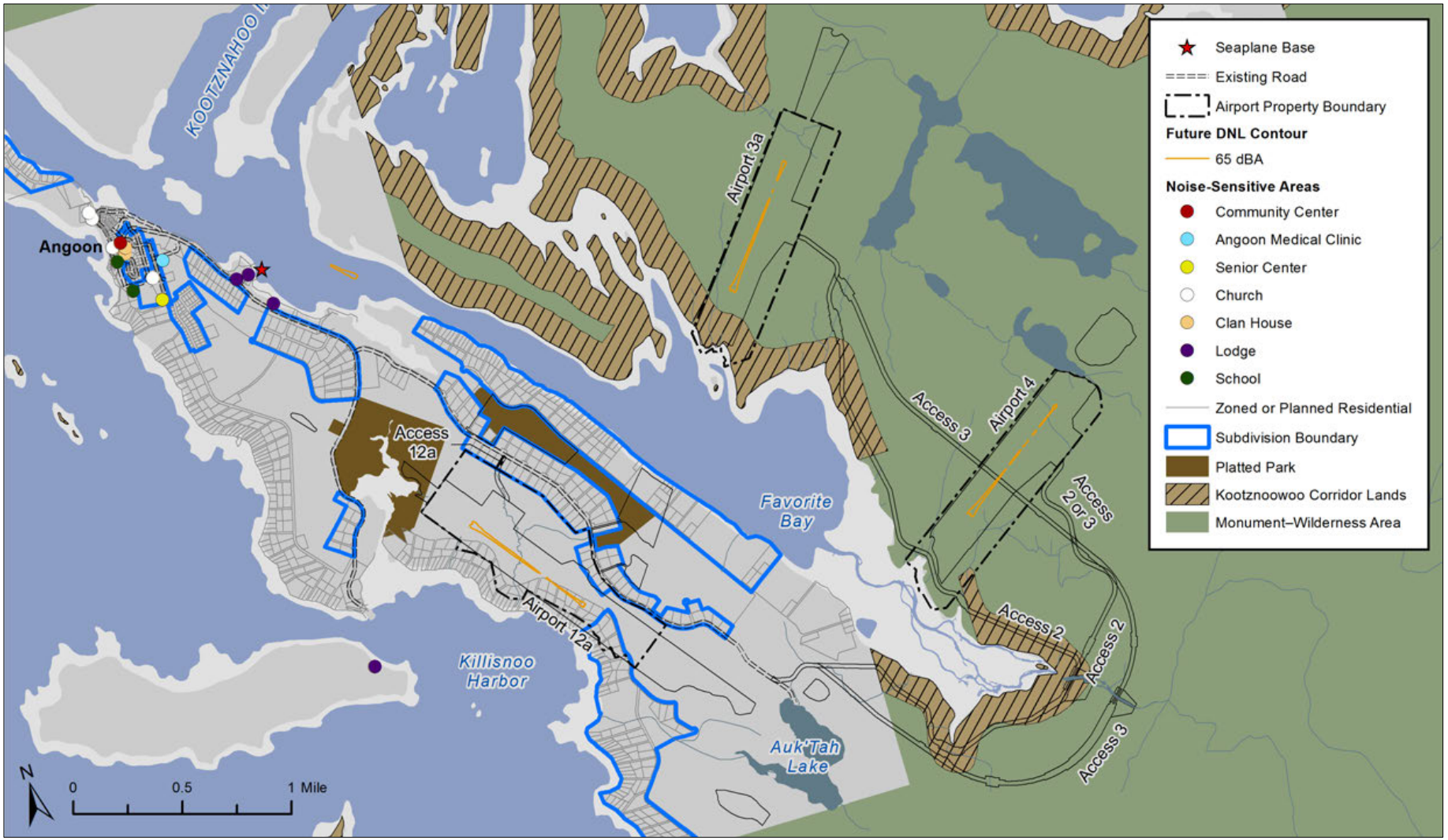


Figure LU10. DNL contours for proposed airport sites and reduced seaplane operations, relative to noise-sensitive areas in and around Angoon.

4.3.3.3.2. Project compatibility

The no action alternative would be compatible with existing land use plans for Angoon because it would not change any existing land uses or introduce any new noise or aviation sources.

Because ANILCA Title XI provides a process through which an airport could be allowed within the Monument–Wilderness Area and no land use plan amendment would be required, Airport 3a and Airport 4 are considered by the FAA to be a compatible land use.

Neither Airport 3a nor Airport 4 would conflict with the zoning or land use plans for the City of Angoon, Kootznoowoo, Inc., or the State of Alaska. However, to be compliant with existing plans, the City of Angoon would need to rezone some lands acquired by the Alaska Department of Transportation and Public Facilities for Airport 12a with Access 12a, because permitted uses for these lands do not include an airport.

4.3.3.3.3. Effects from land acquisition, rights-of-way, permits, and/or leases

The no action alternative would not create any new land use issues because no airport would be built. Landownership, access to land, and the amount of land available for current subsistence, recreation, and other land uses would be of the type and extent currently occurring in the Angoon area.

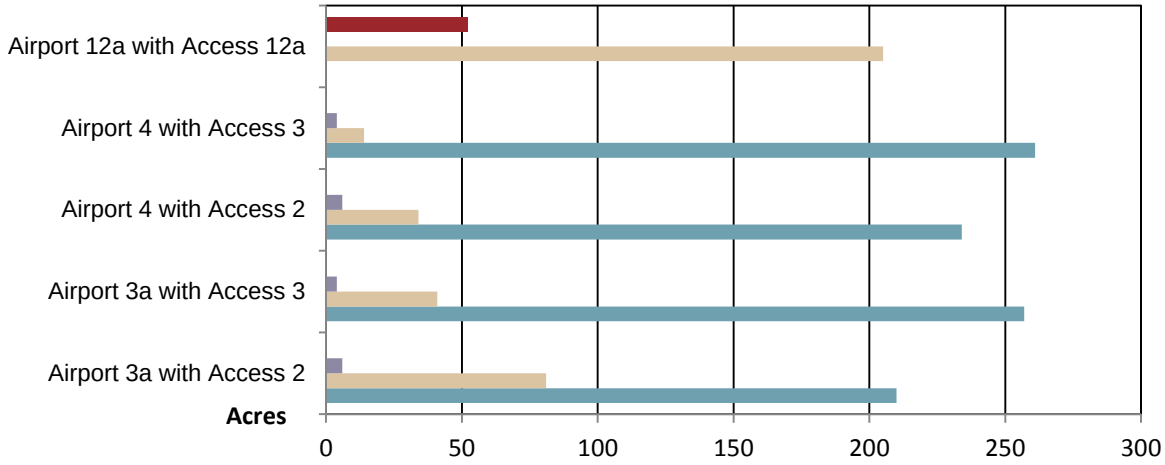
All action alternatives would require land acquisition, rights-of-way, permits, and/or leases for airport and access road construction and operation. Figure LU11 summarizes acres of affected lands by landowner for each alternative. This calculation includes surrounding lots zoned or planned residential for Airport 12a to control encroachment on the airport.

For Airport 3a and Airport 4, approximately 71% to 94% of all lands required for the proposed airport, bridge, and access road are in the Monument–Wilderness Area managed by the U.S. Forest Service. A right-of-way for the Alaska Department of Transportation and Public Facilities to access these lands would occur through the ANILCA Title XI process (see Chapter 5 for more on the ANILCA process). The process by which the Alaska Department of Transportation and Public Facilities (DOT&PF) would obtain lands owned by the City of Angoon or Kootznoowoo, Inc. would be determined after the record of decision, and could take the form of a land purchase or long-term lease. Kootznoowoo, Inc. lands are fee simple, which means that there are no sales restrictions. Access 2 and Access 3 are currently routed through the Auk'Tah Lake watershed (owned by the City of Angoon), but may be rerouted prior to construction to avoid this property.

For Airport 12a with Access 12a, the Alaska Department of Transportation and Public Facilities would have to acquire private, zoned or planned residential properties within the airport property

Terms to know

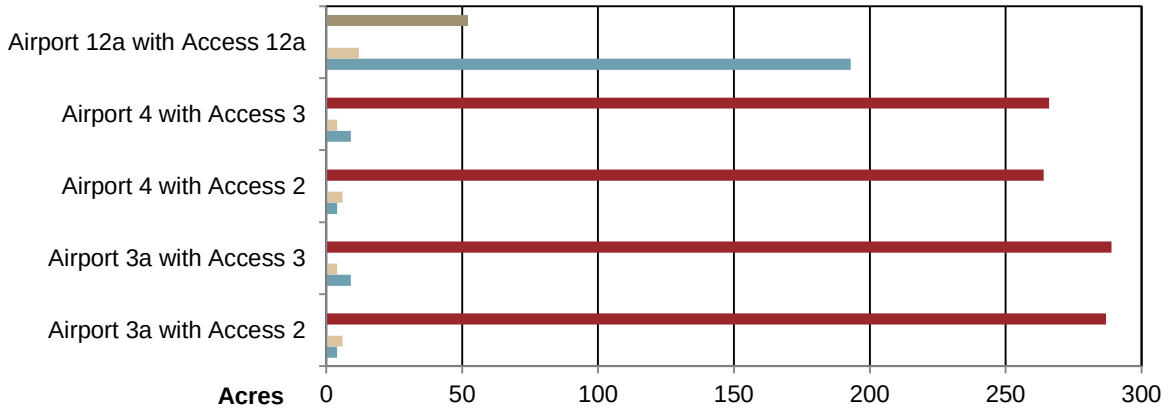
Avigation easements: A right-of-way tool used in airport planning to grant certain rights to the holder of the easement. For this EIS, avigation easements outside of airport property would provide the Alaska Department of Transportation and Public Facilities (DOT&PF) the right to access areas to clear them of obstructions and maintain that clearance.



	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Private	0	0	0	0	52
City of Angoon	6	4	6	4	0
Kootznoowoo, Inc.	81	41	34	14	205
U.S. Forest Service	210	257	234	261	0

Figure LU11. Acres affected per landowner/land manager for each alternative. Lands subject to ***avigation easements*** are not included in this calculation. The DOT&PF would negotiate a right-of-way agreement with landowners/land managers for long-term access to those lands to clear obstacles, but there would be no change in landownership.

boundary. This long-term acquisition would be done in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (PL 91-646), which covers any private lands, including those conveyed under ANCSA. While no formal discussions with private landowners have occurred about this potential acquisition, all contacted land owners have allowed the FAA access to their lands for field studies. Acquisition of Kootznoowoo, Inc. lands would likely take the form of a land purchase, long-term lease, or perpetual easement. The general manager of Kootznoowoo, Inc. has verbally indicated that, at the discretion and final approval of the board of directors, the corporation would consider transferring lands to the airport sponsor if Airport 12a is selected (Naoroz 2014).



	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Residential	0	0	0	0	52
Recreation/Subsistence	287	289	264	266	0
Recreation	0	0	0	0	0
Government	6	4	6	4	12
Commercial	4	9	4	9	193

Figure LU12. Land uses converted, per alternative. Lands subject to avigation easements are not included in this calculation. The DOT&PF would negotiate a right-of-way agreement with landowners for long-term access to those lands to clear obstacles, but there would be no change in land use.

Acquisition and/or permitted use of Monument–Wilderness Area (U.S. Forest Service), Kootznoowoo, Inc., state, private, and City of Angoon lands would convert existing zoned or planned residential, commercial, or recreation and subsistence land uses to transportation use (Figure LU12).

For any action alternative, this long-term land use conversion would result in a change or loss of access by local and non-local residents to affected land parcels for their intended land use. The magnitude and extent of this change in access would differ by alternative, however. For Airport 3a and Airport 4, most of the land use conversion would occur on lands used for recreation and subsistence in the Monument–Wilderness Area. In contrast, land use conversion for Airport 12a would mostly occur on currently undeveloped lands owned by Kootznoowoo, Inc. but reserved for economic and other uses to benefit their

shareholders. As noted above, Access 2 and Access 3 are currently routed through the Auk'Tah Lake watershed (classified as a government land use), but may be rerouted prior to construction to avoid this property.

Under any of the action alternatives, property owners would lose access to all existing zoned or planned residential and commercial lands within the airport property boundary and access road right-of-way for the duration of the airport's and road's operation; construction of non-airport and non-road structures such as homes or businesses would not be permitted within the airport property line or road right-of-way. For Airport 12a with Access 12a, this would affect approximately 10% of lands currently available for commercial land uses. Airports 3a and 4, by comparison, would affect less than 1% of lands for commercial uses because only the portions of their associated access road options that connect to the existing Angoon road system would affect such lands.

Airport 12a with Access 12a would also affect 37 zoned or planned residential home sites conveyed to Kootznoowoo, Inc. shareholders under ANCSA (see section 4.12.3.3.1 in Socioeconomic Conditions for discussion of resident relocation). This represents approximately 6% of available zoned or planned residential land use in the Angoon area. Additionally, Kootznoowoo, Inc. would lose access to below-ground resources within the airport property boundary and the access road right-of-way for the duration of the airport's and road's operation.

Construction activity for the airport, road, and bridge would result in a temporary reduction in access to recreation and subsistence land uses in the construction footprint throughout construction. Once the airport is operating, residents would be excluded from recreation and subsistence land uses within the airport perimeter fence. Under Airports 3a and 4, construction of the road around Favorite Bay would improve long-term access to existing recreation and subsistence areas, and provide new access to lands within a 0.5-mile radius of the proposed airport and access road locations (see Figure LU13 and section 4.13 Subsistence Resources and Uses).

4.3.3.4. How do all the effects to land use compare?

Project effects to land use compatibility are summarized by alternative in Table LU7. Action alternatives would result in similar noise effects but would differ based on their compatibility with existing plans, laws, and land use and ownership changes associated with project-related land acquisition, rights-of-way, permits, and/or leases. The FAA has determined that Airports 3a and 4 would be compatible because, through the ANILCA process, an airport and access road could be allowed on Monument–Wilderness Area lands. These alternatives would require land acquisition, rights-of-way, permits, and/or leases on predominantly U.S. Forest Service lands, and would convert recreation and subsistence land uses to transportation uses. In comparison, the City of Angoon would need to rezone some lands acquired by the DOT&PF for Airport 12a with Access 12a, because permitted uses for these lands do not include an airport. This alternative would also require acquisition of predominantly Kootznoowoo, Inc. lands, and would convert commercial and residential land uses to transportation uses.

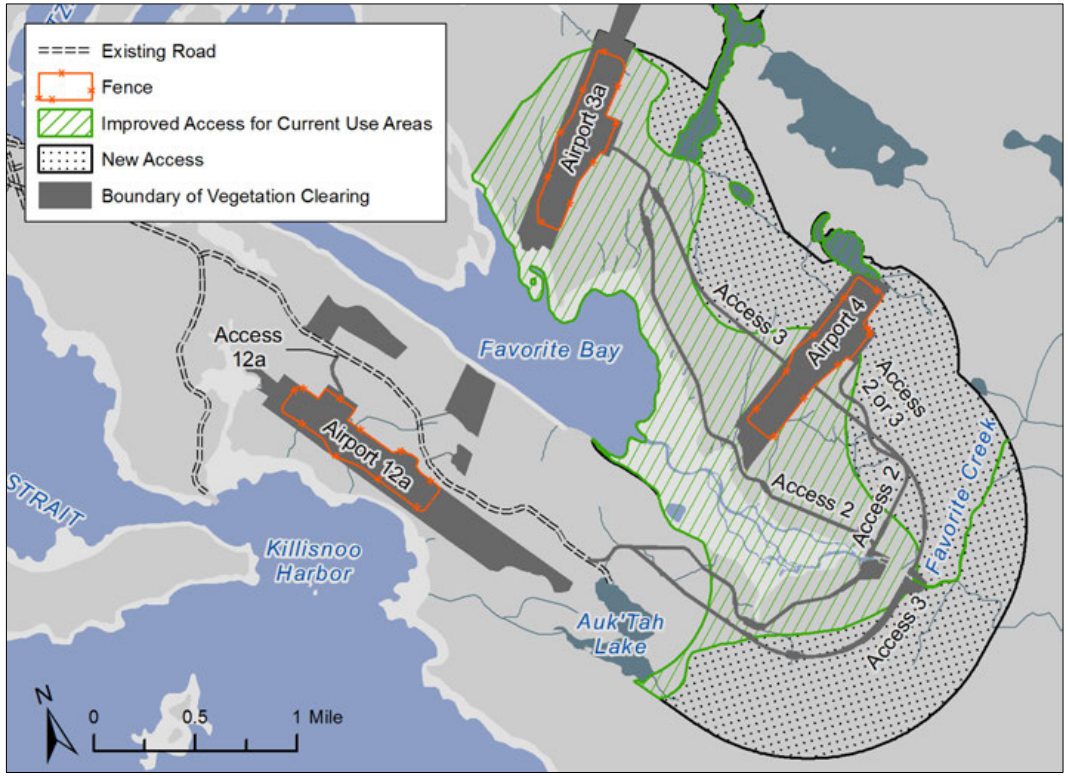


Figure LU13. Locations where land uses would be altered.

Table LU7. Comparison of project effects to land use compatibility by alternative

Effect	No Action Alternative	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Changes in day-night average sound level	• No change in noise level and duration; 1.3 acres above DNL 65 dBA	• 4.0 acres above DNL 65 dBA • Increase in average daily noise levels on Monument–Wilderness Area lands as compared to no action alternative	• Same as Airport 3a with Access 2	• 2.9 acres above DNL 65 dBA • Increase in average daily noise levels on Monument–Wilderness Area lands as compared to no action alternative	• Same as Airport 4 with Access 2	• 4.0 acres above DNL 65 dBA • Increase in average daily noise levels on private and ANCSA lands as compared to no action alternative
Project compatibility	• Compatible with plans and laws	• Compatible because ANILCA Title XI provides a process through which an airport could be allowed within the Monument–Wilderness Area, and no land use plan amendment would be required	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Compatible through rezoning of some acquired lands
Land acquisition, rights-of-way, permits, and/or leases	• No change in landownership or land use	• Land acquisition, rights-of-way, permit, and/or lease of 210 acres of U.S. Forest Service and 81 acres of Kootznoowoo, Inc. lands • Conversion of 287 acres of recreation or subsistence land uses to transportation	• Land acquisition, rights-of-way, permit, and/or lease of 257 acres of U.S. Forest Service and 41 acres of Kootznoowoo, Inc. lands • Conversion of 289 acres of recreation or subsistence land uses to transportation	• Land acquisition, rights-of-way, permit, and/or lease of 234 acres of U.S. Forest Service and 34 acres of Kootznoowoo, Inc. lands • Conversion of 264 acres of recreation or subsistence land uses to transportation	• Land acquisition, rights-of-way, permit, and/or lease of 261 acres of U.S. Forest Service and 14 acres of Kootznoowoo, Inc. lands • Conversion of 266 acres of recreation or subsistence land uses to transportation	• Land acquisition, rights-of-way, permit, and/or lease of 205 acres of Kootznoowoo, Inc. and 52 acres of private lands • Conversion of 192 acres of commercial land uses, 12 acres of recreation land uses, and 52 acres of land zoned or planned for residential use to transportation

4.3.3.5. Would any effects be irreversible or irretrievable?

Construction of any action alternative would result in irreversible and irretrievable effects to compatible land use. The land for the airport and access road would be unavailable for other land uses during the operation of the facilities.

4.3.3.6. Would any of the alternatives have a significant effect on compatible land use?

As discussed in section 4.3.3.2, the FAA uses two criteria—noise and project compatibility—to determine significance for compatible land use. The significance determinations per these two criteria are as follows:

4.3.3.6.1. Noise

Findings of significance for land use compatibility are primarily based on noise effects. Even with the added penalty for night-time flights, there would be no noise-sensitive areas within the DNL 65 dBA contour for any action alternative. Therefore, per significance thresholds in FAA Order 1050.1E, there would be no significant effects from noise within the airport property boundary.

It should be noted, however, that the significance of noise effects on wilderness qualities is not fully captured by established FAA noise thresholds. Because of the quiet nature of the wilderness area, the FAA also used supplemental noise metrics to evaluate a wider range of noise effects. Discussions of noise as it pertains to wilderness qualities can be found throughout section 4.16.3 in Wilderness Character.

4.3.3.6.2. Project compatibility

Based on the FAA's definition of the term "compatible land use" (meaning there are laws or land management plans in place to allow for an airport to be placed on private, ANCSA, or wilderness lands), Airports 3a and 4 would be considered a compatible land use because the ANILCA process could allow for an airport and access road to be placed on Monument–Wilderness Area lands. To allow for the placement of Airport 12a with Access 12a on ANCSA lands, some of those lands would need to be rezoned per City of Angoon zoning regulations (General Code Title 18, Zoning) to be in compliance with City of Angoon policies. Therefore, Airport 12a with Access 12a would be considered to be a compatible land use. For these reasons, per the significance thresholds discussed in section 4.3.3.2, no significant compatible land use effects are expected from any of the action alternatives.

4.3.3.7. How could the effects described above be avoided, minimized, or mitigated?

Because no significant effects are anticipated for compatible land use, no additional mitigation measures beyond those discussed in Chapter 7: Mitigation would be implemented under any action alternative. Chapter 7 describes best management practices that would be implemented during construction. Best management practices are relatively common activities in construction that are intended to prevent pollution, minimize environmental harm, and assure that appropriate response action is taken if unacceptable environmental effects occur. Through the use of these best management practices, effects would be reduced during construction. The best management practices described in Chapter 7 were considered during effects analysis for this resource.

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4.4. U.S. Department of Transportation Act Section 4(f) Evaluation Summary

What is discussed in this section?

This section discusses the requirements of Section 4(f) of the Department of Transportation Act of 1966 (49 United States Code [USC] 303). It also summarizes the detailed analysis and findings of the full Section 4(f) evaluation, which is included in this environmental impact statement (EIS) as Appendix D, *U.S. Department of Transportation (USDOT) Section 4(f) Evaluation* (SWCA 2014b).

Section 6(f) of the Land and Water Conservation Fund Act (16 USC 4601-4 to 4601-11) is typically also discussed in an EIS section such as this. However, no resources related to Section 6(f) are present in the Angoon area, so it is not further discussed in this EIS. The sidebar titled at right "Section 6(f) and the Angoon Airport project" describes the requirements of Section 6(f) and the Federal Aviation Administration's (FAA) actions regarding Section 6(f).

Section 6(f) and the Angoon Airport project

Section 6(f) of the Land and Water Conservation Fund Act provides federal funding to states, which in turn provide funding to local municipalities, for the development of public parks. The funds can be used to purchase property for park purposes or to develop such property for park uses. Section 6(f) includes provisions to ensure that parks purchased or developed with Section 6(f) funding (referred to as "Section 6(f) resources") are protected from use or damage related to other purposes. Section 6(f) states that because federal funding was used to create the park, land cannot be taken from that park for other uses unless that land is replaced in kind. All federal agencies are required to consider whether their actions will affect Section 6(f) resources.

The FAA examined all available lists of Section 6(f) resources in Alaska and determined that no Section 6(f) resources are present in the Angoon area or specifically in an area that could be affected by an action alternative.

4.4.1. Background information

4.4.1.1. What is Section 4(f), and how does it apply to this project?

Section 4(f) is part of the Department of Transportation Act, which has been amended several times, most recently in 2008 (23 Code of Federal Regulations [CFR] 774). Section 4(f) applies only to agencies of the U.S. Department of Transportation, and states that such agencies cannot affect certain types of lands and resources (referred to in this EIS as "Section 4(f) resources" or "Section 4(f) properties") unless

- there is no ***feasible*** and ***prudent*** avoidance alternative and the action in question includes all possible planning to minimize harm to the property in question, or
- the use of that property will have a ***de minimis impact*** on it.

The types of properties and resources protected by Section 4(f) are

- ***publicly owned*** land of a park or recreation area of national, state, or local significance;
- publicly owned land of a wildlife refuge of national, state, or local significance; and
- land from a historic site of national, state, or local significance (defined as properties that are eligible for or listed on the National Register of Historic Places), unless the lead federal agency determines an exception under FAA *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a:A-21).

Section 4(f) does not apply to parks, recreation areas, or wildlife refuges if the agency with jurisdiction over that land determines that it is not significant at a national, state, or local level and the FAA has reviewed and concurred with that determination (FAA Order 1050.1E: A-19). Section 4(f) also does not apply to archaeological sites if the responsible FAA official, after consultation with the State Historic Preservation Officer/Tribal Historic Preservation Officer, determines that the archaeological resource is important chiefly for data recovery, and is not important for preservation in place (FAA Order 1050.1E: A-21).

Terms to know

De minimis impact: In the context of Section 4(f), a "*de minimis* impact" is an effect on a public park, recreation area, wildlife refuge, or historic site that will not adversely affect the property's important activities, features, or attributes.

Feasible: In a Section 4(f) context, a feasible alternative is one that can be built as a matter of sound engineering judgment.

Prudent: In a Section 4(f) context, a prudent alternative is one that does not compromise the project to an extent that it

- is unreasonable to proceed, given the project's purpose and need;
- results in unacceptable safety or operational problems;
- even with mitigation, still causes severe social, economic, or environmental impacts, disruption of established communities, disproportionate impacts to minority or low-income populations, or impacts to environmental resources protected under other federal statutes;
- results in extraordinary additional construction, maintenance, or operational costs;
- causes other unique problems or unusual factors; or
- causes cumulative impacts of an extraordinary magnitude.

Publicly owned: Owned by a local, state, or federal governmental agency and available to the general public most of the time.

4.4.2. Existing conditions

4.4.2.1. Are there any Section 4(f) resources present in the proposed locations of the alternatives?

The FAA identified potential Section 4(f) resources in the vicinity of the proposed locations of the action alternatives (Figure 4f1) as follows:

- Three publicly owned parks or recreational areas: the Admiralty Island National Monument and Kootznoowoo Wilderness Area (referred to in this EIS as the Monument–Wilderness Area) and two parcels owned by the City of Angoon and platted as parks
- Nine historic sites (not shown on map for confidentiality reasons)

There are no publicly owned waterfowl or wildlife refuges near any of the alternatives.

The following sections discuss these resources and provide the rationale for the FAA's determination whether they do or do not qualify as a Section 4(f) resource.

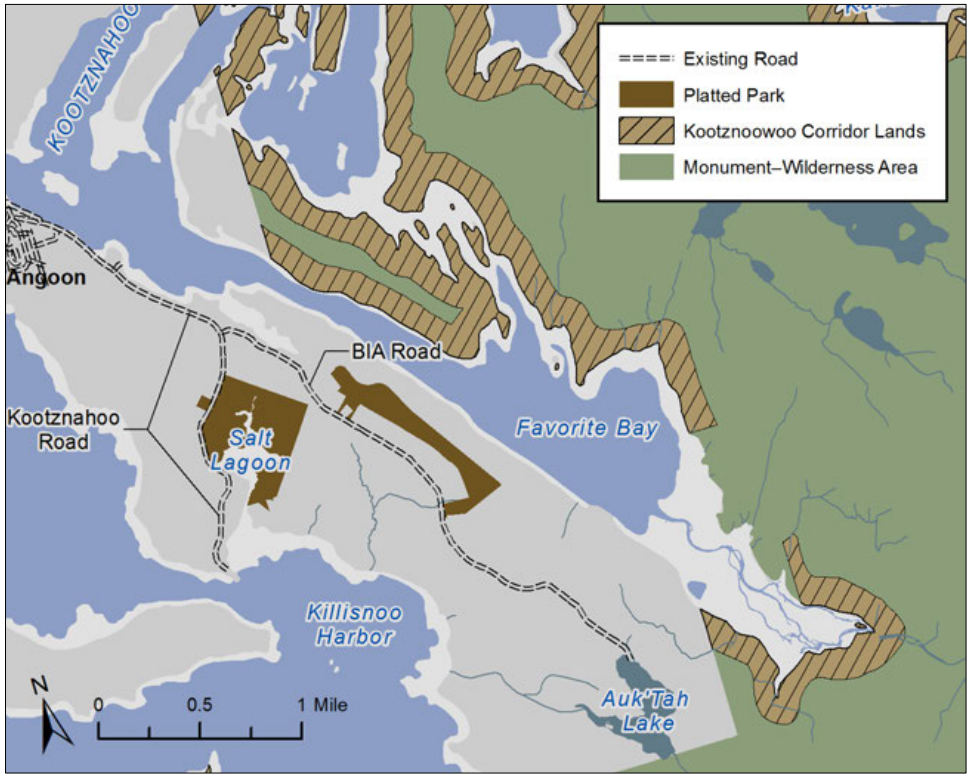

Figure 4f1. Properties potentially qualifying for Section 4(f) consideration. Historic sites are not shown for confidentiality reasons.

4.4.2.1.1. Publicly owned parks or recreational properties

Section 4(f) applies to publicly owned properties whose designated or primary purpose is public recreation. Such properties include existing recreational properties and planned, publicly owned recreational properties, as long as the officials with jurisdiction over the property have identified the planned park as being significant for public recreational purposes, and the FAA has agreed with that determination. The FAA presumes a Section 4(f) resource is significant unless the officials with jurisdiction indicate otherwise, or unless the FAA's independent evaluation of the resource finds it is not significant. There must be sufficient information available about the planned public recreational uses of the property for the FAA to determine the applicability of Section 4(f).

Monument–Wilderness Area

National monuments and wilderness areas are not necessarily Section 4(f) resources. The applicability of Section 4(f) to such properties is determined based on the major purposes of the area and its designation, and a determination by the officials with jurisdiction that the property is significant for such purposes. In accordance with Appendix A, Section 6.2b of FAA Order 1050.1E, the FAA considers a wilderness area that provides purposes similar to those of a park, refuge, or historic site to be subject to Section 4(f), unless the agency with jurisdiction over that area specifically determines the area is not being used for Section 4(f) purposes.

Among the purposes of the Monument–Wilderness Area, as set forth in the Wilderness Act of 1964 (Public Law [PL] 88-577) and the legislation establishing the special designations, are opportunities for solitude and primitive and unconfined recreation. The Admiralty Island National Monument was established in 1978 and contains nearly 1 million acres—almost the entirety of Admiralty Island. The Kootznoowoo Wilderness Area was established in 1980 with the passage of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 (PL 96-487). The national monument and the wilderness area are co-located (meaning that they overlap on the same lands) except for an area of approximately 18,000 acres where the national monument designation applies and the wilderness area designation does not. The land in the Monument–Wilderness Area is part of the publicly owned Tongass National Forest. The U.S. Forest Service supervises the Monument–Wilderness Area lands for, among other things, "unrivaled opportunities for solitude and primitive recreation" (U.S. Forest Service 2012a). As part of determining the applicability of Section 4(f) to the Monument–Wilderness Area, the FAA consulted with the officials with jurisdiction over the property (the U.S. Forest Service). In March 2014, the U.S. Forest Service provided written confirmation to the FAA that the Monument–Wilderness Area is a significant recreational property (U.S. Forest Service 2014d) and confirmed that they do not consider the use of this property to be *de-minimis* use. The FAA therefore considers the Monument–Wilderness Area a Section 4(f) resource.

When ANILCA established the Kootznoowoo Wilderness Area, it also granted ownership of certain lands on Admiralty Island to Kootznoowoo, Inc., the Alaska Native corporation for the community of Angoon. Specifically, Section 506 of ANILCA granted to Kootznoowoo, Inc. the surface rights in a 660-foot-wide corridor along most of the shorelands of Favorite, Kanalku, and Mitchell bays. These lands are typically referred to as the Kootznoowoo Corridor Lands, and they are located directly adjacent to, but not inside, the boundaries of the Monument–Wilderness Area.

The timber, subsurface, and development rights to the Kootznoowoo Corridor Lands reside with the federal government and are managed by the U.S. Forest Service (U.S. Forest Service 2002). ANILCA 506(a)(3)(C)(iv) states that development rights in the Kootznoowoo Corridor Lands are reserved to the United States

> except that the Secretary of Agriculture is authorized to permit construction, maintenance, and use of structures and facilities on said land which he [or she] determines to be consistent with the management of the Admiralty Island National Monument, provided that all structures and facilities so permitted shall be constructed of materials which blend and are compatible with the immediate and surrounding landscape. (Alaska Department of Transportation and Public Facilities 2006:44)

Further, ANILCA 506(a)(3)(E) states that

> the Secretary of Agriculture shall consult and cooperate with Kootznoowoo, [Inc.] in the management of Mitchell, Kanalku, and Favorite bays, and their immediate environs, and the Secretary is authorized to enter into such cooperative arrangements as may further the purposes of this Act and other provisions of law, concerning, but not limited to: permits for any structures and facilities, and the allocations of revenues therefrom; regulations of public uses; and management of the recreational and natural values of the area.

The FAA has found that although the Monument–Wilderness Area is considered a Section 4(f) resource, the Kootznoowoo Corridor Lands are not considered a Section 4(f) resource because they are not 1) formally designated as part of the Monument–Wilderness Area, which is a recreational area, 2) publicly owned, or 3) managed for the primary purpose of recreation.

Angoon city parks

The FAA considered two parcels of land near the Angoon community that appear as city parks on plats and selection data sheets related to Section 14(c)(3) of the Alaska Native Claims Settlement Act (ANCSA) of 1971 (43 USC 1601 et seq.) (see Figure 4f1). The FAA has determined that neither parcel qualifies for Section 4(f) protection. The basis for this determination is as follows:

Prior to the release of the draft EIS in January 2015, the FAA was given information that Kootznoowoo, Inc. deeded 111.36 acres of land around the Salt Lagoon to the City of Angoon as part of a reconveyance of land under ANCSA Section 14(c)(3). This area is referred to as "City Park." Further, the FAA was informed that at the same time, Kootznoowoo, Inc. also deeded a 107.4-acre parcel of land along the Bureau of Indian Affairs (BIA) Road to the City of Angoon. This area is referred to as "Central Park." Both parcels were recorded on the reconveyance plat (the official map of parcels being deeded to the new owners of the parcels). The two parcels were included on that plat as public parks owned by the City of Angoon (Naoroz 2009). Following the release of the draft EIS, the FAA met with the mayor of Angoon to further discuss the platted parks. During this meeting, the mayor indicated that the deeds for conveying the land to the City were never finalized. Because of this, the platted parks are not currently publicly owned; rather, they remain in the ownership of Kootznoowoo, Inc., a non-public entity. However, the mayor indicated that the City was in the process of revising the 14(c)(3) conveyances with Kootznoowoo, Inc. Once that is completed, the final paperwork will be filed to complete the land transfer. The City did not have a projected timeframe for the completion of this paperwork at the time of the meeting.

There are no developed parks or recreational facilities currently present on either platted park parcel. The area in City Park was historically used for berry picking, but such activity has occurred very rarely, if at all, over the last several years due to potential contamination from runoff from the community's landfill and sludge lagoon (Thompson and Thompson 2009). Berry picking can be considered both a recreational activity and a ***subsistence use***, the recreational berry picking often occurring as incidental to other types of recreation, such as hiking or picnicking. ANILCA Section 803, among other provisions of ANILCA and policies of state and federal land management agencies in Alaska, clearly distinguishes between subsistence activity for the primary purpose of acquiring food or personal use items and the recreational taking of natural resources (e.g., recreational hunting and fishing); that is, existing law and policy treat subsistence use as a non-recreational activity. The Central Park property is primarily used incidentally as part of the broader landscape in which subsistence use takes place; however, in late 2015 the mayor of Angoon indicated that he has observed people occasionally picnicking in the area.

Terms to know

Subsistence use: According to Section 803 of ANILCA, "the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade." See section 4.13 Subsistence Resources and Uses for more information.

The City of Angoon does not have a current master plan or other land management plan in place. Previous plans, which were developed prior to the reconveyance of the intended park property, have expired and are no longer in force. The only documentation of the intended purposes for the parcels is in the draft reconveyance plan (Sheinberg Associates 1997) and its related reconveyance plat map. This plan documents Kootznoowoo, Inc.'s desired uses of the lands platted as parks, but does not necessarily constitute planning on behalf of the City of Angoon (the public property owner) to manage the parcels expressly for these purposes, designate permissible activities, or develop these parcels (as appropriate) to support designated recreational activities. The information provided in the draft reconveyance plan and the related selection data sheets for the two parcels provides a broad range of desired and potential uses, and identifies the primary purposes of these lands as both preservation of open space and recreation. To qualify a property as a Section 4(f) resource, planning related to that property should be specific enough to allow the lead agency to determine the key functions and values of the property as it relates to uses that are protected under Section 4(f). The current level of planning regarding these parcels does not appear to provide that level of specificity. Additionally, to qualify for Section 4(f) protection as a publicly owned recreational resource, the land must be managed for the primary purpose of recreation; all other purposes must be secondary or incidental (Federal Highway Administration 2012: Question 1). As described in the draft reconveyance plan, the two park parcels under consideration here were assigned dual purposes. Further, the FAA consulted with the City of Angoon regarding the latter's intent for the management of these parcels. The City of Angoon indicated that the lands would be managed to protect subsistence uses and that the City of Angoon has no plans at this time to develop them as parks (M. Kookesh, Jr. 2014). In August 2015, the mayor stated his desire and intent to develop the lands around the Salt Lagoon as a memorial park. He did not address any intent regarding Central Park. The FAA does not consider the mayor's statements, in and of themselves, as management plans, and the mayor did not provide any documentation to formalize the City's plans to manage the Salt Lagoon lands as a park.

Based on this review of information, the FAA determined that there is no substantive evidence of formal or informal designation by the City of Angoon of either parcel as public recreational property, and available evidence indicates the officials with jurisdiction over the land (i.e., the City of Angoon) intend manage the lands for subsistence rather than public recreational uses. Given this, the FAA has found that neither property qualifies for consideration as a Section 4(f) resource.

4.4.2.1.2. Historic sites

Nine sites in the areas of potential effects for the action alternatives fit the criteria for National Register eligibility. None of the sites are located in areas that would be physically disturbed during construction or operation of the airport or access road; all are located in areas that could be affected indirectly by visual intrusion, vibration during construction, or intentional or inadvertent damage due to increased human access. To protect these historic sites from vandalism or other damage, and in accordance with federal laws (such as the Archaeological Resources Protection Act [16 USC 470hh] and the National Historic Preservation Act [16 USC 470w-3(a)]), the locations of these resources cannot be discussed in detail or shown on maps in this EIS.

The nine sites are as follows:

- SIT-00014 (Killisnoo Island Village)
- SIT-00033 (the Favorite Bay Fish Weir)
- SIT-00034 (a prehistoric ***midden*** and historic garden site)
- SIT-00056 (St. Andrews Church)
- SIT-00169 (Killisnoo Harbor Village)
- SIT-00302 (the Favorite Bay Garden Site)
- SIT-00502 (a historic garden site)
- SIT-00749 (the Killisnoo Cemetery site)
- SIT-00781 (Beaver Tail Rock)

Terms to know

Midden: A term used in archaeology to refer to a dump for domestic trash such as discarded food scraps, shells, broken pottery, and other items. Shell middens (dump areas consisting almost entirely of shells from marine invertebrates such as clams or chitons) are very common, and reflect the food-gathering and processing activities of prehistoric and historic human populations that once lived in the area.

Preservation in place: A Section 4(f) term that indicates a site is chiefly important for reasons other than its scientific data potential (in other words, what can be learned by excavating it). As an example, a site would warrant preservation in place because its presence on the landscape in that location is important, and it would lose its value by being removed or altered.

Of these, site SIT-00302 has been formally determined eligible for the National Register under Criterion D. The FAA has received concurrence on this determination from the U.S. Forest Service, which manages the land where the site is located, and the Alaska State Historic Preservation Officer (SHPO). Further, the FAA has determined that site SIT-00014 is eligible for the National Register under Criteria A and D, and that site SIT-0749 is eligible under Criterion A. Both sites warrant ***preservation in place***. The FAA has also determined that sites SIT-00056 and SIT-00169 are both eligible for the National Register under Criterion D for their scientific information potential. The FAA received concurrence on these determinations from the SHPO. With these findings, the FAA has determined that Section 4(f) applies to sites SIT-00014 and SIT-00749 and that the archaeological site exception found in 23 CFR 774.13(b), and discussed above, applies to sites SIT-00056, SIT-00169, and SIT-00302.

The FAA has made preliminary determinations of eligibility for the remaining four sites (SIT-00033, SIT-00034, SIT-00502, and SIT-00781). The FAA has preliminarily determined that site SIT-00033 (the Favorite Bay Fish Weir) is eligible for the National Register under Criteria C and D, and warrants preservation in place. The FAA has preliminarily determined that site SIT-00781 (Beaver Tail Rock) is eligible for the National Register under Criterion A, and also warrants preservation in place. Finally, the FAA has preliminarily determined that sites SIT-00034 and SIT-00502 (a

historic garden site) are eligible for the National Register under Criterion D. With these findings, the FAA has determined that Section 4(f) applies to sites SIT-00033 and SIT-00781 and that the archaeological site exception discussed above applies to sites SIT-00034 and SIT-00502.

In summary, the FAA has determined that four historic sites qualifying for Section 4(f) protection are present in the areas of potential effects for the proposed airport alternatives. These are sites SIT-00014 (Killisnoo Island Village), SIT-00033 (Favorite Bay Fish Weir), SIT-00749 (Killisnoo Cemetery), and SIT-00781 (Beaver Tail Rock). Sites SIT-00014 and SIT-00749 are both located in area of potential visual effects for the Airport 12a alternative. Sites SIT-00033 and SIT-00781 are located in the areas of potential indirect effects from improved access for both access road options associated with Airports 3a and 4.

4.4.3. Project effects

4.4.3.1. How are effects defined under Section 4(f)?

Section 4(f) defines effects differently than does the National Environmental Policy Act of 1969 (PL 91-190) or other regulations. Effects to Section 4(f) properties are evaluated in terms of use of those properties. There are two main categories of use based on the following definitions:

> Use: Use occurs when there is an actual, physical taking of lands [from a publicly owned recreational property or wildlife refuge or from a historic site] in conjunction with a project (FAA Order 1050.1E: A-20).
>
> *De minimis* use: FAA guidance is silent on findings of *de minimis* use, which is set forth in Section 4(f) legislation. For this reason, the FAA follows the Section 4(f) legislation, itself, at 23 CFR 774.17, which defines *de minimis* use depending on the type of Section 4(f) resource involved. The definitions are as follows:
>
> (1) For historic sites, *de minimis* impact or use means that the administration (in this case the FAA) has determined, in accordance with 36 CFR 800, that no historic property is affected by the project or that the project will have "no adverse effect" on the historic property in question.
>
> (2) For parks, recreation areas, and wildlife refuges, a *de minimis* impact or use is one that will not adversely affect the features, attributes, or activities qualifying the property for protection under Section 4(f).

Use is often referred to as "physical use" to clarify that it represents direct impacts to the Section 4(f) resource as opposed to indirect impacts. In this EIS, the term "physical use" will be used hereafter.

Certain other types of effects on Section 4(f) properties can occur that do not meet the definitions for physical use and *de minimis* use stated above, and these reflect indirect effects to Section 4(f) resources. This situation is known as "constructive use," defined on the next page.

What is discussed in this section?

Section 4(f) use and ANILCA

As described at left, one type of use under Section 4(f) occurs when land is physically taken in conjunction with a transportation facility, such as an airport or road.

This idea of permanently incorporating land into a transportation facility should not be confused with changing land designation. ANILCA Title XI allows for an airport (described in ANILCA as a transportation and utility system) to be placed in the Monument–Wilderness Area (described in ANILCA as a conservation system unit) without changing the land's current designation as a conservation system unit.

To sum up, the land occupied by the airport would still be considered part of the Monument–Wilderness Area even though under Section 4(f) it would have been incorporated into a transportation facility. This process is described in Chapter 5: ANILCA.

Constructive use: FAA Order 1050.1E, Appendix A, Section 6 defines "constructive use" as occurring when there is no physical taking of land from a Section 4(f) resource but indirect effects on the resource would be so adverse as to "substantially impair" that resource.

The Order defines "substantial impairment" as occurring "only when the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished."

The most common source of indirect effects from aviation projects on adjacent land uses is aircraft noise. The FAA relies on guidance in the Airport Noise Compatibility Planning Toolkit (14 CFR 150) to assess noise compatibility with sensitive land uses, including Section 4(f) uses, but also weighs other factors to determine appropriate noise thresholds for properties where a quiet setting is a generally recognized feature or attribute of the property's significance. (FAA Order 1050.1E: A-20 to A-21)

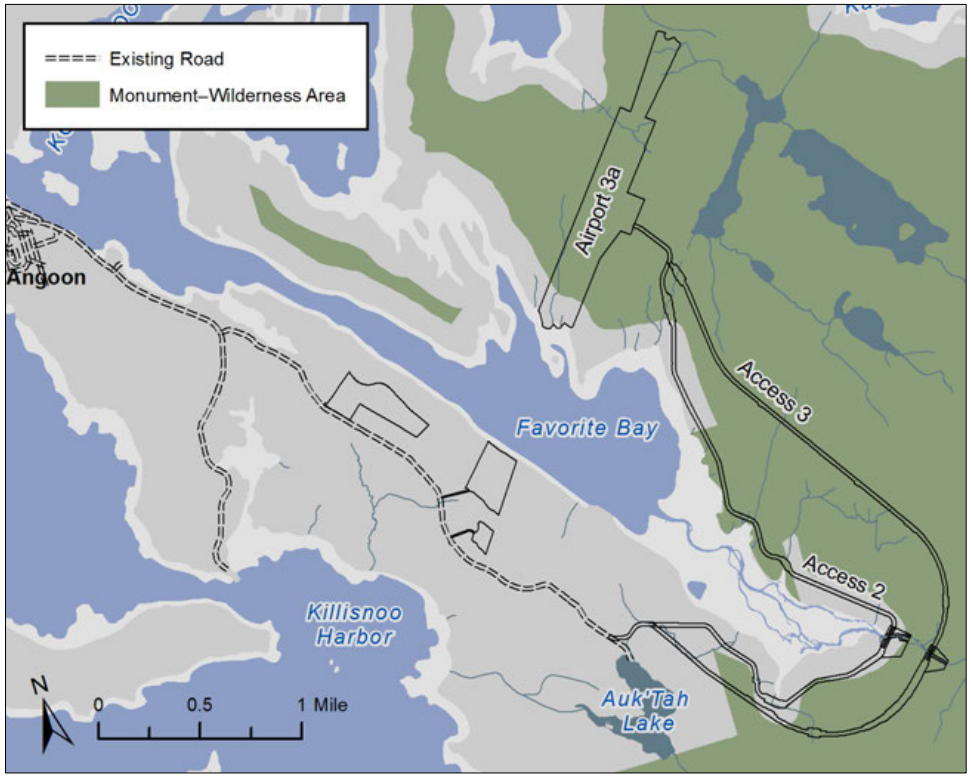

Figure 4f2. Proposed locations of Airport 3a with Access 2 or Access 3 showing physical use of Section 4(f) properties. Historic properties are not shown for confidentiality reasons.

4.4.3.2. What are the findings of Section 4(f) use?

Based on the definitions provided in section 4.4.3.1, the FAA makes the following findings for each of the Section 4(f) resources.

4.4.3.2.1. Publicly owned recreational properties

As discussed in section 4.4.2.1.1, the Monument–Wilderness Area is the only publicly owned recreational property in the vicinity of the proposed locations of the alternatives that the FAA determines qualifies for Section 4(f) protection.

The FAA has found that Airport 3a with Access 2 (the proposed action), Airport 3a with Access 3, Airport 4 with Access 2, and Airport 4 with Access 3 would result in Section 4(f) use of the Monument–Wilderness Area. Each of these action alternatives would permanently incorporate Monument–Wilderness Area lands into a new transportation and utility system under ANILCA (see Figures 4f2 and 4f3). The FAA has further determined that the anticipated use of Monument–Wilderness Area lands under these alternatives does not meet the criteria for a *de minimis* use finding, and that Airport 3a with Access 2 or Access 3 and Airport 4 with Access 2 or 3 would use this Section 4(f) resource. The U.S. Forest Service—the officials with jurisdiction over the Monument–Wilderness Area—concurred with the FAA's determination, stating that the "permanent incorporation of land from the Kootznoowoo Wilderness Area into an airport and access road…would not constitute a *de minimis* use…of the wilderness area" (U.S. Forest Service 2014d).

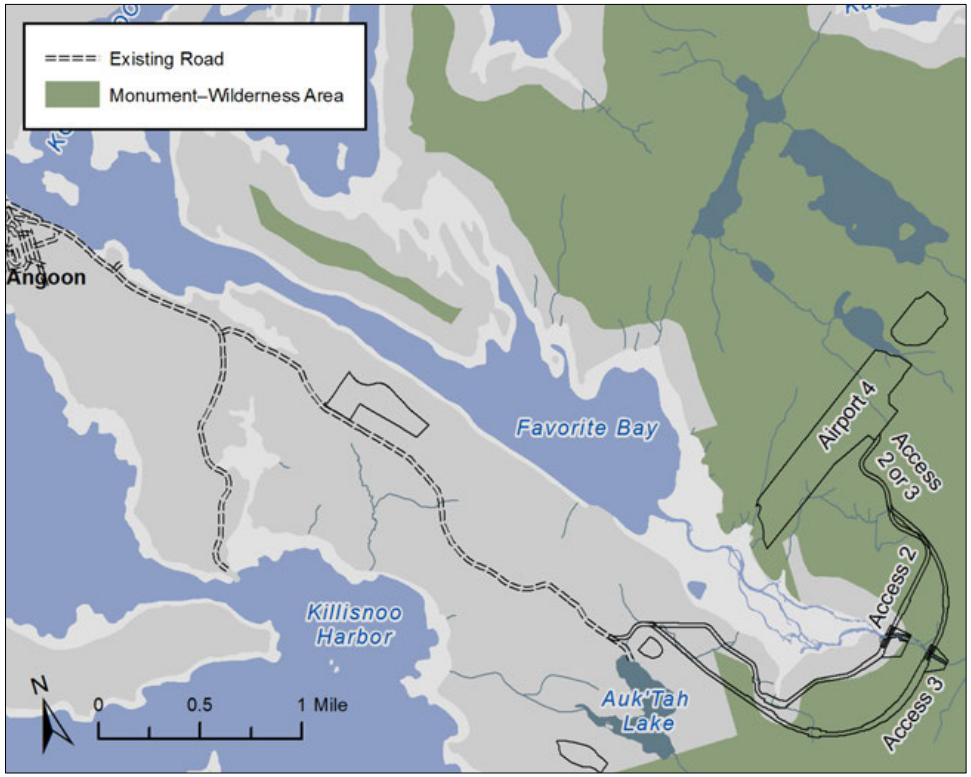

Figure 4f3. Proposed locations of Airport 4 with Access 2 or Access 3 showing physical use of Section 4(f) properties. Historic properties are not shown for confidentiality reasons.

Neither the no action alternative nor Airport 12a with Access 12a (preferred alternative) would result in physical use or constructive use of the Monument–Wilderness Area (Figure 4f4).

As stated above, Airport 3a and Airport 4 with either access would result in physical use of lands designated for public recreational purposes (in other words, the Monument–Wilderness Area), but each would incorporate a different amount of land into the transportation facility based on the specific nature of the landscape disturbance required for each airport and access road location, which is dependent on the unique terrain at each location. Table 4f1 summarizes the acreage of Monument–Wilderness Area lands that would be subject to physical use under Section 4(f) criteria.

Table 4f1. Monument–Wilderness Area land subject to physical use

Alternative	Acreage subject to physical use
Airport 3a with Access 2	238
Airport 3a with Access 3	285
Airport 4 with Access 2	263
Airport 4 with Access 3	289
Airport 12a with Access 12a	0
No action alternative	0

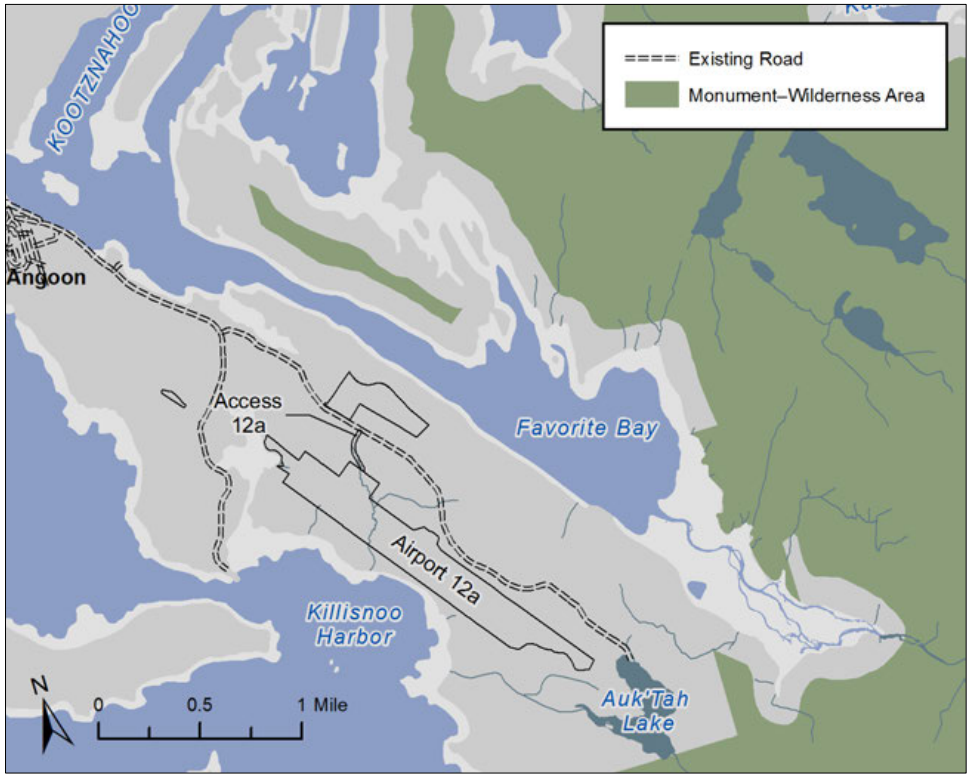

Figure 4f4. Locations of Section 4(f) properties relative to proposed location of Airport 12a with Access 12a. Historic sites are not shown for confidentiality reasons.

4.4.3.2.2. Historic sites

Based on the analysis and subsequent consultation that took place under the National Historic Preservation Act and its implementing regulations at 36 CFR 800, the FAA has found that none of the action alternatives would result in physical use or constructive use of any historic site qualifying for Section 4(f) protection (see section 4.8.2.2 Cultural Resources for a description of how this consultation has been conducted). None of the alternatives would permanently incorporate any portion of the sites into the airport or access road or any project-related facility. No construction activities would require temporary or permanent use of any known historic site qualifying for Section 4(f) protection.

The FAA has found that pursuant to the criteria listed in section 4.4.3.1, Airport 3a and Airport 4 with either access alternative would have a *de minimis* impact on sites SIT-00033 (the Favorite Bay Fish Weir) and SIT-00781 (Beaver Tail Rock). These sites are located in areas that could see increased human access due to the presence of the proposed access roads. The occurrence or severity of any effects caused in the future by individuals who may travel off the access roads and intentionally or inadvertently damage these sites cannot be predicted with any certainty; it is just as likely that the sites would remain unaffected. Given this, the FAA has determined that a finding of no adverse effects under the National Historic Preservation Act and its implementing regulations at 36 CFR 800 is appropriate at this time, and, by extension, a finding of *de minimis* use under Section 4(f) has been made. Should adverse effects from increased access be identified in the future, the finding of effect may be amended and mitigation measures may be needed to resolve the effect.

The FAA has also found that Airport 12a with Access 12a would result in a *de minimis* use of sites SIT-00014 (Killisnoo Island Village) and SIT-00749 (Killisnoo Cemetery). Both are located in areas where visual changes to the viewshed from these sites would be noticeable under Airport 12a with Access 12a. The FAA has determined that a finding of no adverse effects under the National Historic Preservation Act and its implementing regulations at 36 CFR 800 is appropriate, and by extension, a finding of *de minimis* use under Section 4(f) has been made for these sites. The Alaska SHPO has concurred with the FAA's finding of no adverse effects.

4.4.3.3. Is there a feasible and prudent alternative to use of Section 4(f) resources?

Only the no action alternative would avoid all use of Section 4(f) resources. None of the action alternatives considered by the FAA would fully avoid Section 4(f) resources. Airport 12a with Access 12a would avoid physical use of Section 4(f) resources. The FAA has determined that Airport 12a with Access 12a is both feasible and prudent according to the criteria

outlined in section 4.4.1.1. The FAA has determined that the no action alternative is not prudent in that it would compromise the project to such a degree that the project's purpose and need would not be met. As such, the no action alternative is not a viable alternative to avoid using Section 4(f) resources.

4.4.3.4. Would any effects to Section 4(f) resources be significant?

Section 4(f) does not use the wording "significant;" rather, it makes a determination of whether there would be *use* of historic properties or recreation properties. All action alternatives with the exception of Airport 12a with Access 12a would result in physical use of Section 4(f) resources; Airport 12a with Access 12a would result in *de minimis* impacts to two Section 4(f) resources. According to FAA Order 1050.1E, a significant effect would occur pursuant to NEPA when a proposed action either involves more than a minimal physical use (in other words, *de minimis* impacts) of a Section 4(f) property or is deemed a "constructive use" substantially impairing the Section 4(f) property, and mitigation measures do not eliminate or reduce the effects of the use below the threshold of significance. Because Airport 3a and Airport 4 with either access would result in more than a minimal physical use of a Section 4(f) property, this use would be considered significant under FAA thresholds. The *de minimis* impacts to Section 4(f) resources under Airport 12a with Access 12a would not be considered significant under these same thresholds.

4.4.3.5. How could the effects described above be avoided, minimized, or mitigated?

Placement of either Airport 3a or Airport 4 in the wilderness area would result in use of Section 4(f) properties, and none of these effects could be entirely avoided or mitigated. The FAA has assumed that the best management practices, mitigation measures, and permit requirements discussed in Chapter 7: Mitigation would be implemented for any selected alternative. These actions are designed to minimize effects to resources and land uses, including Section 4(f) impacts, to the extent practicable.

Effects from the visibility of permanent structures can be reduced by using natural color schemes incorporating green, brown, and tan, and natural materials such as wood for any aboveground structure or equipment. Where vegetation clearing is visible, as described in section 4.9 Light Emissions and Visual Resources, contrasts can be reduced by allowing natural, low-growing revegetation to occur, and feathering edges to provide a more natural transition between forest and cleared areas.

4.5. Biological Resources

What is discussed in this section?

Studies of biological resources—the plants and animals that live in or use an area—involve many scientific disciplines, including botany, wildlife biology, and aquatic and marine biology. Each discipline uses different techniques and terminology to discuss the same or similar topics. For this reason, discussions about the potential effects to biological resources from construction and operation of the Angoon Airport alternatives are presented in three related sections:

Section 4.5.1 Terrestrial Habitats and Associated Species describes the terrestrial habitats and associated plant, animal, and bird species in the area of the airport and access road alternatives and a potential on-island material source. Because many of the birds associated with Alaska's coast use both terrestrial and aquatic habitats, it is not appropriate to classify them as purely terrestrial or aquatic. However, for the purpose of this environmental impact statement and to consolidate the discussion of birds in a single location, all bird species that use habitats in the study area are described in this section. Examples of other species discussed in the Terrestrial Habitats and Associated Species section include mammals such as brown bears and red squirrels; birds such as bald eagles; and plants such as western hemlock and bog blueberry. Readers should note that brown bears, eagles, and certain other terrestrial species are also discussed in section 4.5.3 Special Status Species, relative to the additional consideration afforded them under state or federal law or policy.

Section 4.5.2 Aquatic Habitats and Associated Species describes the aquatic habitats and associated plant and animal species that live exclusively in water-based habitats—both freshwater and marine water—in the area of the airport and access road alternatives and a potential on-island material source. Examples of such species include invertebrates such as sea urchins; fish; marine mammals; plants such as eelgrass that grow entirely below the surface of the water; and plant-like species such as seaweed and kelp. This section includes discussion of non-wetland waters of the U.S. (see section 4.15 Wetlands for discussion of wetland waters of the U.S.) and discussion of essential fish habitat. As with terrestrial species, certain aquatic species, including marine mammals and specific fish, are also discussed in section 4.5.3 Special Status Species, relative to the additional consideration afforded them under state or federal law or policy.

Section 4.5.3 Special Status Species describes the plant and animal species that currently receive special protection and consideration under federal or state law or agency guidelines.

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4.5.1. Terrestrial Habitats and Associated Species

This section addresses the existing conditions of terrestrial habitats and associated plant, animal, and bird species in the area of the airport and access road alternatives. It also addresses the potential changes to those conditions from construction and operation of the proposed land-based airport.

The information contained in this section is summarized from *Vegetation, Wetlands, and Wildlife Resources Existing Conditions Technical Report for Angoon Airport Environmental Impact Statement Angoon, Alaska* (SWCA 2011a), included as Appendix H.

What is discussed in this section?

Terms to know

Aquatic: Relating to water.

Associated species: The plant and animal species that live in or use a habitat type for all or part of their lifecycle.

Habitat: An area with the combination of environmental conditions that supports a given species' life.

Terrestrial: Relating to the land surface.

4.5.1.1. Background information

4.5.1.1.1. What do the terms "terrestrial habitat" and "associated species" mean?

The term ***terrestrial*** refers to land. ***Habitat*** refers to the composition and structure of the plant life and physical or geological features of an area. The habitats discussed in this section are defined by terrestrial vegetation—or plant species that live on land. Terrestrial wildlife includes species that are land-based (such as deer and songbirds), species that live in terrestrial habitats but forage in aquatic habitats (such as mink and otter), and species that occupy both terrestrial and ***aquatic*** habitats (such as beaver, muskrat, and waterbirds including loons, mallard, and Vancouver Canada goose). Vegetation communities—distinct collections of plant species that grow in similar environments and conditions—form the basis for habitats used by animals. The plant and animal species that occupy or use a habitat are its ***associated species***. In an assessment of project effects on the vegetation itself and its function as habitat for the species that live in or use it, effects to individuals, populations, and species of animals must be considered.

4.5.1.2. Existing conditions

Terrestrial habitats and associated species in the study area are discussed here by habitat type (see Figures THAS2 through THAS8). This section also covers how those habitats must be managed in accordance with the two land ownership categories.

4.5.1.2.1. How did the FAA determine which terrestrial habitats and associated species could be affected and their existing condition?

A study area for terrestrial habitats and associated species was established, consisting of approximately 5,071 acres and encompassing a 500-meter buffer around the locations of the airport alternatives (including ***avigation easements***) and access alternatives (see Figure THAS1). It is reasonable to use a 500-meter buffer from the direct habitat disturbance because other studies have similarly applied this buffer distance to effects analyses for native plant communities (Harper et al. 2005; Rose and Hermanutz 2004), grizzly bears (Mattson et al. 1987), and breeding birds (Kissling and Garton 2008; Rail et al. 1997).

Existing data were examined to identify which plants, and therefore which habitats, could be affected by any of the airport or access alternatives. The *Mitchell Bay Watershed Landscape Assessment* (U.S. Forest Service 2002), the *Angoon Airport Master Plan Public Review Draft. Background Report: Planning & Facility Requirements, Access & Apron Alternatives Analysis* (Alaska Department of Transportation and Public Facilities 2006), a conservation assessment of the coastal forests of Southeastern Alaska (Schoen and Dovichin 2007), and the *Angoon Hydroelectric Project Final Environmental Impact Statement* (U.S. Forest Service 2009) were the primary sources of data regarding wildlife and birds that may live in or use the study area. The Federal Aviation Administration (FAA) consulted Tongass National Forest biologists and Alaska Department of Fish and Game biologists about the distribution of plant and animal species and habitats. Finally, the FAA conducted new field surveys for this environmental impact statement (EIS) to verify the types and distribution of habitats and birds and terrestrial wildlife in the terrestrial study area.

What is discussed in this section?

Terms to know

Avigation easements: A right-of-way tool used in airport planning to grant certain rights to the holder of the easement. For this EIS, avigation easements outside of airport property would provide the Alaska Department of Transportation and Public Facilities the right to access areas to clear them of obstructions and maintain that clearance.

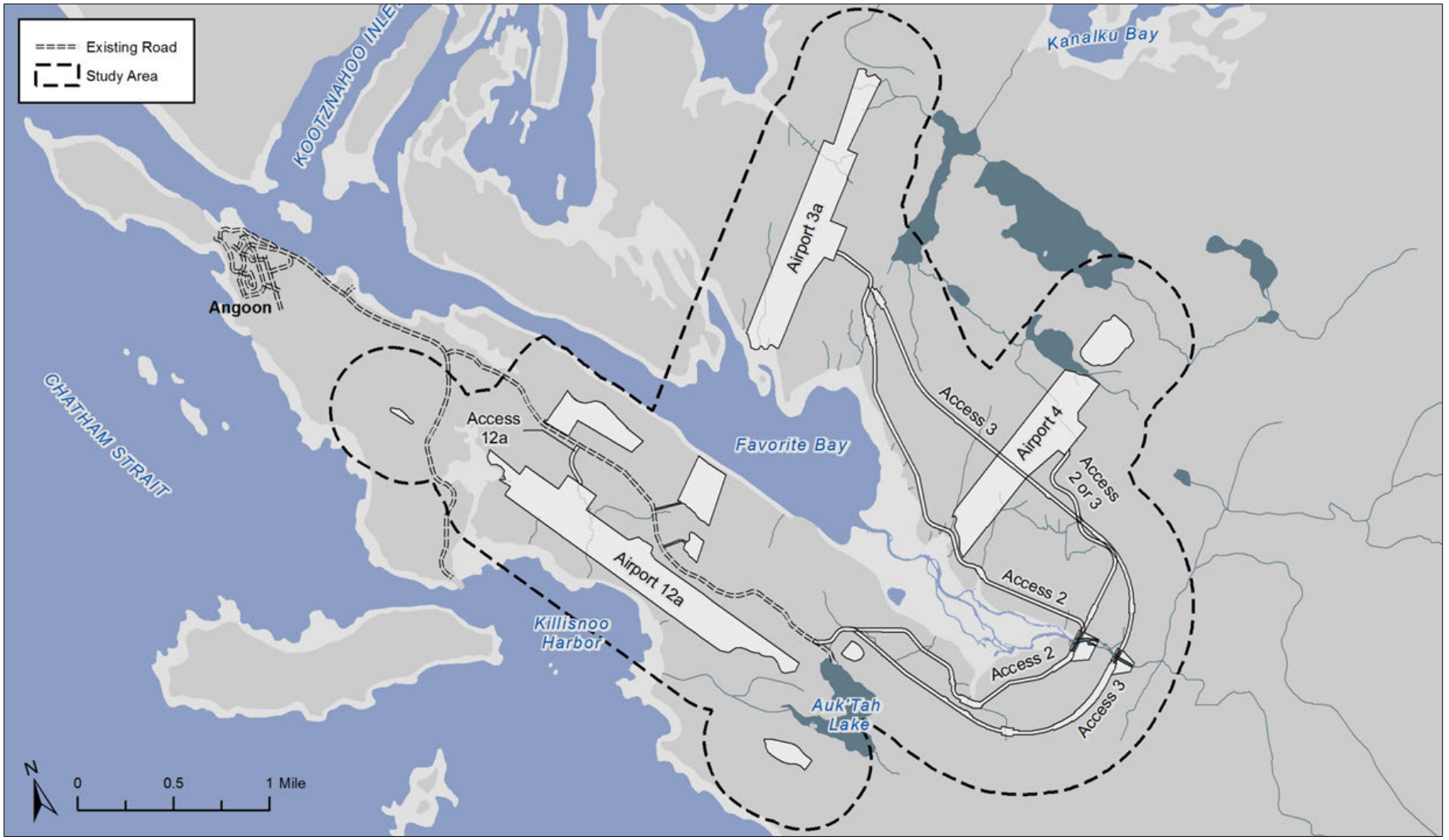


Figure THAS1. Study area for terrestrial habitats and associated species.

4.5.1.2.2. What are terrestrial habitats and associated species in the Angoon area like?

The following terrestrial habitat types were determined to be present in the study area based on Appendix H:

- Spruce-hemlock forest
- ***Bog woodland***
- ***Fen***
- ***Bog forest***
- Existing disturbed lands

The distribution and characteristics of terrestrial habitats in Southeast Alaska are determined by three factors: 1) the way water flows over the land (known as drainage); 2) the elevation of the land above sea level; and 3) and the amount of time since a major disturbance such as glacier formation/movement, high winds, or fire (Schoen and Dovichin 2007). Terrestrial habitats in the study area range from ***uplands*** drained by streams and rivers to lowlands that are poorly drained and have standing water or slowly moving water.

The ***common*** and ***characteristic species*** of birds and terrestrial wildlife found in these habitat types are terrestrial mammals, resident and migratory birds, and forest interior birds. Figure THAS2 shows the locations of these habitat types in the study area, and Figures THAS3 through THAS8 on subsequent pages define and describe each habitat type, and list examples of common and characteristic species associated with them. (*Note*: The colors chosen for each habitat figure are keyed to all maps in this section.)

Approximately 2,372 acres (47%) of the study area is spruce-hemlock forest habitat (Figure THAS3). Well-drained areas typically support spruce-hemlock forest, but forested habitats in the study area also contain a patchwork of bog woodlands (Figure THAS4), fens (Figure THAS5), and bog forest (Figure THAS6). Spruce-hemlock forest occurs on slopes and ridges throughout the study area and is characterized by a dense tree canopy of old-growth and young-growth trees. Bog woodlands, fens, and bog forest are associated with level or low-lying landforms and variations in drainage patterns. Bog woodland, fen, and bog forest habitats are characterized by widely spaced canopy trees, diverse understory plant species, and the presence of freshwater, all of which provide important values for terrestrial wildlife. Salt marshes are located between uplands and estuarine or marine habitats, and are below the saltwater high

Terms to know

Bog: A type of wetland with spongy ground consisting of partially decayed plants, particularly peat mosses.

Bog forest: Used here, a bog area with a canopy of greater than 30% shore pine and western hemlock.

Bog woodland: Used here, a bog area with a low understory that allows light to penetrate to the ground.

Characteristic species: A species that occurs only in a particular region or that is representative of the natural habitats that exist in a given area.

Common species: A species that occurs widely or in abundance in a given area.

Fen: A type of wetland with flowing, mineral-rich surface water or groundwater.

Uplands: An area that is elevated above surface water or groundwater.

tide line (Figure THAS7). Although these habitats have an aquatic nature, in this EIS, effects to these habitats are analyzed in this section, as well as in section 4.15 Wetlands. There are also existing disturbed lands (Figure THAS8) associated with roadways, gravel quarries, and other surface disturbances in the study area.

Field surveys conducted for this EIS determined the presence and distribution of non-native, ***invasive***, and noxious plant species. Although no ***noxious weeds*** were identified in the study area, two non-native species were: field mustard (*Brassica rapa*), which is also an invasive species, and common dandelion (*Taraxacum officinale*), one of the most widespread non-native species in North America. The presence of invasive and non-native plant species in the study area is described further in Appendix H.

Terms to know

Invasive plant species: Introduced or exotic plant species whose introduction causes or is likely to cause economic or environmental harm to human health.

Noxious weed: An invasive plant that has been designated by county, state, or federal authorities as harmful to agricultural or horticultural crops, natural habitats or ecosystems, and humans or livestock.

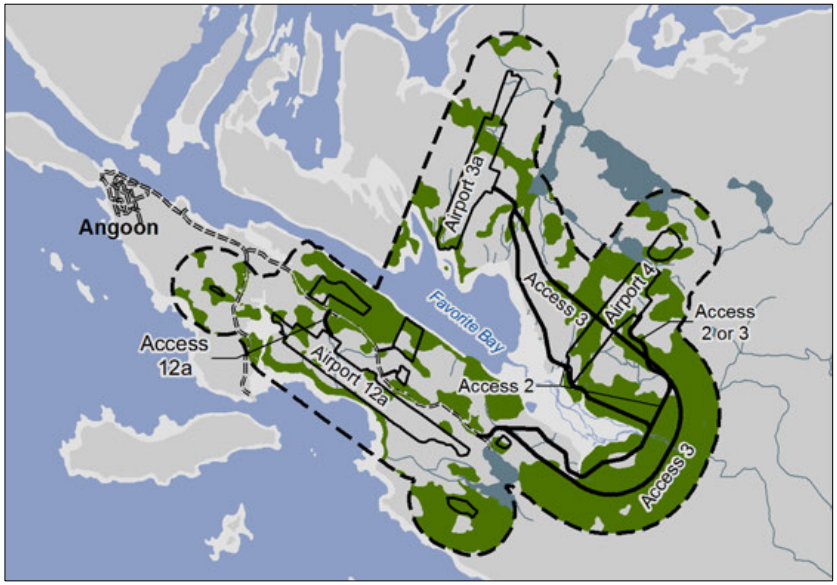
Only approximately 48 acres of existing roadways and other disturbed lands occur in the study area; therefore, the terrestrial habitats there are largely undisturbed by human developments and activities, and provide high-quality habitats for terrestrial species. Vehicle access to most habitats in the study area is currently limited, and the habitats are mostly continuous and undisturbed, with little or no fragmentation. Field studies conducted for this EIS confirm that the terrestrial habitats that would be affected by Airport 12a with Access 12a are in the same high-quality condition as the terrestrial habitats that would be affected by Airports 3a and 4 and their associated access roads, which are located almost entirely in the Admiralty Island National Monument and Kootznoowoo Wilderness Area (referred to in this EIS as the Monument–Wilderness Area). During the field inventory, the only evidence of disturbance in the vicinity of the proposed location of Airport 12a was a trail in the southern portion of where the Airport 12a runway would be located (and where the vegetation clearing for the existing road's right-of-way currently occurs). Numerous informal foot trails are present in the Monument–Wilderness Area. These trails cross through and around the proposed locations of Airports 3a and 4 and their associated access roads. The trails are used by residents to access locations in the Wilderness Area for subsistence. Angoon residents reported that they generally use areas in and around each alternative's proposed location for subsistence activities (see section 4.13 Subsistence Resources and Uses for more details on subsistence). Because of difficult terrain, these areas are accessed by foot where there are no trails or existing roads.

Although Airports 3a and 4 would be located in the Kootznoowoo Wilderness Area and Airport 12a would not, the quality and integrity of terrestrial habitats in all areas cannot be differentiated. Some of the terrestrial habitats around the proposed location of Airport 12a are easier to access because of an existing road, but Angoon residents still use the terrestrial habitats around the proposed locations of Airports 3a and 4.

Subsistence, tourism, guided hunting and fishing, and commercial fishing (the primary sources of income and employment for Angoon residents) likely contribute to some noise and human presence in terrestrial habitats and reduce habitat quality near Angoon and other habitat areas. Small aircraft also fly near or over the area on a regular basis, exposing terrestrial species to periodic aircraft noise. Despite the use of terrestrial habitats for subsistence, tourism, hunting, and fishing, these activities generally result in limited existing disturbance to terrestrial species.

Figure THAS2. Terrestrial habitat types in the study area.

Spruce-hemlock forest habitat and associated species



Physical features of the habitat

- Covers 2,372 acres (47%) of the study area
- Found on well-drained coastal uplands, slopes, and ridges
- Occurs as a patchwork of uplands and small wetland habitats

Common and characteristic plant species

- Canopy of old-growth and even-aged young-growth Sitka spruce (*Picea sitchensis*) and western hemlock (*Tsuga heterophylla*)
- Understory of blueberry species (*Vaccinium ovalifolium*, *V. alaskense*) and fool's huckleberry (*Menziesia ferruginea*)
- Ground cover of dwarf dogwood (*Cornus canadensis*), five-leaved bramble (*Rubus pedatus*), twisted stalk species (*Streptopus amplexicaulis, S. roseus*), and dense moss cover

Common and characteristic mammal species

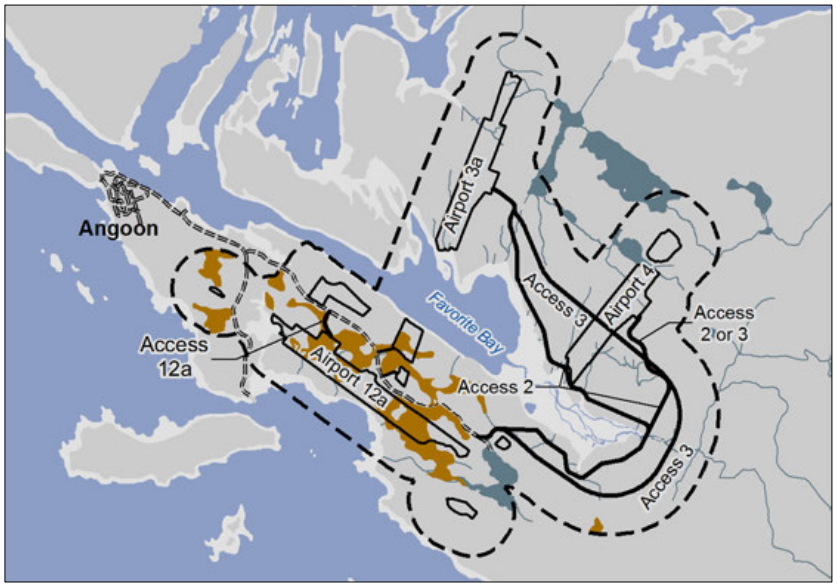
- Brown bear (*Ursus arctos*), Sitka black-tailed deer (*Odocoileus hemionus*), Pacific marten (*Martes caurina*), ermine (*Mustela erminea*), and red squirrel (*Tamiasciurus husonicus*)

Common and characteristic bird species

- Year-round resident birds (red crossbill [*Loxia curvirostra*], chestnut-backed chickadee [*Poecile rufescens*], Steller's jay [*Cyanocitta stelleri*], red-breasted sapsucker [*Sphyrapicus ruber*], common raven [*Corvus corvax*], and varied thrush [*Lxoreus naevius*])
- Forest interior breeding birds (Swainson's thrush [*Catharus ustulatus*], hermit thrush [*Catharus guttatus*], Pacific-slope flycatcher [*Empidonax difficilis*], and golden-crowned kinglet [*Regulus satrapa*])
- Waterbirds (Vancouver Canada goose [*Branta canadensis*], common loon [*Gavia immer*], and Pacific loon [*Gavia pacifica*])

Figure THAS3. Spruce-hemlock forest habitat characteristics, distribution, and associated species.

Bog woodland habitat and associated species



Physical features of the habitat

- Covers 385 acres (8%) of the study area
- Occurs in flat or ponded areas between bog forest and fen habitats
- Wetland habitat with stagnant surface or subsurface water
- Low understory layer allows light to penetrate to the ground, providing habitats for nesting and foraging wildlife and birds as well as for some plant species

Common and characteristic plant species

- Canopy of less than 30% shore pine (*Pinus contorta*) and western hemlock
- Understory of lady fern (*Athyrium felix-foemina*), skunk cabbage (*Lysichiton americanum*), blueberry species (*Vaccinium* spp.), small cranberry (*Oxycoccus oxycoccus*), and black crowberry (*Empetrum nigrum*)
- Ground layer of dwarf dogwood, Labrador tea (*Ledum groenlandicum*), sedges (*Carex* spp.), and sphagnum moss (*Sphagnum* spp.)

Common and characteristic mammal species

- Brown bear, Sitka black-tailed deer, ermine, long-tailed vole (*Microtus longicaudus*), and meadow vole (*Microtus pennsylvanicus*)

Common and characteristic bird species

- Year-round resident birds (song sparrow [*Melospiza melodia*])
- Forest interior breeding birds (hermit thrush, Swainson's thrush, orange-crowned warbler [*Vermivora celata*], MacGillvray's warbler [*Oporornis tolmiei*], Wilson's warbler [*Wilsonia pusilla*], tree swallow [*Tachycineta bicolor*], and Lincoln's sparrow [*Melospiza linconii*])

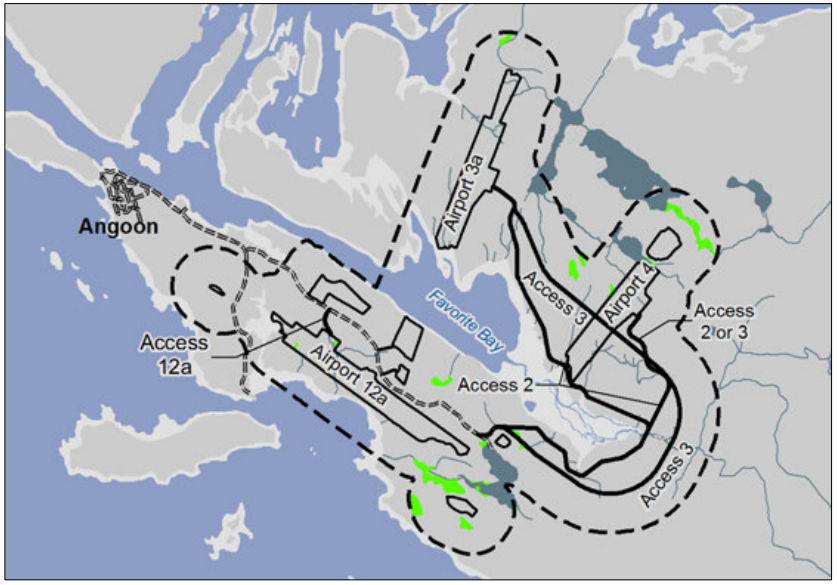
Common and characteristic amphibian species

- Western toad (*Bufo boreas*)

*Used here, the abbreviation "sp." indicates an unknown species within a particular classification of plants or animals. The abbreviation "spp." indicates multiple species under a particular classification.

Figure THAS4. Bog woodland habitat characteristics, distribution, and associated species.

Fen habitat and associated species



Physical features of the habitat

- Covers 93 acres (2%) of the study area
- Wetlands characterized by mineral-rich surface water flow or groundwater flow

Common and characteristic plant species

- Emergent plant species such as sedges (*Carex stichensis*, *C. aquatilis*), small-flowered bulrush (*Scirpus microcarpus*), bog buckbean (*Menyanthes trifoliata*), and bluejoint grass (*Calamagrostis canadensis*)

Common and characteristic mammal species

- Brown bear, Sitka black-tailed deer, ermine, long-tailed vole, and meadow vole

Common and characteristic bird species

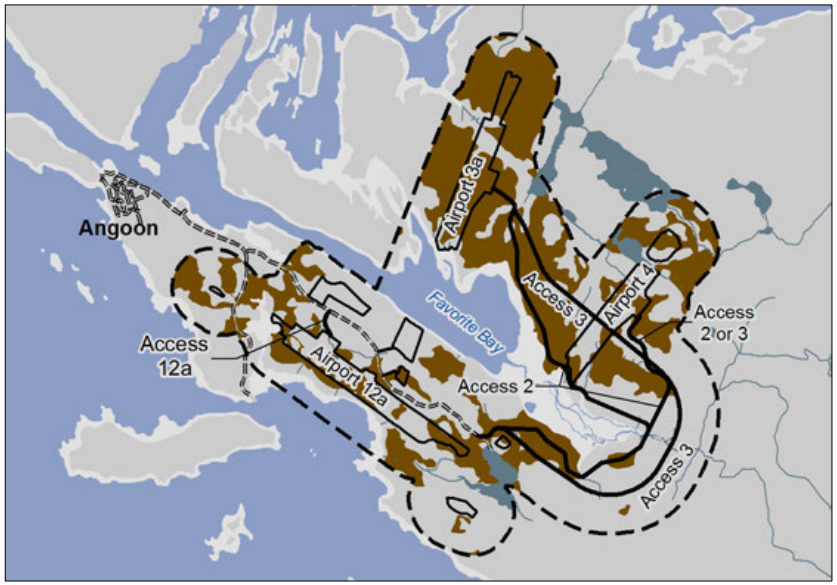
- Year-round resident birds (song sparrow and chestnut-backed chickadee)
- Migratory birds using the forest edge or ecotone habitats (dark-eyed junco [*Junco hyemalis*], Pacific-slope flycatcher, and hermit thrush)
- Waterbirds (mallard [*Anas platyrhynchos*] and Vancouver Canada goose)

Common and characteristic amphibian species

- Western toad

Figure THAS5. Fen habitat characteristics, distribution, and associated species.

Bog forest habitat and associated species



Physical features of the habitat

- Covers 2,093 acres (41%) of the study area
- Occurs in flat or ponded areas between spruce-hemlock forest and bog woodlands
- Wetland habitat with stagnant surface or subsurface water

Common and characteristic plant species

- Canopy of greater than 30% shore pine and western hemlock
- Understory of lady fern, skunk cabbage, and bog blueberry (*Vaccinium uliginosum*)
- Ground layer of dwarf dogwood, western oakfern (*Gymnocarpium dryopteris*), and sphagnum moss

Common and characteristic mammal species

- Brown bear, Sitka black-tailed deer, ermine, long-tailed vole, and meadow vole

Common and characteristic bird species

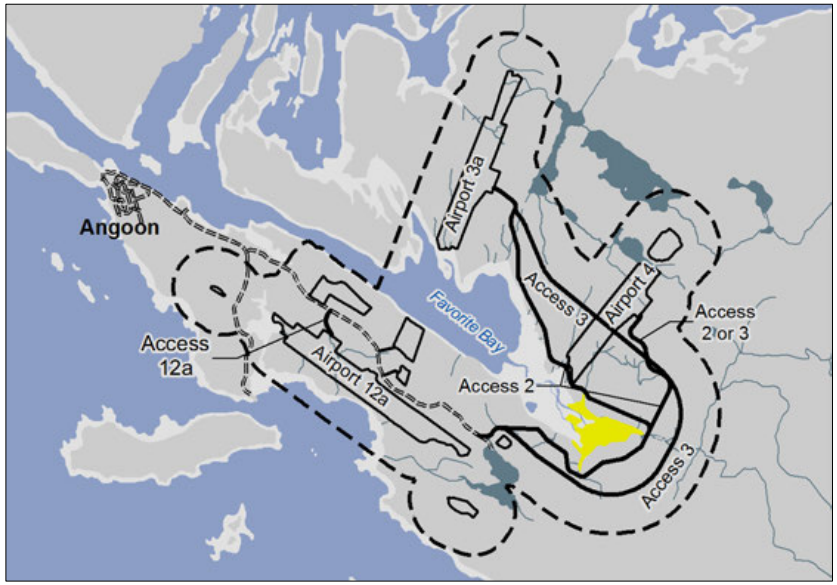
- Year-round resident birds (varied thrush and chestnut-backed chickadee)
- Forest interior breeding birds (dark-eyed junco, winter wren [*Troglodytes troglodytes*], and red-breasted sapsucker)

Common and characteristic amphibian species

- Western toad

Figure THAS6. Bog forest habitat characteristics, distribution, and associated species.

Salt marsh habitat and associated species



Physical features of the habitat

- Covers 80 acres (2%) of the local study area
- Sheltered intertidal zones between uplands and estuarine habitats
- Important interface between marine and upland habitats

Common and characteristic plant species

- Emergent plant species such as Lyngby's sedge (*Carex lyngbyei*), seaside arrowgrass (*Triglocin maritimum*), sea milk-wort (*Glaux maritima*), dunegrass (*Elymus mollis*), bluejoint, common sweetgrass (*Hierochloe odorata*), and beach pea (*Lathyrus japonicus*)

Common and characteristic mammal species

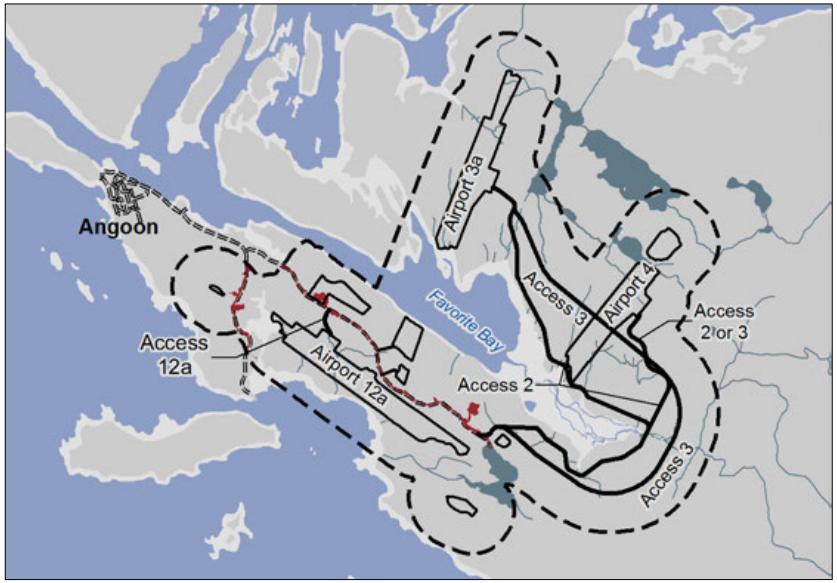
- Brown bear, Sitka black-tailed deer, river otter, mink, meadow vole

Common and characteristic bird species

- Year-round resident birds (Canada goose [*Branta canadensis*])
- Migratory (breeding) birds (spotted sandpiper [*Actitis macularia*], Lincoln's sparrow, great blue heron [*Ardea herodias*])
- Birds using forest edge or ecotone habitats (mallard)

Figure THAS7. Salt marsh habitat characteristics, distribution, and associated species.

Existing disturbed lands and associated species



Physical features

- Covers 48 acres (1%) of the study area
- Barren, filled, or paved areas generally devoid of vegetation
- Includes roadways and developments

Common and characteristic plant species

- Generally lacks plant cover
- Plants often invasive or noxious weed species

Common and characteristic mammal species

- Brown bear, red squirrel, and northwestern deer mouse (*Tamiasciurus hudsonicus*)

Common and characteristic bird species

- Year-round resident birds (common raven, northwestern crow [*Corvus caurinus*], bald eagle [*Haliaeetus leucocephalus*], American robin [*Turdus migratorius*], and chestnut-backed chickadee)
- Migratory (breeding) birds (barn swallow [*Hirundo rustica*])

Common and characteristic amphibian species

- Western toad

Figure THAS8. Existing disturbed habitat lands, distribution, and associated species.

4.5.1.3. Project effects

For all action alternatives, construction, operation, and maintenance of an airport and access road would affect terrestrial habitats and associated species through removal of vegetation and disturbance to soils and structural habitat components, such as bedrock and downed trees. Although the nature of effects on terrestrial habitats and associated species would be the same for all action alternatives, the magnitude and extent of effects would differ per alternative. The sections below describe the actions causing the effect, the nature of the effects, the methods for analyzing effects, any assumptions used in the analysis, and the magnitude and extent of effects for each alternative.

What is discussed in this section?

4.5.1.3.1. How did the FAA determine the effects of the alternatives on terrestrial habitats and associated species?

As described in the introduction to Chapter 4 (section 4.1), construction actions for all action alternatives would involve vegetation removal related to the airport, road, and avigation easements (clearing of all vegetation for construction, line of sight, and open areas for flight approach and takeoff); terrain disturbance (grading and recontouring the ground surface through cut and fill to create flat surfaces for the road and runway); paving the runway and road; and potential extraction of construction materials such as gravel, soil, and rock from an on-island materials source. Four of the five action alternatives require bridge construction across Favorite Creek.

Actions related to airport operation and maintenance would consist of vehicle traffic along the new road; continual vegetation maintenance along the runway, road, and avigation easements; and road and runway maintenance.

For the purposes of effects analysis in this section, these actions are grouped according to the nature of the effect they would cause. See Table THAS1 for the effects, the actions causing them, and the methods for determining their extent.

Table THAS1. Effects and analysis methods

Effect	Action causing the effect	Direct (D) or indirect (I)	Temporary (T), short term (S) or long term (L)	Method for analyzing and assumptions
Long-term habitat removal	Terrain disturbance, vegetation clearing, and maintenance of cleared areas	D	L	Acres where runways, roads, and other terrain disturbance and vegetation clearing overlap terrestrial habitats
Long-term habitat alteration	Vegetation removal during bridge construction at Favorite Creek (cleared areas would be allowed to revegetate)	D	L	Acres where the temporary use area for bridge construction overlaps terrestrial habitats
Changes to habitat quality and connectivity	Creation of new habitat edges as a result of vegetation removal	I	L	Acres of long-term habitat removal and miles of new access road
Disturbance or displacement of animals	Noise and light due to construction and operation of the airport, human presence during construction	I	T, S	Disturbance or displacement of animals is described qualitatively based on the duration of changes in environmental conditions
Increased potential for disturbance, injury, or mortality to animals	Increased traffic, improved human access	I	L	Miles of new access road

Long-term habitat removal

Terrestrial habitats would be removed in locations where the terrain would be disturbed and vegetation would be cleared during construction; as part of paving of the airport runway, the access road, and parking area; or in association with potential extraction of construction materials from an on-island materials source. Terrestrial habitats would also be removed in locations where vegetation is cleared for road rights-of-way and safety zones for the airport, such as the avigation easements.

The following factors are considered in the evaluation of this effect:

- The removal of suitable habitat, both at the local Admiralty Island scale and the regional scale, has the potential to affect the viability of wildlife and plant populations in the terrestrial study area by reducing the amount of habitat available for individuals and populations to meet their needs for foraging, denning, nesting, and breeding.
- The removal of a certain habitat type is a more severe effect to a species if that habitat type is the only one used by that species. Removal of a habitat type that is one of many types used by a species results in a less severe effect to that species.
- The removal of rare or uncommon habitat types typically has a proportionally greater effect on species that use them than do effects from removal of abundant habitat types.
- Most wildlife and bird species using bog and fen habitats in the study area use more than one habitat type at different times of the year to meet their needs for foraging, breeding, and cover; therefore, effects to bog and fen habitats would not result in disproportionate effects to species using these habitats.
- Because existing disturbed lands do not provide important habitat for terrestrial species using the study area, existing disturbed lands are not included in the discussion of effects to terrestrial habitat and species.

- It is assumed that ***soil productivity*** would be lost in all areas of long-term terrestrial habitat removal.
- As described in section 4.5.2.2.2 of Aquatic Habitats and Associated Species, beach and estuarine fringe habitat is a sensitive and important type of habitat for wildlife and fish. Effects to this habitat are discussed in section 4.5.2.3.2 of Aquatic Habitats and Associated Species under "***riparian*** management area removal."

Terms to know

Riparian: The zone between land and a river or stream.

Soil productivity: The soil's ability to support both the quality and quantity of vegetation.

Long-term habitat alteration

Terrestrial habitats would be altered where vegetation removal would occur in the temporary use area for bridge construction at Favorite Creek. The temporary use area at Favorite Creek includes construction staging areas and a temporary access road for bridge construction. Vegetation in the temporary use area would be allowed to reestablish upon completion of construction of the bridge. Vegetation removal in the temporary use area could alter terrestrial habitat and affect terrestrial species in the following ways:

- The cutting of the tree canopy and increased sunlight reaching vegetation at ground level alters the composition of the understory vegetation communities.
- The habitat is no longer suitable for all the species that usually occupy it because the habitat features that provide food or shelter have been altered.

Changes to habitat quality and connectivity

Changes to habitat quality involve complex ecological interactions that result from removal of adjacent habitat. Changes in habitat connectivity result from creation of new habitat edges that limit the movements of some bird and wildlife species due to real or perceived barriers, such as fences or pavement, that prevent them from crossing the barrier to access habitat on the other side. These types of effects generally cannot be quantified or are prohibitively difficult or expensive to quantify. For these reasons, the FAA consulted with state and federal land and biological resource management agencies about that nature of anticipated effects, and describes these effects qualitatively in this EIS. The following factors are considered in the evaluation of the effect of changes to habitat quality and connectivity on terrestrial species:

- Forest interior conditions would change due to the creation of new habitat edges adjacent to areas where habitat removal would occur. Habitat edges are prone to invasion by noxious and invasive weed species. Because

noxious and invasive plant species are adapted to disturbed environmental conditions, they can readily move to new disturbed areas and habitat edges (for example, a roadside or construction site) once they are introduced through sources such as vehicles and construction equipment. Noxious and invasive plant species are often very hardy and aggressive growers that can take over adjacent intact habitats and replace native plant species; the replacement of native plants with noxious or invasive plants changes the character of the habitat and can make it unsuitable for use by species that once occupied it.

- Although the distribution of invasive and non-native plant species in the study area is currently limited, off-site sources of seeds from noxious and invasive plant species exist in disturbed and developed lands outside the study area. Increased vehicle traffic during construction, operation, and maintenance of the airport would increase the potential for introduction of noxious or invasive plant species from off-site sources.
- The removal of portions of habitat would fragment that habitat and create smaller habitat patches that may no longer provide habitat value to wildlife and that may alter seed or animal movements between habitat patches.
- The airport perimeter fence would impede movements of large mammals between habitat patches separated by airport fencing, thereby minimizing the potential for injury to large mammals as a result of airport operations. The airport perimeter fence would not restrict the movements of birds or small animals.

Disturbance or displacement of animals

Human activities that increase the amount of noise or light in the environment can alter the natural behavior of animals, disturbing natural breeding or feeding activities or causing them to avoid certain locations. Disturbance or displacement of terrestrial animals could occur due to the following factors:

- Construction equipment and workers generating noise during construction.
- Vehicles traveling to and from the airport generating noise. Noise from vehicles accessing the airport would be periodic and of short duration relative to any given location in the study area.
- Aircraft arriving and departing the airport generating noise during airport operation. Aircraft noise would be of relatively short duration, occurring only as aircraft arrive and depart.

- Use of lights during construction, if conditions require. During hauling and paving, it is possible that construction would occur during dark hours. These periods would likely be of short duration, and construction crews would work 24 hours a day for 1 to several weeks. The staging area and active work area would be illuminated during dark hours; the haul roads would not be illuminated other than by vehicle lights traveling back and forth along the roads. Lights could attract wildlife to active work areas and roadways or disrupt wildlife behavior during construction.
- Operation of the airport would introduce periodic increases in the amount of light because medium-intensity runway edge and runway lights would be used at night and during times of low light or low visibility during the day. Typically, lights would be on for 10 to 15 minutes after pilot activation of a timer at the airport.

Increased potential for disturbance, injury, or mortality to animals

Increased vehicle traffic and improved human access to previously remote areas would increase the potential for disturbance, injury, and mortality to terrestrial wildlife due to vehicle strikes, hunting, and other recreational activities. The following factors are considered in the evaluation of the potential for disturbance, injury, or mortality to terrestrial animals:

- The expanded road structure would deter some species from using adjacent habitats, while the potential for increased refuse and roadkill along the access road would attract other species to open vegetation and roadsides.
- Although the speed limit and volume of traffic on the access road would be low, there is the potential for animal mortality to occur from vehicle strikes due to the development of an expanded road structure and increased traffic on existing roads.
- The potential for increased refuse and roadkill along the access road would provide food sources that can attract animals such as bald eagles, ravens, bears, and red squirrels to roads.

4.5.1.3.2. How did the FAA determine the significance of the anticipated effects from the alternatives?

Two FAA Orders, *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) and *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b) identify the thresholds for significant effects to fish, wildlife, and plants (see section 4.1, the introduction to Chapter 4, for more on significance). According to FAA Order 5050.4B, the significance thresholds would be exceeded if any of the following happened:

1. The action would adversely affect the population dynamics, sustainability, reproduction, natural or artificial mortality (such as aircraft strikes), or the minimum population size needed to sustain a species.
2. The action would reduce the habitat supporting plant or animal species below that needed to maintain self-sustaining populations of the species.
3. The action would adversely affect the maintenance of natural systems that support wildlife and fish habitat, and/or economically important timber, food, or fiber resources in the affected terrestrial habitats or surrounding systems.
4. The action would be inconsistent with applicable state natural resources management strategies.

The significance of effects on terrestrial habitats and associated species is assessed according to this guidance in section 4.5.1.3.6 below.

4.5.1.3.3. How would each alternative affect terrestrial habitats and associated species?

No action alternative

Under the no action alternative, the airport and associated access road and facilities would not be constructed and extraction of on-island materials related to the airport would not occur. Effects to terrestrial habitats and associated species would be of the type and extent currently occurring. Currently, there are approximately 48 acres of existing roadways and other existing disturbed lands near Angoon. Existing effects to terrestrial habitats and associated species are from the use and maintenance of these roadways and disturbed lands and in surrounding woodlands and shorelines for subsistence and recreational activities. Vehicle access to most terrestrial habitats in the study area is currently limited, and therefore the habitats are mostly continuous and undisturbed with little or no fragmentation, with the exception of developments and roadways associated with the community of Angoon. Terrestrial habitats on private and city lands would continue to be altered over time as vegetation is cleared to accommodate new residences, public facilities, and other structures. Indirect effects on terrestrial habitat and associated species would continue to occur as a result of existing sources in the study area, including aircraft noise from the Angoon Seaplane Base and other aircraft flyovers; noise from the ferry system and other vessels, such as the fuel barge; and artificial light from residential, street, and commercial lights.

Airport 3a with Access 2 (proposed action) or Access 3

Long-term habitat removal

As described in section 4.5.1.3.1, long-term habitat removal would be caused by removing vegetation; grading and recontouring the landscape; paving runways and roads; potentially extracting construction materials such as gravel, soil, and rock from an on-island materials source; and building facilities related to the airport, making the area unfit for the plants and animals that once occupied or used those habitats.

Under Airport 3a with Access 2, there would be 308 acres of long-term habitat removal of all habitat types (see Figure THAS9 for a breakdown by habitat type), which is approximately 6% of all terrestrial habitats in the study area. These habitat types are abundant in the study area, as they are throughout Southeast Alaska, and because the affected acreage of each habitat type would be small relative to the study area, Admiralty Island, and Southeast Alaska, neither Airport 3a with Access 2 nor Airport 3a with Access 3 would adversely affect the population dynamics, sustainability, reproduction, or mortality of the associated species in the study area, on Admiralty Island, or in Southeast Alaska. In areas of terrain disturbance, it is assumed that soil productivity would be lost.

Under Airport 3a with Access 3, there would be 316 acres of long-term habitat removal of all habitat types (see Figure THAS9 for a breakdown by habitat type), which is approximately 6% of all terrestrial habitats in the study area. In areas of terrain disturbance, it is assumed that soil productivity would be lost.

Even though the effects from Airport 3a with Access 3 would be slightly greater than those anticipated for Airport 3a with Access 2, the net effect to the plants and animals associated with the affected habitats is still considered sufficiently small as to not adversely affect the population dynamics, sustainability, reproduction, or mortality of these species in the study area, on Admiralty Island, or in Southeast Alaska.

Airport 3a with Access 2 Effects

	Spruce-Hemlock	Bog Forest	Bog Woodland	Fen	Salt Marsh
Acres habitat removed	112	179	15	1	1
% habitat removed	5%	9%	4%	1%	1%
Acres habitat altered	8	0	0	0	0
% habitat altered	Less than 1%	0%	0%	0%	0%

Airport 3a with Access 3 Effects

	Spruce-Hemlock	Bog Forest	Bog Woodland	Fen	Salt Marsh
Acres habitat removed	137	161	15	3	0
% habitat removed	6%	8%	4%	3%	0%
Acres habitat altered	5	0	0	0	0
% habitat altered	Less than 1%	0%	0%	0%	0%

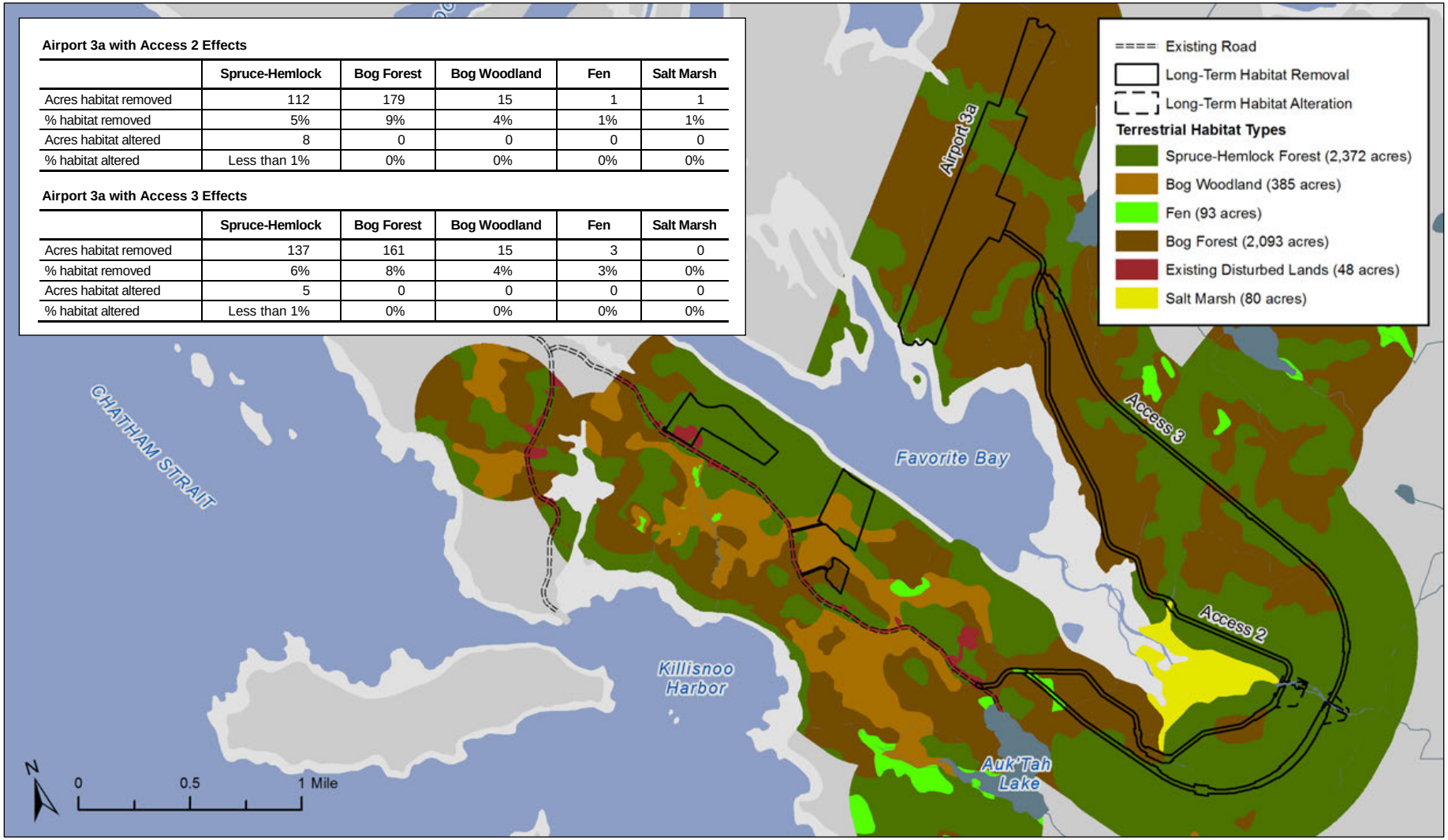


Figure THAS9. Direct effects on terrestrial habitats from Airport 3a with either access alternative.

Long-term habitat alteration

As described in section 4.5.1.3.1, long-term habitat alteration would occur under Airport 3a with either access alternative. The habitats would no longer be suitable for all the plants and animals that usually occupy them because the habitat features that provide food or shelter would be altered. Under Airport 3a with Access 2, there would be 8 acres of long-term habitat alteration in spruce-hemlock forest habitat, which is less than 1% of all terrestrial habitats in the study area (see Figure THAS9 for a breakdown per habitat type). Under Airport 3a with Access 3, there would be 5 acres of long-term habitat alteration in spruce-hemlock forest habitat, which is also less than 1% of all terrestrial habitats in the study area (see Figure THAS9 for a breakdown per habitat type). Forested habitat types are abundant in the study area, and because the affected acreage of each habitat type would be relatively small, Airport 3a with either access alternative would not adversely affect the population dynamics, sustainability, reproduction, and mortality of the associated species in the study area, on Admiralty Island, or in Southeast Alaska.

Indirect effects

As described in section 4.5.1.3.1, indirect effects would be caused by new habitat edges, periodic increases in noise, periodic increases in lighting, and a new road and improved human access to previously remote areas.

Under Airport 3a with either access alternative, changes to terrestrial habitat quality and connectivity (as a result of new habitat edges) would be proportional to the acres of long-term habitat removal (308 acres for Airport 3a with Access 2 or 316 acres for Airport 3a with Access 3) and the length of the new access road (4.4 miles for Access 2 or 4.7 miles for Access 3). Most indirect effects would occur to spruce-hemlock forest habitats and the associated species. As discussed in section 4.5.1.3.1, the acreage of habitats that would be affected by indirect effects is difficult to quantify; however, due to the abundance of high-quality terrestrial habitats in the study area, on Admiralty Island, and in Southeast Alaska, the loss in habitat quality and connectivity from Airport 3a with either access alternative would not adversely affect the population dynamics, sustainability, reproduction, and mortality of the associated species in the study area, on Admiralty Island, or in Southeast Alaska.

Temporary displacement or disturbance of terrestrial wildlife from suitable habitat may occur due to noise and light from airport construction. However, because suitable habitat is abundant in and around the terrestrial study area, individuals near construction noise and light are expected to readily move into adjacent habitats, and measureable effects to local populations of terrestrial species are not expected as a result of Airport 3a with either access alternative. Individual animals could be attracted during dark hours to the illuminated staging area and active work area. During construction of the temporary and permanent bridges across Favorite Creek under Airport 3a with either access alternative, the temporary use area could be an illuminated, active work area during dark hours. Because these construction activities during dark hours are expected to be of short duration, this potential wildlife attractant would cease at the end of those brief construction periods.

Operation of the airport would cause short periods of increased noise as aircraft approach and depart the airport. Based on the results of the noise modeling in section 4.11.3.3 in Noise, significant increases in noise levels from arriving and departing aircraft would not extend beyond the airport facility; nonetheless, there is potential that the periodic increase in noise would disturb or displace terrestrial wildlife individuals from near the airport when planes approach and depart. The disturbance or displacement of individuals is expected to only occur when planes approach and depart, and no long-term effects to the Southeast Alaska populations of wildlife species are expected.

Operation of the airport would result in the potential for incidental bird strikes to individual birds as aircraft approach and depart the airport. As part of the airport's certification process, a wildlife hazard assessment would be conducted, and, if necessary, an airport wildlife hazard management plan would be developed to minimize bird and wildlife hazards to airplanes. These plans, which undergo their own NEPA review prior to implementation, also include hazing efforts, which would discourage wildlife from being in the vicinity of the airport and therefore avoid strike potential.

The access road for Airport 3a (Access 2 at 4.4 miles long or Access 3 at 4.7 miles long) and increased vehicle traffic on existing roads could result in increased wildlife disturbance, injury, or mortality from vehicle strikes. This increase is expected to be low, however, given the low speed limit and overall low volume of traffic. In addition, improved human access to areas that are currently difficult to access would increase the potential for disturbance, injury, and mortality to Sitka black-tailed deer and upland birds from increased hunting. As described in Table SU2 in section 4.13 Subsistence Resources and Uses, a new road would result in increased Sitka black-tailed deer harvest initially (pounds of harvest per capita) because of improved access, but over time, the per capita harvest would return to existing levels. Although increased vehicle strikes and hunting-related mortality would affect individual Sitka black-tailed deer in the

Angoon area, the viability of the local population of this species would not be affected. Improved human access into the areas near either proposed access road and airport parking area could also lead to increased bear-human encounters in areas where no road access currently exists; increased bear-human interactions could result in an increase in non-hunting-related (for example, safety-related) bear mortality over existing levels, which are currently low.

Airport 4 with Access 2 or Access 3

Long-term habitat removal

As described in section 4.5.1.3.1, long-term habitat removal would be caused by removing vegetation, grading and recontouring the landscape, paving runways and roads, potentially extracting construction materials from an on-island materials source, and building facilities related to the airport.

Under Airport 4 with Access 2, there would be 263 acres of long-term habitat removal of all habitat types (see Figure THAS10 for a breakdown by habitat type), which is approximately 5% of all terrestrial habitats in the study area. As with the Airport 3a alternatives, because the affected habitat types are abundant in the study area, as they are throughout Southeast Alaska, and because the affected acreage of each habitat type would be small relative to the study area, Admiralty Island, and Southeast Alaska, this alternative would not adversely affect the population dynamics, sustainability, reproduction, or mortality of the associated species in the study area, on Admiralty Island, or in Southeast Alaska. In areas of terrain disturbance, it is assumed that soil productivity would be lost.

Under Airport 4 with Access 3, there would be 271 acres of long-term habitat removal of all habitat types (see Figure THAS10 for a breakdown by habitat type), which is approximately 5% of all terrestrial habitats in the study area. As with the other action alternatives, the net effect to the plants and animals associated with the affected habitats is considered sufficiently small as to not adversely affect the population dynamics, sustainability, reproduction, or mortality of terrestrial species in the study area, on Admiralty Island, or in Southeast Alaska. In areas of terrain disturbance, it is assumed that soil productivity would be lost.

Airport 4 with Access 2 Effects

	Spruce-Hemlock	Bog Forest	Bog Woodland	Fen	Salt Marsh
Acres habitat removed	170	90	0	3	0
% habitat removed	7%	4%	0%	3%	0%
Acres habitat altered	8	0	0	0	0
% habitat altered	Less than 1%	0%	0%	0%	0%

Airport 4 with Access 3 Effects

	Spruce-Hemlock	Bog Forest	Bog Woodland	Fen	Salt Marsh
Acres habitat removed	189	78	0	4	0
% habitat removed	8%	4%	0%	4%	0%
Acres habitat altered	5	0	0	0	0
% habitat altered	Less than 1%	0%	0%	0%	0%

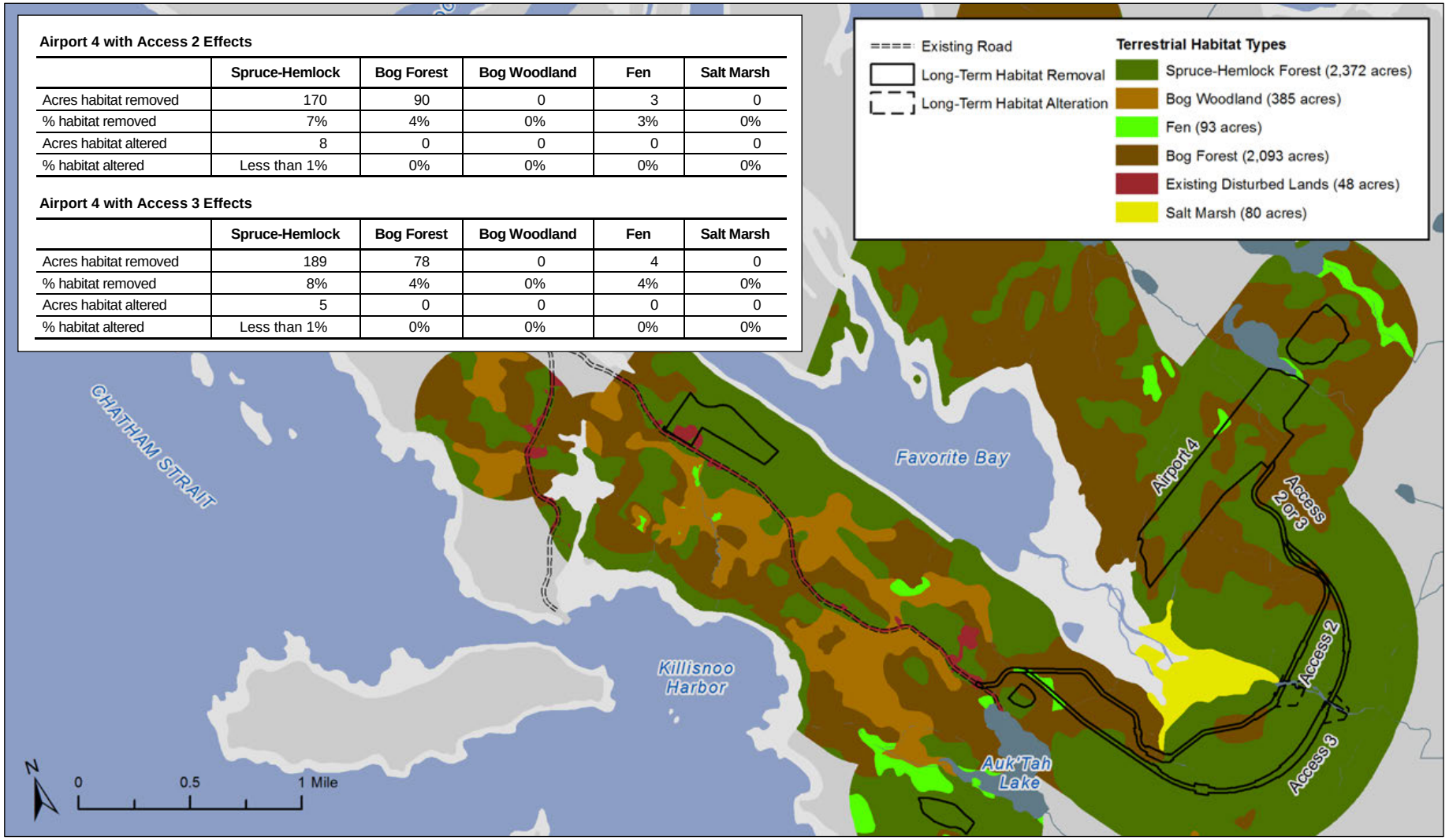


Figure THAS10. Direct effects on terrestrial habitats from Airport 4 with either access alternative.

Long-term habitat alteration

As described in section 4.5.1.3.1, long-term habitat alteration would occur under either of the Airport 4 alternatives. Under Airport 4 with Access 2, there would be 8 acres of long-term habitat alteration in spruce-hemlock forest habitat, which is less than 1% of all terrestrial habitats in the study area (see Figure THAS10 for a breakdown per habitat type). Under Airport 4 with Access 3, there would be 5 acres of long-term habitat alteration in spruce-hemlock forest habitat, which is also less than 1% of all forested habitats in the study area (see Figure THAS10 for a breakdown per habitat type). Forested habitat types are abundant in the study area, and because the affected acreage of each habitat type would be relatively small, Airport 4 with either access alternative would not adversely affect the population dynamics, sustainability, reproduction, or mortality of the associated species in the study area, on Admiralty Island, or in Southeast Alaska.

Indirect effects

As described in section 4.5.1.3.1, indirect effects would be caused by new habitat edges, periodic increases in noise, periodic increases in lighting, and a new road and improved human access to previously remote areas.

Under Airport 4 with either access alternative, changes to terrestrial habitat quality and connectivity (as a result of new habitat edges) would be proportional to the acres of long-term habitat removal (263 acres for Airport 4 with Access 2 or 271 acres for Airport 4 with Access 3) and the length of the new access road (2.9 miles for Access 2 or 3.2 miles for Access 3). Most indirect effects would occur to spruce-hemlock forest habitats and the associated species. As discussed in section 4.5.1.3.1, the acreage of habitats that would be affected by indirect effects is difficult to quantify; however, due to the abundance of high-quality terrestrial habitats in the study area, on Admiralty Island, and in Southeast Alaska, the loss in habitat quality and connectivity due to Airport 4 with either access alternative would not adversely affect the population dynamics, sustainability, reproduction, or mortality of the associated species in the study area, on Admiralty Island, or in Southeast Alaska.

Temporary displacement of terrestrial wildlife from suitable habitat may occur due to noise and light from airport construction. However, because suitable habitat is abundant in and around the terrestrial study area, individuals near construction noise and light are expected to readily move into adjacent habitats, and measureable effects to local populations of terrestrial plants and animals are not expected as a result of Airport 4 with either access alternative. Individuals could be attracted during dark hours to the illuminated staging area and active work area. During construction of the temporary and permanent bridges across Favorite Creek under Airport 4 with either access alternative, the temporary use area could be an illuminated active work area during dark hours. Because these construction activities during dark hours are expected to be of short duration, this potential wildlife attractant would cease at the end of those brief construction periods.

Operation of the airport would cause short periods of increased noise as aircraft approach and depart the airport. Based on the results of the noise modeling in section 4.11.3.3 in Noise, significant increases in noise levels due to arriving and departing aircraft would not extend beyond the airport facility; nonetheless, there is potential that the periodic increase in noise would disturb or displace terrestrial wildlife individuals from near the airport when planes approach and depart. The disturbance or displacement of individuals is expected to only occur when planes approach and depart, and no long-term effects to the Southeast Alaska populations of wildlife species are expected.

Operation of the airport would result in the potential for incidental bird strikes to individuals as aircraft approach and depart the airport. As part of the airport's certification process, a wildlife hazard assessment would be conducted, and, if necessary, an airport wildlife hazard management plan would be developed to minimize bird and wildlife hazards to airplanes. These plans, which undergo their own NEPA review prior to implementation, also include hazing efforts, which would discourage wildlife from being in the vicinity of the airport and therefore avoid strike potential.

The access road for Airport 4 (Access 2 at 2.9 miles long or Access 3 at 3.2 miles long) and increased vehicle traffic on existing roads could result in increased wildlife disturbance, injury, or mortality from vehicle strikes. This increase is expected to be low, however, given the low speed limit and overall low volume of traffic. In addition, improved human access to areas that are currently difficult to access would increase the potential for disturbance, injury, and mortality to Sitka black-tailed deer and upland birds from increased hunting. According to Table SU2 in section 4.13 Subsistence Resources and Uses, roads would increase Sitka black-tailed deer harvest initially because of improved access, but over time, the per capita harvest would return to existing levels. Although increased vehicle strikes and hunting-related mortality would affect individual Sitka black-tailed deer in the Angoon area, the viability

of the local population of this species would not be affected. Improved human access into the areas near either proposed access road and airport parking area could also lead to increased bear-human encounters in areas where no road access currently exists; increased bear-human encounters could result in an increase of non-hunting-related (for example, safety-related) bear mortality over existing levels, which are currently low.

Airport 12a with Access 12a (preferred alternative)

Long-term habitat removal

As described in section 4.5.1.3.1, long-term habitat removal would be caused by removing vegetation, grading and recontouring the landscape, paving runways and roads, potentially extracting construction materials from an on-island materials source, and building facilities related to the airport.

Under Airport 12a with Access 12a, there would be 252 acres of long-term habitat removal of all habitat types (see Figure THAS11 for a breakdown by habitat type), which is approximately 5% of all terrestrial habitats in the study area. As with the Airport 3a and Airport 4 alternatives, because the affected habitat types are abundant in the study area, as they are throughout Southeast Alaska, and because the affected acreage of each habitat type would be small relative to the study area, Admiralty Island, and Southeast Alaska, this alternative would not adversely affect the population dynamics, sustainability, reproduction, or mortality of the associated species in the study area, on Admiralty Island, or in Southeast Alaska. In areas of terrain disturbance, it is assumed that soil productivity would be lost.

Airport 12a with Access 12a Effects

	Spruce-Hemlock	Bog Forest	Bog Woodland	Fen	Salt Marsh
Acres habitat removed	76	83	90	3	0
% habitat removed	3%	4%	23%	3%	0%
Acres habitat altered	0	0	0	0	0
% habitat altered	0%	0%	0%	0%	0%

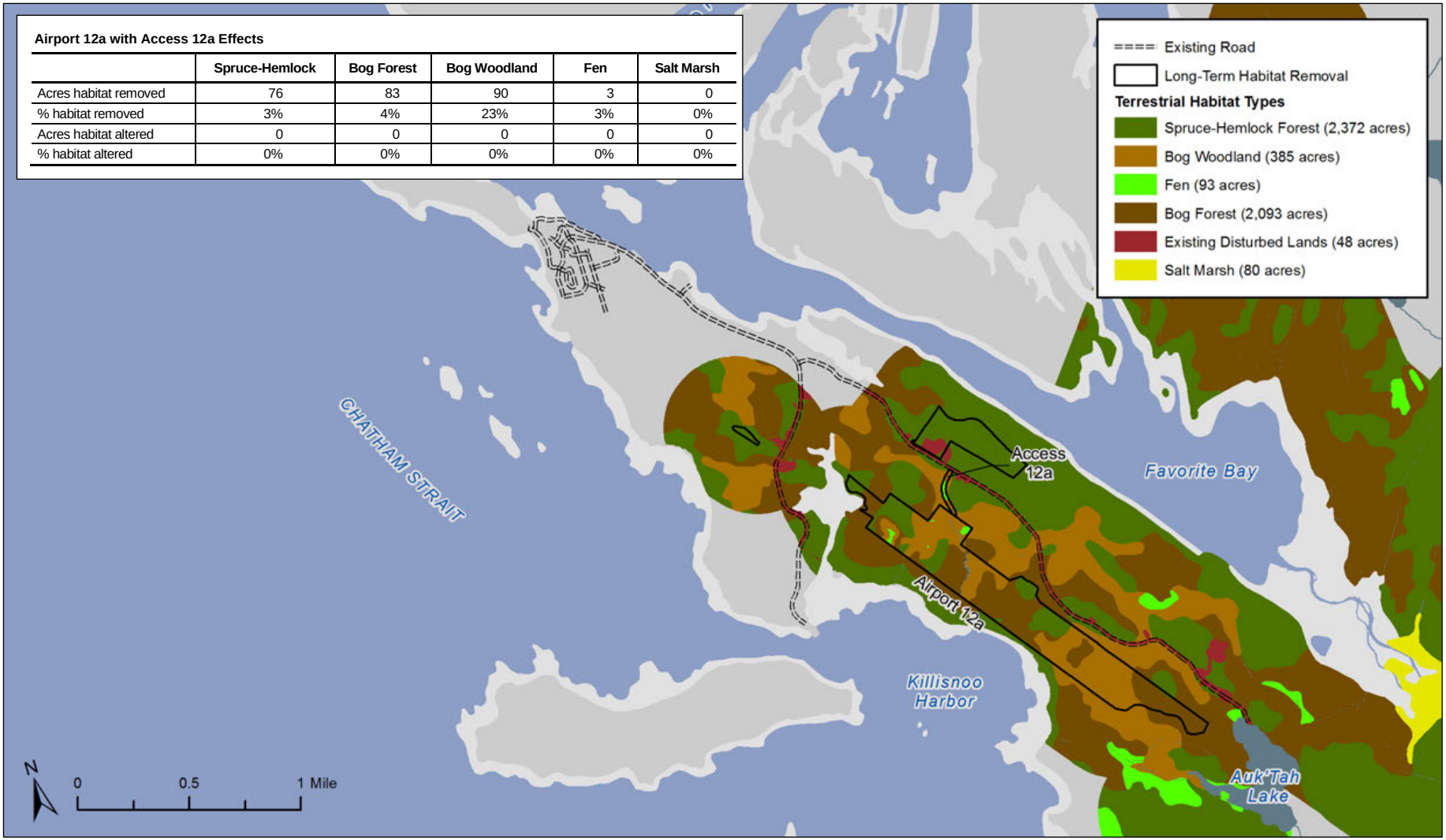


Figure THAS11. Direct effects on terrestrial habitats from Airport 12a with Access 12a.

Long-term habitat alteration

Under Airport 12a with Access 12a, there would be no long-term habitat alteration in any terrestrial habitats (see Figure THAS11 for a breakdown per habitat type). This alternative would not adversely affect the population dynamics, sustainability, reproduction, or mortality of the associated species in the study area, on Admiralty Island, or in Southeast Alaska.

Indirect effects

As described in section 4.5.1.3.1, indirect effects would be caused by new habitat edges, periodic increases in noise, periodic increases in lighting, and a new road and improved human access to previously remote areas.

Under Airport 12a with Access 12a, changes to terrestrial habitat quality and connectivity (as a result of new habitat edges) would be proportional to the acres of long-term habitat removal (252 acres) and the length of the new access road (0.2 mile). Most indirect effects would occur to spruce-hemlock forest habitats and the associated species. As discussed in section 4.5.1.3.1, the acreage of habitats that would be affected by indirect effects is difficult to quantify; however, due to the abundance of high-quality terrestrial habitats in the study area, on Admiralty Island, and in Southeast Alaska, the loss in habitat quality and connectivity from Airport 12a with Access 12a would not adversely affect the population dynamics, sustainability, reproduction, or mortality of the associated species in the study area, on Admiralty Island, or in Southeast Alaska.

Temporary displacement of terrestrial wildlife from suitable habitat may occur due to noise and light from airport construction. However, due to the abundance of suitable habitat in and around the terrestrial study area, individuals in the immediate area of construction noise and light are expected to readily move into adjacent habitats, and measureable effects to local populations of terrestrial species are not expected as a result of Airport 12a with Access 12a. Individual animals could be attracted during dark hours to the illuminated staging area and active work area. Because these construction activities during dark hours are expected to be of short duration, this potential wildlife attractant would cease at the end of those brief construction periods. Because the new access road for Airport 12a is substantially shorter (0.2 mile) than all other action alternatives, displacement of terrestrial wildlife from construction noise and light would be the least of all action alternatives.

Operation of the airport would cause short periods of increased noise as aircraft approach and depart the airport. Based on the results of the noise modeling in section 4.11.3.3 in Noise, significant increases in noise levels due to arriving and departing aircraft would not extend beyond the airport facility; nonetheless, there is potential that the periodic increase in noise would temporarily disturb or displace terrestrial wildlife individuals from near the airport when planes approach and depart. The disturbance or displacement of individuals is expected to only occur when planes approach and depart, and no long-term effects to the Southeast Alaska populations of wildlife species are expected.

Operation of the airport would result in the potential for incidental bird strikes to individuals as aircraft approach and depart the airport. As part of the airport's certification process, a wildlife hazard assessment would be conducted, and, if necessary, an airport wildlife hazard management plan would be developed to minimize bird and wildlife hazards to airplanes. These plans, which undergo their own NEPA review prior to implementation, also include hazing efforts, which would discourage wildlife from being in the vicinity of the airport and therefore avoid strike potential.

The 0.2-mile access road for Airport 12a and increased vehicle traffic on existing roads could result in increased wildlife disturbance or injury or mortality from vehicle strikes. This increase is expected to be low, however, given the low speed limit and overall low volume of traffic. The short length of new access road would provide slightly improved human access to areas that are currently difficult to access. This slight improvement in human access would not increase the potential for disturbance, injury, and mortality to Sitka black-tailed deer and upland birds from increased hunting, or lead to increased bear-human encounters. Given the large size of the resident Sitka black-tailed deer population, effects due to road-related mortality would not affect the viability of the local population of this species.

4.5.1.3.4. How do the effects to terrestrial habitats and associated species compare?

Long-term habitat removal, long-term habitat alteration, and indirect effects from changes to habitat quality and connectivity, disturbance or displacement of animals, and increased traffic and access to terrestrial habitats would be very similar under all action alternatives. Only the no action alternative would have substantively different effects, which would not remove or alter any terrestrial habitat or increase indirect effects to terrestrial species.

Under all action alternatives, the same types of habitats would be affected during construction, operation, and maintenance of the airport and access road. The alternatives would differ only in the following ways:

- The number of acres of terrestrial habitats removed

- The number of acres of terrestrial habitats altered
- The number of miles of new road, which increases vehicle traffic and human access to habitats, increasing potential for disturbance, injury, or mortality for individual animals
- All three of these effects change habitat quality and connectivity, and create new habitat edges

Table THAS2 summarizes the acreages of terrestrial habitat removal and alteration and miles of new access road for each of the alternatives, and ranks them from least effects to most effects. Although the acreages and miles vary among action alternatives, the effects from the highest-ranking action alternative do not differ significantly from the lowest-ranking action alternative. During construction, operation, and maintenance, all the action alternatives could disturb or displace animals because of increases in the amount of noise and light in the environment potentially altering animals' behavior.

Table THAS2. Summary of effects by alternative for terrestrial habitats and associated species

Alternative	Long-term habitat removal, including creation of new habitat edges		Long-term habitat alteration, including creation of new habitat edges		Indirect effects from new habitat edges and increased traffic and access	
	Acres	Rank*	Acres	Rank*	Miles	Rank*
No action alternative	0	1	0	1	0	1
Airport 3a with Access 2	308	5	8	6	4.4	5
Airport 3a with Access 3	316	6	5	5	4.7	6
Airport 4 with Access 2	263	3	8	6	2.9	3
Airport 4 with Access 3	271	4	5	5	3.2	4
Airport 12a with Access 12a	252	2	0	1	0.2	2

4.5.1.3.5. Would any effects be irreversible or irretrievable?

There would be irreversible and irretrievable effects to terrestrial habitats (including soil productivity) and associated species under all action alternatives due to removal of terrestrial habitats and the loss of individuals of associated plant and animal species during airport construction and ongoing operation.

4.5.1.3.6. Would any of the alternatives have a significant effect on terrestrial habitats and associated species?

Development of any alternative would affect terrestrial habitats and individual plants and animals by removing or altering habitats. However, these effects would not be significant because they would not be so extensive as to alter the population dynamics, sustainability, reproduction, mortality, or minimum population size needed to sustain a species. The effects would not reduce the habitat supporting species below that needed to maintain self-sustaining populations. Maintenance of natural systems would not be adversely affected. The action would be consistent with applicable state natural resources management strategies.

4.5.1.3.7. How could the effects described above be avoided, minimized, or mitigated?

Because no significant effects are anticipated for these resources, no additional mitigation measures beyond those discussed in Chapter 7: Mitigation would be implemented under any action alternative. Chapter 7 describes best management practices that would be implemented during construction. Best management practices are relatively common activities in construction, and are intended to prevent pollution, minimize environmental harm, and assure that appropriate response action is taken if unacceptable environmental effects occur. Through the use of these best management practices, effects are reduced during construction. The best management practices described in Chapter 7 were considered during effects analysis for this resource.

4.5.2. Aquatic Habitats and Associated Species

This section addresses the existing conditions of aquatic habitats and the associated wildlife and plant species in the area of the airport and access road alternatives. It also addresses the potential changes to the conditions of those resources from construction and operation of the proposed land-based airport.

The information contained in this section is summarized from the *Freshwater, Estuarine, and Marine Resources Existing Conditions Technical Report for Angoon Airport Environmental Impact Statement Angoon, Alaska* (SWCA 2011b), which is included in this environmental impact statement (EIS) as Appendix I.

4.5.2.1. Background information

4.5.2.1.1. What does the term "aquatic habitats and species" mean?

Aquatic habitats are water-based places lived in or used by plants and animals. They consist of ***freshwater, estuarine,*** and ***marine habitats***. For the sake of analysis in this section, estuarine habitats are included with marine habitats. Aquatic species are the animals and plants that live in those habitats most of the time. These include fish, invertebrates (such as sea urchins, sea stars, and insects), plants that grow in water (such as eelgrass, seaweed, kelp, and pond lily), and marine mammals (discussed in section 4.5.3 Special Status Species).

What is discussed in this section?

Terms to know

Estuarine habitats: Partly enclosed, nutrient-rich bodies of water where saltwater from the ocean mixes with freshwater from rivers and streams.

Freshwater habitats: Habitats in surface waters such as lakes, ponds, rivers, and streams that have low salinity.

Marine habitats: Habitats influenced by saltwater. These occur in estuarine, coastal, and open ocean saltwater environments.

4.5.2.1.2. What guidelines and regulations guided how aquatic habitats and species were assessed?

Terms to know

Stream class: A designation applied to all freshwaters (streams and lakes) that describes how fish use those water bodies, and how the water bodies influence downstream areas.

Stream inventories: Data collected to establish aquatic conditions and to assess management needs.

Many guidelines and regulations protect aquatic habitats and species. For this EIS, one guidance document (the *Tongass Land and Resource Management Plan* [U.S. Forest Service 2008a], hereafter referred to as the "land management plan") and two regulations (the Clean Water Act and the Magnuson-Stevens Fishery Conservation and Management Act) direct the way in which aquatic resources are addressed. The Clean Water Act of 1972 (Public Law [PL] 107-303) and the Magnuson-Stevens Fishery Conservation and Management Act of 1976 (PL 94-265, as amended by the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act [PL 109-479]) assign regulatory designations to aquatic habitats and species, and trigger permitting processes related to aquatic habitats and species. These regulatory designations are included as appropriate in the effects discussions that follow.

Tongass National Forest Land and Resource Management Plan

Because the U.S. Forest Service is the principal land management agency for four of the five action alternatives, the Federal Aviation Administration (FAA) was required by the land management plan to conduct ***stream inventories*** per the guidance in the *Aquatic Habitat Management Handbook, FSH2090.21* (U.S. Forest Service 2001a). Although Airport 12a with Access 12a would not be located on lands managed by the U.S. Forest Service, the FAA applied the U.S. Forest Service guidelines to it as well as the other alternatives for the sake of consistent analysis and disclosure of possible effects.

Through these inventories, the FAA validated existing data, documented any previously undocumented freshwater habitats, and identified ***stream classes***.

The U.S. Forest Service's stream classes (which also apply to lakes, though they are called "stream class") are as follows:

- Class 1: Supports ***anadromous*** fish populations.
- Class 2: Supports only resident fish populations.
- Class 3: Does not support fish populations but directly influences fish-bearing fresh waters by moving ***sediment*** and food sources downstream.
- Class 4: Does not support fish populations and does not directly influence fish-bearing fresh waters. These are generally small ***headwater*** streams or isolated ponds.
- Class 5: Small headwater or wetland ***seeps***, considered by the U.S. Forest Service to be "non-streams."

It is important to identify stream class because the U.S. Forest Service assesses effects to aquatic habitats and species according to these designations. With their land management practices, the U.S. Forest Service makes every effort to minimize the degradation or loss of Class 1 and 2 freshwater habitats.

Terms to know

Anadromous: A term describing fish that spawn in freshwater, but live most of their adult lives in saltwater.

Headwater: The origin or source of a stream or river that is the farthest distance upstream of its mouth.

Riparian: The zone between land and a river or stream.

Sediment: Material such as sand or silt that can be transported by water to a water body, where it can remain suspended in the water or settle to the bottom.

Seep: A location where groundwater percolates through the ground to form a puddle.

As part of protecting streams, the U.S. Forest Service designates "***riparian*** management areas" near streams because riparian areas are important for the health of aquatic habitats. Riparian areas consist of terrestrial habitats of any type that contribute essential elements to the health and normal function of a river or stream. They contribute food for fish in the form of land-dwelling invertebrates such as insects, centipedes, and spiders. They contribute organic matter, which provides nutrients for aquatic invertebrates such as stoneflies, which are a source of prey for fish. Large wood (woody vegetation such as branches and fallen trees) is another important riparian contribution. As it falls into streams, large wood creates pools and adds habitat complexity, providing aquatic species with cover, refuge from high flows and predators, and variety in food sources. Effects to terrestrial habitats in a riparian area cause related effects to aquatic habitats.

Clean Water Act and waters of the U.S.

The Clean Water Act designates the U.S. Army Corps of Engineers as the regulatory agency over "waters of the U.S.," which are defined as follows:

> All waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide. [These include] lakes, rivers, streams, mudflats, sandflats, [and] wetlands…, the use, degradation, or destruction of which could affect interstate or foreign commerce. (33 Code of Federal Regulations [CFR] 328.3)

In the Angoon area, the presence of commercial and recreational fishing (which are considered part of interstate commerce by regulation) means that all aquatic habitats in the area—including the oceans, lakes, streams, and wetlands—are considered waters of the U.S. (*Note:* This section focuses on non-wetland waters of the U.S.; wetland waters of the U.S. are discussed in section 4.15 Wetlands.) Because these habitats are waters of the U.S., the Angoon Airport project would require a permit under Section 404(b)(1) of the Clean Water Act. It is also possible that permits would be required under Sections 9 and 10 of the Rivers and Harbors Act of 1899 (33 United States Code [USC] 403).

Section 404(b)(1) of the Clean Water Act provides guidelines that the U.S. Army Corps of Engineers uses to determine whether a project can obtain a permit. Projects that are not permittable are those that have unacceptable adverse effects according to the U.S. Army Corps of Engineers using the criteria in the Section 404(b)(1) guidelines. Unacceptable adverse effects are those that 1) violate state water quality standards, 2) violate toxic effluent standards or prohibitions, 3) jeopardize the continued existence of species listed as endangered or threatened, or 4) violate any requirement to protect a marine sanctuary. The U.S. Army Corps of Engineers is responsible for determining whether an action does not have unacceptable adverse effects and therefore complies with Section 404(b)(1) guidelines. A Section 404 permit may not be issued without such compliance.

Because all aquatic habitats in the Angoon area are considered non-wetland waters of the U.S., the effects disclosed in this EIS are used to determine if there are unacceptable adverse effects under the Section 404(b)(1) guidelines.

Magnuson-Stevens Fishery Conservation and Management Act and essential fish habitat

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with the National Marine Fisheries Service on all actions that may adversely affect designated "essential fish habitat." Essential fish habitat under this act is defined as "waters and ***substrate*** necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 USC 1802(10)). More details regarding these selected fish stocks and essential fish habitat are discussed in Appendix I. The Angon area contains essential fish habitat in freshwater and marine habitat types. All Aquatic habitats in the Angoon area that are accessible to andromous fish (Class 1 streams and all marine areas) have been designated as essential fish habitat for salmon.

Terms to know

Substrate: The material on the bottom of a water body, such as sediment or bedrock underlying wetlands and stream channels. In aquatic habitats, substrate provides the surface material on which a species lives, grows, or feeds.

4.5.2.2. Existing conditions

Aquatic habitats and species in the study area are discussed here according to their association with fresh and marine waters. Freshwater habitats include streams, lakes, and ponds (see Figure AHAS3 below). Marine habitats consist of water bodies influenced by saltwater (see Figure AHAS4 below). The distribution of these habitats is illustrated in Figure AHAS2 below.

What is discussed in this section?

4.5.2.2.1. How did the FAA determine which aquatic habitats and associated species could be affected and their existing condition?

Existing data and new field studies conducted for this EIS were used to identify aquatic habitats and species that could be affected by any of the airport and access alternatives. Because existing studies of aquatic habitats around Angoon (for example, U.S. Forest Service 2002 and U.S. Forest Service 2009) contain incomplete data on the areas that could be affected by the alternatives, the FAA consulted biologists from the U.S. Forest Service, National Marine Fisheries Service, and Alaska Department of Fish and Game about the occurrence and distribution of aquatic habitats and species in the area encompassing the alternatives. The FAA identified this area of study—the aquatic study area—by estimating the likely locations and extents of project-related construction, operation, and maintenance activities that would have the potential to affect aquatic habitats and species (Figure AHAS1). The FAA conducted field surveys to verify the accuracy and completeness of existing data and to examine areas where data regarding aquatic resources were lacking. If aquatic species were not directly observed during field surveys but suitable habitat for those species was present, the FAA assumed for the purpose of this EIS that the species were present also.

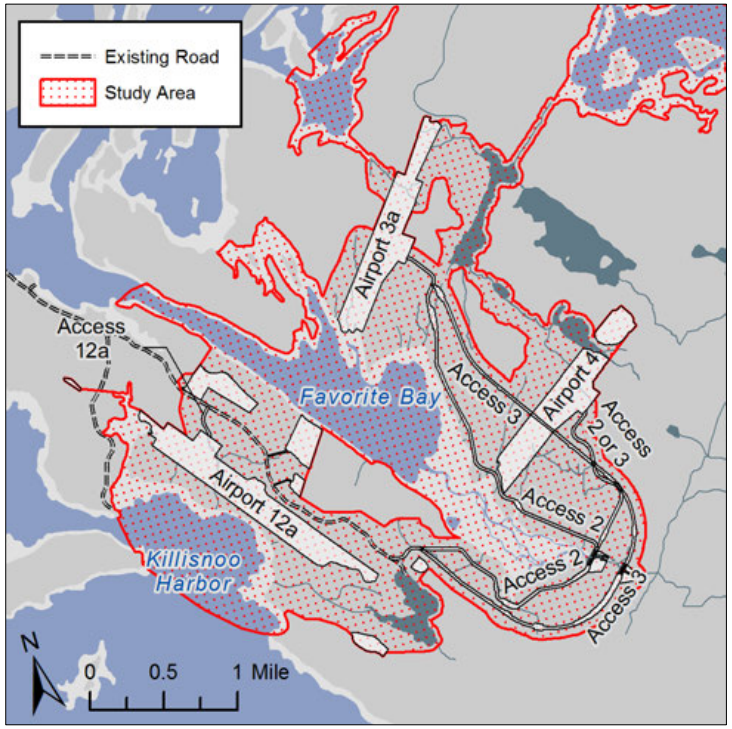


Figure AHAS1. The study area examined for aquatic habitats and species.

For the purposes of analysis in this EIS, the aquatic study area has been refined from the area used for the field surveys (described in Appendix I). Because water flows downstream, effects to aquatic habitats are anticipated in the immediate vicinity and downstream of project-related activities, but not upstream. The downstream extent of the study area is based on a conservative estimate of ***dilution*** and geographic boundaries of small bays to larger marine water bodies. It is reasonable that potential effects to water quality, and subsequent effects to aquatic habitats and species, would lessen as more water is encountered (dilution) and the distance from the effects increases downstream. The upstream extent of the study area follows freshwater bodies upstream from marine water bodies until arriving upstream of the potential project-related activities. In some cases this coincides with the watershed boundary (for example, in watershed 10 as shown in Figure AHAS2), but in other watersheds, such as Favorite Creek and watershed 2, it was not necessary to include areas of those watersheds that were upstream of the potential project-related activities. See Figure AHAS1 for the boundaries of this refined aquatic study area.

Terms to know

Dilution: The process by which the concentration of a particular substance is lessened because the other surrounding substances are increased.

High-quality aquatic habitat: Used here, a water body in which the combination of physical, chemical, and biological components results in an ideal spawning, rearing, refuge, or migratory setting.

4.5.2.2.2. What are aquatic habitats and associated species in the Angoon area like?

The condition of all aquatic habitats in the study area is relatively undisturbed and high quality because the Angoon area has a small human population that is concentrated near the town center. Outside of the Angoon town center, there are few existing roads or other human-built infrastructure or human activities that could decrease the quality of the existing aquatic habitats. The only existing roads are from the community of Angoon to the ferry terminal (at the mouth of the Salt Lagoon, adjacent to Killisnoo Harbor) and to Auk'Tah Lake, the city's water supply. Aquatic habitats are mostly continuous, with little or no disturbance.

Invasive aquatic species are typically found where there is frequent human activity and associated disturbance. No invasive aquatic species were observed during fieldwork for the EIS. The absence of invasive species is a further indication of the lack of human disturbance and presence of ***high-quality aquatic habitats*** in the study area.

Beach and estuarine fringe habitat sensitivity

Beach and estuarine fringe habitat is the vital link between terrestrial and marine aquatic habitats. Because the beach and estuarine fringe occurs where two habitat types overlap, it is a biologically rich area. It provides important habitat, migration corridors, and habitat connectivity for wildlife such as eagles, bears, otters, deer, shorebirds, and waterbirds. Many terrestrial species feed in estuarine habitats or the intertidal zone, and use the beach and estuarine fringe as a corridor to access these habitats. The quality of the beach and estuarine fringe contributes to the ecological integrity of estuarine habitats and their associated riparian management areas. Beach and estuarine fringe is of high value to many wildlife and fish species, and therefore is managed by the U.S. Forest Service as a highly sensitive habitat.

Because the study area contains high-quality aquatic habitats and very little human disturbance, it is assumed that aquatic species in the area have stable populations. There are no apparent indications of instability.

The riparian management areas used in this analysis consist of areas within 150 feet of Class 1 and Class 2 lakes and streams, and within 50 feet of Class 3 fresh waters. In addition, the U.S. Forest Service (U.S. Forest Service 2008a) describes specific management objectives for marine beach and estuary fringe habitat because these areas are sensitive (for more information on this sensitivity, see the sidebar titled "Beach and estuarine fringe habitat sensitivity" above). The U.S. Forest Service identifies the fringe as approximately 1,000 feet inland from mean high tide line around all marine coastlines or estuaries. For this analysis, this 1,000-foot fringe is considered marine beach or estuary riparian area, and effects to the fringe are described as effects to riparian management areas.

Riparian management areas in the Angoon area are relatively undisturbed by humans, except those closest to Angoon. The riparian areas near the proposed Airport 12a location are used more frequently by humans, as reflected by trails, land clearing, and pipes directing stream water to homes. However, these riparian areas are not on U.S. Forest Service managed lands, so the U.S. Forest Service riparian management area guidelines do not apply to these areas.

Essential fish habitat was determined based on the presence of certain fish species in these habitats. In freshwater habitats, this was determined by identifying stream class (see Figure AHAS2) and referring to the Alaska Department of Fish and Game's *Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes* (Johnson and Blanche 2012) as well as the *Atlas of the Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes* (Alaska Department of Fish and Game 2011; Johnson and Blanche 2012). In marine habitats, areas were assumed to be essential fish habitat if the habitat was suitable for certain species as detailed in the North Pacific Fishery Management Council's *Fishery Management Plan for Groundfish of the Gulf of Alaska* (2008).

The Angoon area contains essential fish habitat in freshwater and marine habitat types. Favorite Creek, a Class 1 stream, contains spawning and rearing habitat for Dolly Varden char (*Salvelinus malma*), chum (*Oncorhynchus keta*), coho (*O. kisutch*), and pink salmon (*O. gorbuscha*) (Johnson and Klein 2009). Other freshwater streams in the area contain rearing habitat for juvenile coho. Marine essential fish habitat has also been identified for five salmon species (Chinook [*O. tshawytscha*], coho, chum, pink, and sockeye [*O. nerka*]) and for at least one life stage for other marine fish species; for example, walleye pollock (*Theragra chalcogramma*) (North Pacific Fishery Management Council 2008).

Statewide harvest survey results for the saltwater shoreline of Admiralty Island near the community of Angoon indicate that during at least 1 year in the 2001–2013 period, sport fishing survey respondents reported catching or harvesting hardshell clams, Dungeness crab, Dolly Varden char, cutthroat trout, chum salmon, pink salmon, and coho salmon (Alaska Department of Fish and Game 2013a).

Finally, there is existing human access by boat within the study area's marine habitats, and fishing and harvest of aquatic resources occurs throughout Favorite and Mitchell Bays. These activities are further discussed in section 4.13.2 in Subsistence Resources and Uses. For this EIS, it was assumed that the current harvest levels are sustainable because of Angoon's small human population and the prevalence of marine habitats throughout the study area. Marine habitats cover almost half of the study area (46%), the rest of which is mostly terrestrial habitats (see Figure AHAS2).

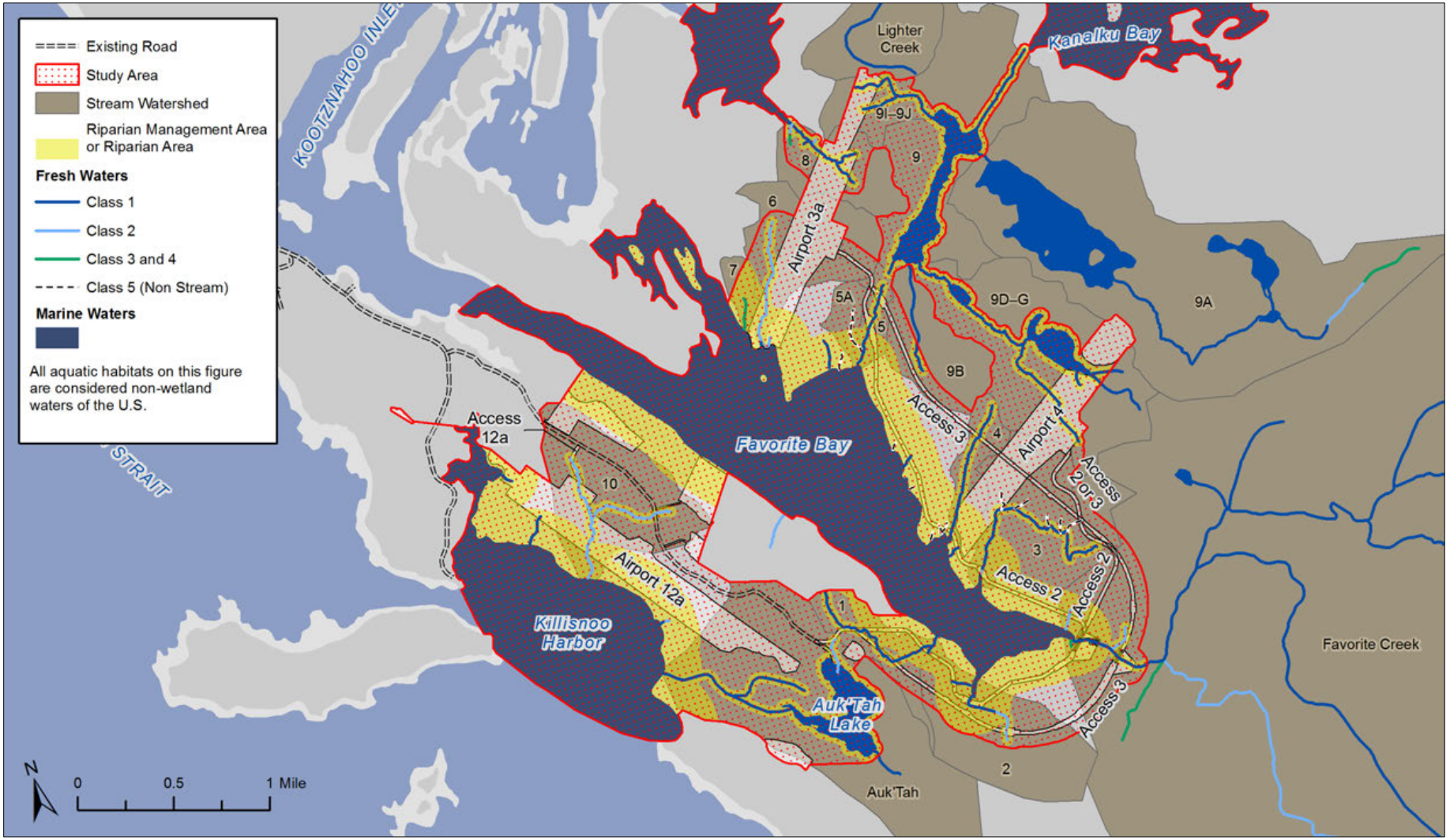


Figure AHAS2. Aquatic habitats in the study area.

Freshwater habitats (162 acres; 3% of the study area)

Common and characteristic aquatic species

- Typical streambanks composed of sedges (*Carex* spp.*) and grasses, with overhanging vegetation, undercut banks, and large wood.
- Freshwater lakes and ponds support common freshwater plant species such as yellow pond lily (*Nuphar polysepalum*) and pondweed (*Potamogeton* sp.*).
- Favorite Creek supports sculpins and at least three species of salmon (pink, chum, coho), cutthroat trout (*O. clarkii*), and Dolly Varden char.
- Favorite Creek is the largest anadromous stream in the study area, and provides spawning and rearing habitat for cutthroat trout; Dolly Varden char; and chum, coho, and pink salmon (Johnson and Klein 2009).
- Other unnamed streams contain rearing habitat for juvenile coho salmon, and for pink and chum salmon in the extreme lower reaches.
- The lake complex that drains to Kanalku Bay supports three anadromous species (coho, Dolly Varden char, cutthroat trout), threespine stickleback (*Gasterosteus aculeatus*), and two sculpin species.
- Lakes and ponds are used by a variety of anadromous and resident aquatic species.
- Resident fish are also present in the unnamed streams and lakes.

Note: Although fens could be classified as a freshwater habitat, they are analyzed in this EIS as wetlands (see section 4.15 Wetlands). Also, because fens support more terrestrial wildlife species in the study area than aquatic species, the animal species living in fen habitats are discussed in section 4.5.1 Terrestrial Habitat and Associated Species and section 4.5.3 Special Status Species.

*Used here, the abbreviation "sp." indicates an unknown species within a particular classification of plants or animals. The abbreviation "spp." indicates multiple species under a particular classification.

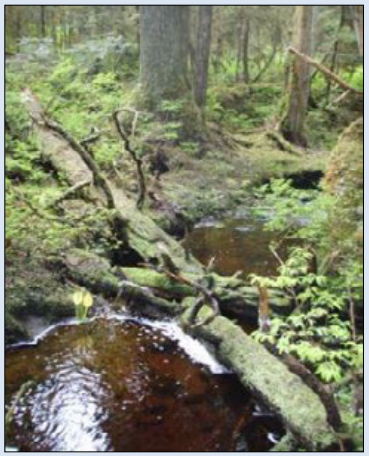


Figure AHAS3. Freshwater habitats and species.

Marine habitats (2,656 acres; 46% of the study area)

Common and characteristic aquatic species

- Plants that grow in these habitats include eelgrass, green algae, seaweed, and kelp.
- Marine invertebrates such as clams, cockles, limpets, isopods, crabs, and barnacles are commonly found in these habitats.
- These habitats are used for rearing by anadromous fish species, including pink salmon, chum salmon, coho salmon, cutthroat trout, Dolly Varden char, sculpin, and threespine stickleback.
- Other marine fish species such as groundfish and Pacific herring (*Clupea pallasii*) are found here.
- Marine mammals, including humpback whales (*Megaptera novaeangliae*), Dall's porpoises (*Phocoenoides* dalli), harbor porpoises (*Phocoena phocoena*), Steller sea lions (*Eumetopias jubatus*), and harbor seals (*Phoca vitulina*) were observed in Favorite Bay and are likely to use Killisnoo Harbor and Chatham Strait (see Figure AHAS2). These species are discussed in section 4.5.3 Special Status Species.

Figure AHAS4. Marine habitats and species.

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4.5.2.3. Project effects

What is discussed in this section?

For all action alternatives, construction, operation, and maintenance of an airport and access road would affect aquatic habitats and species. Although the nature of the effects would be the same for all action alternatives, the magnitude and extent of effects would differ per alternative.

Table AHAS1 and the sections that follow it describe the actions causing the effects, the nature of the effects, the methods for analyzing effects, assumptions used in the analysis, and the magnitude and extent of effects for each alternative.

Figures AHAS3 and AHAS4 list common and characteristic aquatic species that can be found in the freshwater and marine habitats near each action alternative. Assessing effects to individual aquatic species is not possible; in other words, determining the specific number of individuals affected by any given alternative is neither feasible nor likely to be accurate. For that reason, in this EIS, the FAA uses acres of aquatic habitat removed or altered as a relative measure of the effect from each alternative on the aquatic species using those habitats.

The U.S. Forest Service makes every effort to minimize effects to fish-bearing fresh waters, and potential effects to fish-bearing freshwater habitats must be permitted through the Alaska Department of Fish and Game. Therefore, throughout this analysis, the FAA discusses effects to fish-bearing fresh waters (Class 1 and 2).

Because all aquatic habitats in the study area are non-wetland waters of the U.S., the analyses of effects to habitats and species discussed in the sections that follow also apply to non-wetland waters of the U.S. (Class 1–5).

4.5.2.3.1. How did the FAA determine the effects of the alternatives on aquatic habitats and species?

As described in section 4.1, the introduction to Chapter 4, construction actions for all action alternatives would involve vegetation removal related to the airport, road, and avigation easements (clearing of all vegetation for construction, line of sight, and open areas for flight approach and takeoff); terrain disturbance (grading and recontouring the ground surface through cut and fill to create flat surfaces for the road and runway); paving the runway and road, creating ***impervious*** surfaces; and potential extraction of construction materials such as gravel, soil, and rock from an on-island materials source.

Where streams would intersect the runway or road, ***culverting***, rerouting, or filling of streams would be necessary. Four of the five action alternatives would involve bridge construction over Favorite Creek as part of either Access 2 or Access 3. The Access 2 bridge would have an estimated two ***piers*** surrounded by ***riprap*** at the edge of the stream channel. The Access 3 bridge would not have piers in the stream channel. Construction of the permanent bridge at either proposed access location would require a temporary use area that would likely involve vegetation removal, terrain disturbance, construction of a temporary access road, the installation of permanent bridge piers (at Access 2 only), and the installation of a temporary bridge with piers in the stream channel for up to three construction seasons.

Terms to know

Avigation easement: A right-of-way tool used in airport planning to grant certain rights to the holder of the easement. For this EIS, avigation easements outside airport property would provide the Alaska Department of Transportation and Public Facilities the right to access areas to clear them of obstructions and maintain that clearance.

Culverting: The creation of a drain or pipe that allows water to flow under a road, runway, or similar structure.

Impervious: The quality of not allowing water to pass through. Instead, water collects and can create runoff.

Pier: Upright support for a structure.

Riprap: Large rocks protecting a structure, such as a bridge pier, from erosion.

Actions related to operation and maintenance would consist of continual vegetation maintenance along the runway, road, and avigation easements and increased human activity from new or improved access.

For the purposes of effects analysis in this section, these actions are grouped according to the kind of effect they would cause. Table AHAS1 lists the effects, the actions causing them, and the methods for determining their extent. The sections that follow the table describe the nature of the effects.

In this EIS, effects to estuarine habitats and associated species are discussed in section 4.5.1 Terrestrial Habitats and Associated Species and section 4.15 Wetlands. Any special status species occupying estuarine habitats are discussed in section 4.5.3 Special Status Species, including marine mammals protected under the Marine Mammal Protection Act of 1972 (16 USC 31).

Table AHAS1. Effects and analysis methods

Effect*	Action causing effect	Direct (D) or indirect (I)	Temporary (T) or long term (L)	Method for analyzing and assumptions
Stream† habitat removal	Culverting, rerouting, or filling streams; pier installation at Favorite Creek bridge	D	T, L	Acres where runways, roads, and other types of disturbance intersect streams, requiring culverting, rerouting, or filling of the stream, or, in the case of Favorite Creek, pier installation in the stream channel for the permanent and temporary bridge construction.
Stream† habitat alteration	Terrain disturbance and vegetation removal	I	L	Streams with channel changes from increased peak discharge (as modeled in section 4.6.3 of Floodplains, Stream Geomorphology, and Hydrology).
Riparian management area removal	Vegetation removal	D, I	L	Acres of riparian management area potentially affected. See section 4.5.2.1.2 for a description of riparian management areas used for analysis. Effects to marine beach and estuary fringe are included.
Behavioral change, injury, or mortality	Favorite Creek bridge construction: • Sound from pile driving‡ associated with pier installation • Dark-hour construction lighting attracting aquatic species to the in-stream work area	D, I	T	A qualitative description stating the following: • The number of estimated piers that would be installed for the permanent and temporary bridge in the Favorite Creek stream channel • The potential for injury exists.
Reduction of aquatic resources and damage to aquatic habitats	New or improved human access, and increased fishing and harvest of aquatic resources	I	L	A qualitative assessment of whether increased human activity is anticipated in lakes, Favorite Creek, and Favorite Bay marine areas.

*Other potential effects to aquatic habitats include contamination and increases in turbidity (a reduction in the clarity of water). However, as detailed in section 4.14.3 in Water Quality, it is assumed that best management practices would make these effects negligible, so these effects are not analyzed in this section.

†Because there are no anticipated direct effects to lakes or ponds, habitat removal and alteration are analyzed only for the freshwater stream habitats.

‡Pile driving is the use of a crane hammer that pounds the piles (poles or H-shaped lengths of steel) into the ground.

Stream habitat removal

Culverting, rerouting, or filling streams

Stream habitats would be removed anywhere the terrain is disturbed in a stream channel, requiring that stream section to be culverted, rerouted, or filled. This would be a direct long-term effect.

Filling a stream channel removes the stream habitat completely. Rerouted stream sections would function in a similar manner as ditches and would no longer provide intact habitat—instead, they would be uniform channels simply conveying water.

Culverting removes stream habitat in the following ways:

- The culverted section may not have natural substrate to contribute to ***nutrient cycling***, invertebrate production, or food sources for fish.
- The culverted section would not have exposure to light and therefore would not contribute to the ***primary productivity*** of the stream.
- The culverted section would not have natural banks and therefore would not benefit from the contributions of a riparian area (as described in section 4.5.2.1.2).

All culverts and rerouted sections would be designed to allow fish passage during construction and operation, so there would be no effects to fish passage. This EIS assumes that the function of the culverted or rerouted stream segment would be limited to fish passage only, and that stream section would no longer be suitable for its other habitat functions for fish, including hatching of eggs and rearing of young.

Pier installation for bridge support at Favorite Creek

The proposed location of either Airport 3a or Airport 4 would require construction of a permanent bridge across Favorite Creek. The permanent bridge would cause long-term direct effects at Access 2 but not at Access 3. At the Access 2 location, an estimated two piers would support the permanent bridge. Where these piers are located at the edges of the stream channel, long-term stream habitat removal would occur in the exact location of each pier. This acreage of stream habitat is included with the acreages of stream habitat removal due to culverting, rerouting, or filling

Terms to know

Nutrient cycling: The process by which minerals and nutrients move from a physical environment (such as soil) into living organisms (such as plants and animals), then back into the environment again.

Primary productivity: The process of using or releasing oxygen in a water body through the breakdown of organic matter or photosynthesis by aquatic plants.

of streams. This analysis assumes that the pier footprint includes the concrete base of each pier plus the riprap surrounding the pier. Because the quantity of habitat that the edge of the riprap would replace is very small (316 square feet), this habitat was analyzed as stream habitat removal instead of alteration. However, aquatic species would likely use the edge of the riprap, despite its reduced habitat value (see the sidebar titled "Why does riprap have reduced aquatic habitat value?").

For construction of the permanent bridge, a temporary bridge might be installed. The temporary bridge could be used to move equipment, facilitate construction of the permanent bridge, and as a haul route. To accommodate these uses, the temporary bridge could require numerous in-stream piers. The piers would be installed by a crane situated above the ***ordinary high water mark*** and outside the stream channel; however, this analysis assumes temporary habitat removal within the entire in-stream temporary use area. The EIS analysis makes this assumption because the exact quantity and locations of piers will not be determined until the design phase of the project. The analysis of these temporary effects examines only the Favorite Creek stream habitat within the study area—not the total stream habitat in the entire study area. The in-stream temporary use area is greater than what would be implemented during construction because the work area would likely be isolated via ***coffer dams***. Through coordination with the Alaska Department of Fish and Game, in-stream construction activities would not be conducted during the typical salmon migratory or spawning periods, approximately May 15 to September 15 (U.S. Forest Service 2001b). The temporary stream habitat removal that would occur in Favorite Creek would be a direct, temporary effect for up to three construction seasons, depending on the length of construction, because the habitat would return to its existing condition once construction ceased.

Terms to know

Coffer dams: Vertical enclosures installed in the stream with a pile-driving hammer. Water is pumped out of the enclosure, and construction can occur within it, isolated from the creek. This prevents construction materials and sediment from entering a stream during the installation of bridge piers.

Ordinary high water mark: The line on a shore or streambank created by the rise and fall of water levels. It can be indicated by impressions or shelving on the bank, changes in soil, destruction of vegetation, or the presence of debris.

Why does riprap have reduced aquatic habitat value?

Placing riprap in existing aquatic habitats typically decreases habitat value because it reduces the sources and diversity of organic matter and insects. This subsequently reduces the quality of cover and foraging habitat for juvenile fish. Although riprap does not provide the same aquatic habitat quality, the spaces between the riprap may provide some areas for cover and food production (Kahler et al. 2000).

Stream habitat alteration

In watersheds where terrain disturbance and vegetation removal cause an increase in surface runoff, peak discharge in streams would increase and stream channels would noticeably change, altering, in turn, the quality of the stream habitat as follows:

- Increased flow: Additional water volume in small streams typically straightens them and reduces habitat suitability.
- Reduced riffle and pool frequency: Riffles and pools provide foraging and resting habitat, respectively, and their alteration makes the habitat less usable for aquatic species.
- Shallower pool depths: Shallow pools provide less protection for aquatic species than do deeper pools.

These effects would be indirect and occur over the long term. Details of the peak discharge analysis per stream and how it indicates changes to stream channels are further discussed in section 4.6.3 in Floodplains, Stream Geomorphology, and Hydrology. For this analysis, it is anticipated that stream habitat alterations would occur downstream of modeled increases in peak discharge.

Riparian management area removal

Where vegetation would be removed for construction of the airport and access road or from the avigation easements, portions of riparian management areas would be removed. Removal of a portion of a riparian management area would be a direct and long-term effect to that area itself because it would not revegetate to its existing quality in the long term.

Removal of a portion of riparian management area would cause indirect long-term effects to stream habitats in the following ways:

- Decreased shading over the stream and raised water temperature: Increased water temperatures can have harmful, indirect effects on aquatic life, such as fish, that rely on colder temperatures.
- Reduced potential for contributions of large wood that provides fish habitat and stabilizes the streambank to minimize erosion and sediment entering the stream: This added habitat complexity offers aquatic species cover, refuge from high flows and predators, and different food sources than would be available in high-flow areas.
- Reduced availability of terrestrial prey sources and contributions of organic matter important for nutrient cycling.

Removing vegetation from a stream would remove these functions from the stream in the long term. Because existing riparian vegetation in the study area is mostly undisturbed and of high quality, the magnitude of vegetation removal effects from the action alternatives would be proportional to the acres of riparian management area removed for each alternative.

Behavioral change, injury, or mortality

Pile driving during the installation of bridge piers in Favorite Creek would generate sound in the water under the Access 2 or Access 3 alternatives. Pile driving may produce harmful sound levels that can disrupt, displace, injure, or kill fish. The effects of pile-driving noise on fish depend on several factors, including the sound pressure levels transmitted and the size and species of fish. Sound levels produced from pile driving vary by type and diameter of pile, type of installation device, and use of sound reduction devices such as bubble curtains. For this EIS, it is assumed that 1) the pile would be made of steel, 2) the estimated pile size would range from 2 to 6 feet in diameter, and 3) that a pile-driving hammer would be used for all bridge alternatives. The magnitude of the sound effects from pile driving to aquatic species is evaluated using the estimated number of piers that would be installed. Access 2 would require two in-stream piers for the permanent bridge, and from three to 10 in-stream piers for the temporary bridge. Access 3 would require no in-stream piers for the permanent bridge, and from two to five in-stream piers for the temporary bridge.

During bridge construction at Favorite Creek, individuals could be injured by in-stream equipment, especially with the illuminated active work area potentially attracting prey insects and aquatic species to this area during dark hours.

These effects would be direct and temporary, occurring only during bridge construction.

Reduction of aquatic resources and damage to aquatic habitats

Construction of any of the action alternatives would facilitate more convenient access to areas that are currently accessed only by foot trails that residents use for subsistence harvest. New or improved human access to these areas may increase human-caused indirect long-term effects consisting of the following:

- A reduction of aquatic resources (fish, marine invertebrates, and plants like seaweed) because of increased fishing and harvest
- Damage to aquatic habitats from human trampling or potential introduction of contaminants

For each alternative, a qualitative assessment describes whether new or improved human access is anticipated in the area of lakes, Favorite Creek, and the Favorite Bay shoreline because these are the water bodies that produce aquatic resources typically harvested as part of subsistence and recreation.

Overall, effects to aquatic habitats and species from new or improved human access are expected to be minimal for two reasons:

- Public access would continue to be limited to cross-country foot travel. Considering the area's dense vegetation, fallen trees, and steep-sided drainages, it is reasonable to assume that most travel would be limited to within 0.5 mile of the point of access from the airport, vehicle parking area, or access road.
- Any increases in fishing and marine invertebrate harvest are expected to be slight, as demonstrated in section 4.13.3 of Subsistence Resources and Uses.

4.5.2.3.2. How would each alternative affect aquatic habitats and associated species?

No action alternative

There would be no new airport or access road construction under the no action alternative, and no extraction of an on-island materials source related to the airport would occur. Effects to aquatic habitats and species would be the type and extent currently occurring. Because the miles of road and possible access points to the undeveloped landscape are both limited currently, aquatic habitats in the study area are mostly continuous, with little or no disturbance except where streams, ponds, or estuaries are crossed by roadways associated with the community of Angoon. Currently, there is one stream crossing along the existing road to the city water supply at Auk'Tah Lake. Riparian management areas in the Angoon area are relatively undisturbed by humans, except those closest to Angoon. The riparian areas near where Airport 12a would be constructed are used more frequently by humans, as reflected by trails, land clearing, and drinking water collection. However, these riparian areas are not on lands managed by the U.S. Forest Service, so the U.S. Forest Service riparian management area guidelines do not apply to them. No new access roads or bridges would be constructed under the no action alternative, so no effects to aquatic species from pile driving or increased fishing or harvest of aquatic resources are anticipated under this alternative.

Airport 3a with Access 2 (proposed action)

Table AHAS2 and Figure AHAS5 show the effects to habitats and species for Airport 3a with Access 2. Discussion of the effects follows the table. The effects to essential fish habitat are summarized in section 4.5.2.3.6.

Table AHAS2. Effects from Airport 3a with Access 2

Potential effect	Measure of effect
Acres of stream habitat removal:	
Long term* (percentage of all streams in the study area)	0.3 (2%)
Temporary (percentage of Favorite Creek stream habitat in the study area)	0.6 (15%)
Stream habitat alteration	Streams 6, 8, and 9I–9J
Acres of riparian management area removal (percentage of all riparian management areas in the study area)	148 (11%)
Behavioral change, injury, or mortality from pier installation in Favorite Creek:	
Permanent bridge (number of piers)	2
Temporary bridge (number of piers)	3–10
New or improved human access and the potential for reduction of aquatic resources and damage to aquatic habitats:	
Lakes	Yes
Favorite Creek	Yes
Favorite Bay	Yes

*Due to rounding, the acreages of fish-bearing stream habitats (Class 1 or 2 streams) are the same as the acreages of all stream classes (Class 1–5). It should be noted, however, that Class 3–5 streams are not fish-bearing stream habitats.

Stream habitat removal

This alternative would result in the removal of 0.3 acre of stream habitat due to the culverting, rerouting, or filling of stream segments. This EIS assumes that the existing stream function at those segments would be lost, although fish passage would be maintained on fish-bearing streams. In cases of Class 1 and Class 2 streams, the area culverted, rerouted, or filled would no longer provide rearing habitat for fish, and it would no longer contribute nutrients or food to downstream reaches. This would be a direct long-term effect.

There would be one bridge crossing at Favorite Creek. Although this crossing would be located in the tidally influenced portion of the stream, all effects to Favorite Creek were analyzed as effects to freshwater stream habitat and not estuarine habitat. Because this part of Favorite Creek is subject to the high tide, construction of this bridge would likely require permitting in accordance with Sections 9 and 10 of the Rivers and Harbors Act. This bridge would have two permanent piers in the stream channel, resulting in 316 square feet of long-term stream habitat removal. It is likely that aquatic species would eventually use the edge of the riprap surrounding these piers as habitat. During construction, it is possible that three to 10 piers would be placed inside the stream channel, causing up to 0.6 acre of temporary stream habitat removal at Favorite Creek. This is almost 15% of the Favorite Creek stream habitat located in the aquatic study area.

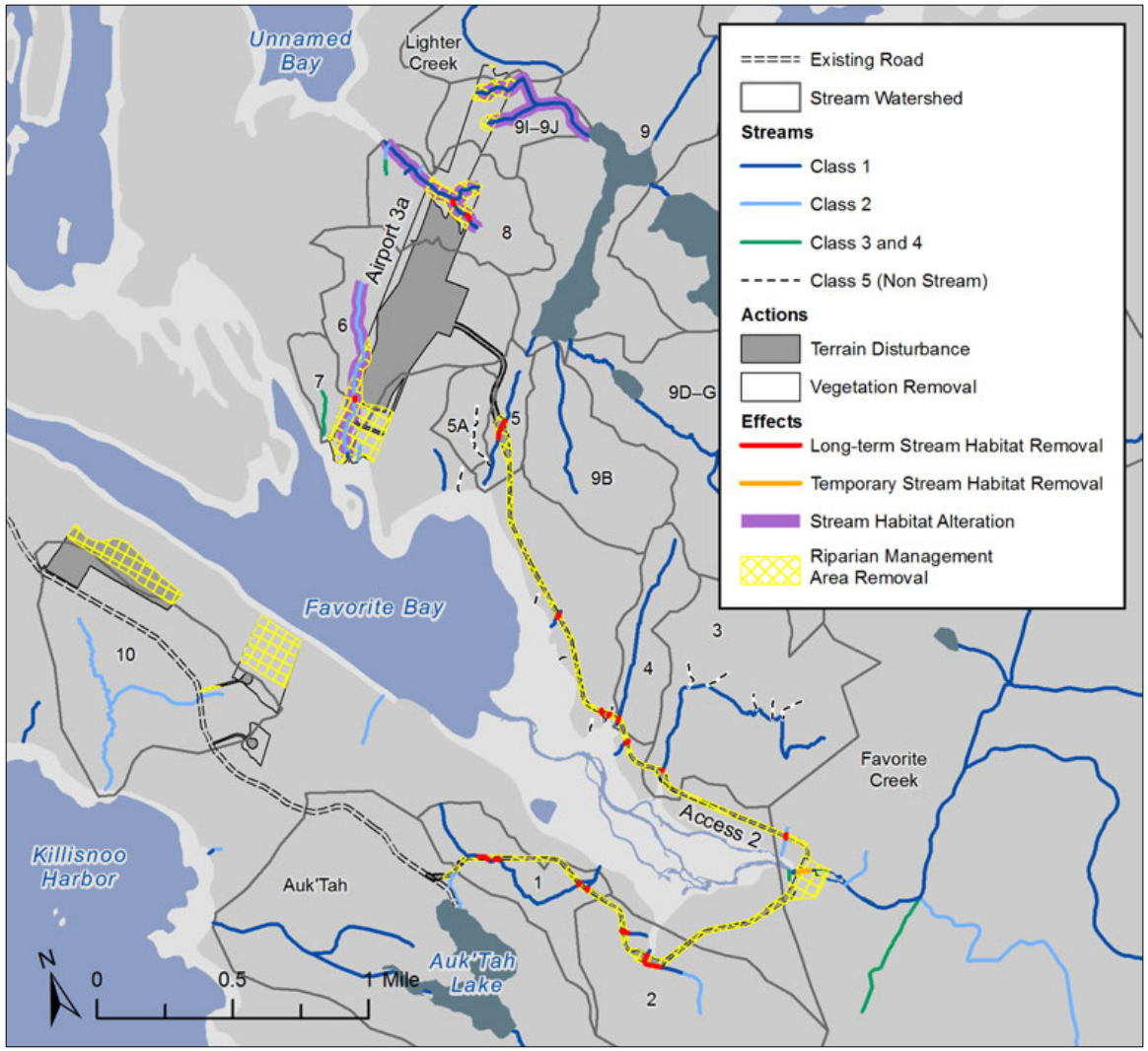


Figure AHAS5. Stream habitat removal and stream habitat alteration for Airport 3a with Access 2.

However, this acreage overestimates the temporary stream habitat removal, because the piers would be a subset of that entire area. Because the exact location of the piers is currently unknown, this analysis uses the entire area for comparative purposes.

The 0.3 acre of long-term stream habitat removal constitutes 2% of the fish-bearing streams in the study area. Because fish passage would be maintained, aquatic species would likely move to similar habitat within or outside the study area.

Stream habitat alteration

Under this alternative, stream channel changes that would alter the stream habitat quality would occur in Streams 6, 8, and 9I–9J (see Figure AHAS5). The Class 1 and 2 stream habitats in these streams might then support fewer fish due to reduced foraging and resting areas, less cover to avoid predation, and decreased habitat suitability. These effects would be indirect and long term.

Effects to the floodplains and stream geomorphology from the two piers that would support the Access 2 Favorite Creek permanent bridge are analyzed in section 4.6.3 of Floodplains, Stream Geomorphology, and Hydrology.

Riparian management area removal

Airport 3a with Access 2 would remove 148 acres of riparian management area (including 8 acres in the temporary use area at Favorite Creek); this represents 11% of the riparian management areas in the study area. Access 2 would be located mainly in the estuarine or marine beach fringe, which is important and sensitive habitat, as discussed in section 4.5.2.2.2. Although these areas would be allowed to revegetate, they would likely not return to their existing high quality in the long term.

Long-term indirect effects would occur to the streams adjacent to the removed riparian management areas. These effects would consist of decreased shading, reduced potential for large wood, and reduced availability of prey sources and nutrient cycling, as described in section 4.5.2.2.2.

Behavioral change, injury, or mortality

Under this alternative, the estimated two piers for the permanent bridge and three to 10 piers for the temporary bridge could cause behavioral change, injury, or mortality of aquatic species. During pile driving to install the piers, aquatic species would likely avoid these areas, which constitutes a disruption of their normal feeding and migratory patterns. Individuals could be injured by in-stream equipment, especially with the illuminated temporary use area potentially attracting prey insects and aquatic species to this area during dark hours. These are direct temporary effects that would cease once bridge construction was complete.

Reduction of aquatic resources and damage to aquatic habitats

The existing habitats that would be exposed to new or improved human access are the most remote of all the alternatives and are relatively undisturbed (see Figure SU7 in section 4.13 Subsistence Resources and Uses). Airport 3a with Access 2 could increase fishing in the lakes northeast of Airport 3a and in Favorite Creek near the proposed bridge location, and could increase harvest of marine invertebrates and seaweed in the Favorite Bay intertidal area. It is possible that human use would also increase at the small Class 1 streams (Streams 2, 3, 4, 9D-G) that provide coho rearing habitat near this alternative. Because Favorite Creek is the only large Class 1 stream in the area of the action alternatives, this is the only stream expected to receive increased stream fishing and therefore more human use. These long-term increases in fishing and harvest and the potential for trampling and contamination would be slight (see Table SU5 in section 4.13), and effects to aquatic habitats and species from this increased pressure would be minimal.

Airport 3a with Access 3

Table AHAS3 and Figure AHAS6 show the effects to habitats and species from Airport 3a with Access 3. Discussion of the effects follows the table. The effects to essential fish habitat are summarized in section 4.5.2.3.6.

Table AHAS3. Effects from Airport 3a with Access 3

Potential effect	Measure of effect
Acres of stream habitat removal:	
Long term* (percentage of all streams in the study area)	0.2 (1%)
Temporary (percentage of Favorite Creek stream habitat in the study area)	0.3 (8%)
Stream habitat alteration	Streams 6, 8, and 9I–9J
Acres of riparian management area removal (percentage of riparian management areas in the study area)	109 (8%)
Behavioral change, injury, or mortality from pier installation in Favorite Creek:	
Permanent bridge (number of piers)	None
Temporary bridge (number of piers)	2–5
New or improved human access and the potential for reduction of aquatic resources and damage to aquatic habitats:	
Lakes	Yes
Favorite Creek	Yes
Favorite Bay	No

*Due to rounding, the acreages of fish-bearing stream habitats (Class 1 or 2 streams) are the same as the acreages of all stream classes (Class 1–5). It should be noted, however, that Class 3–5 streams are not fish-bearing stream habitats.

Stream habitat removal

Because Access 3 would be located farther inland, almost at the upper end of many of the streams, it would intersect fewer streams than Access 2 and would therefore remove less stream habitat. Among all action alternatives, Airport 3a with Access 3 would result in the smallest amount of long-term stream habitat removal—0.2 acre, or 1% of the study area.

Unlike Airport 3a with Access 2, no long-term stream habitat removal would occur at the proposed Favorite Creek bridge crossing for the permanent bridge piers. Because there would be no permanent in-stream bridge piers and this part of Favorite Creek is not subject to the high tide, no permitting would be required under Sections 9 and 10 of the Rivers and Harbors Act. However, the two to five in-stream piers would cause 0.3 acre of temporary stream habitat removal at Favorite Creek during construction. This is approximately 8% of the Favorite Creek stream habitat in the aquatic study area.

Stream habitat alteration

Streams 6, 8, and 9I–9J would have stream channel changes from increased peak discharge; these are the same streams as under Airport 3a with Access 2 because the proposed airport location would be the same. These effects would be indirect and long term.

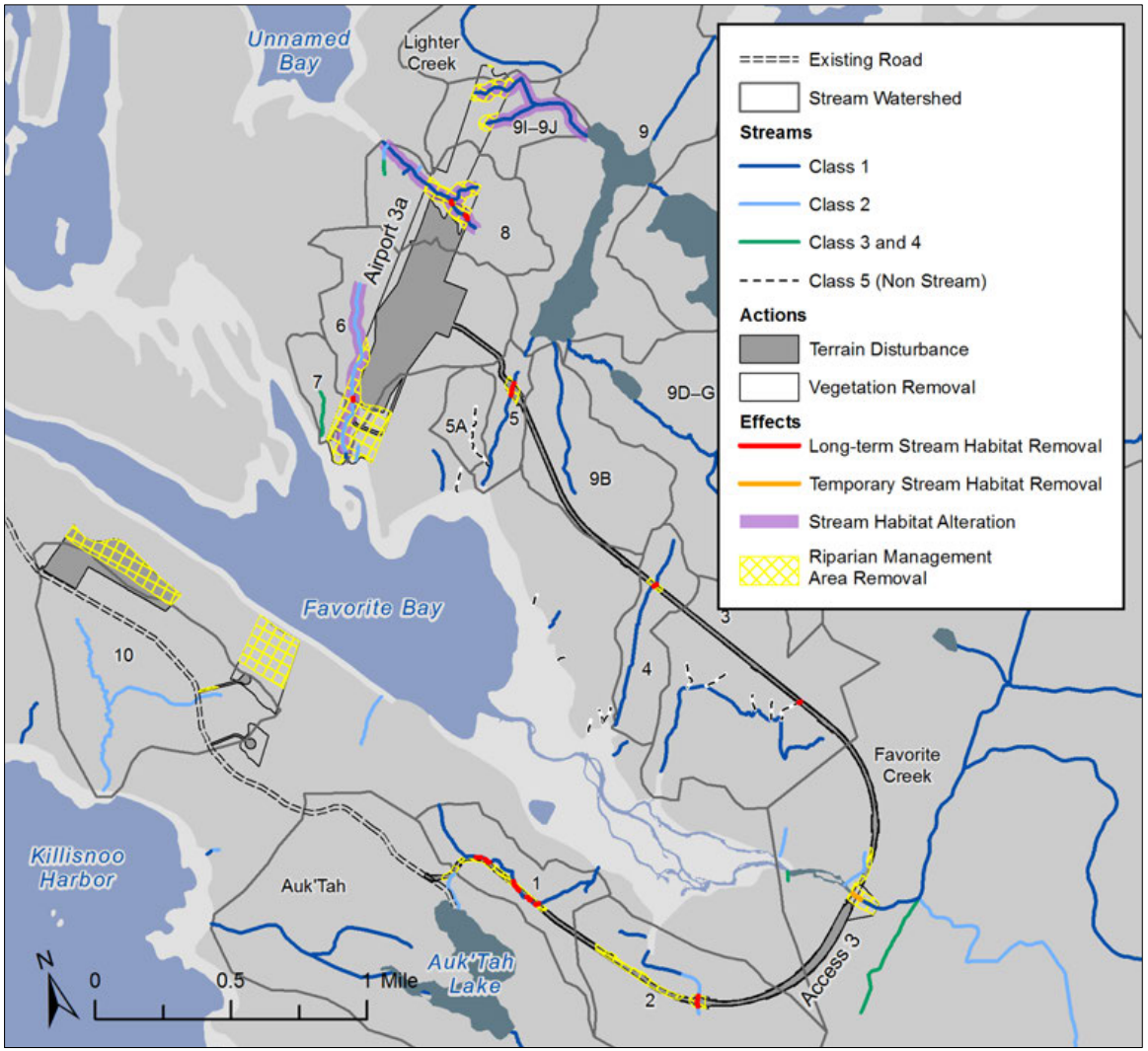


Figure AHAS6. Stream habitat removal and stream habitat alteration for Airport 3a with Access 3.

Riparian management area removal

Because fewer streams would be crossed by Access 3 than by Access 2, fewer riparian management areas would be affected. The proposed location of Access 3 farther inland would require the removal of 109 acres of riparian management area, which is 8% of the riparian management areas in the study area, as compared to 11% under Access 2. Of the 109 acres, 3 acres would be near Favorite Creek, as compared to 8 acres near Favorite Creek under Access 2.

Behavioral change, injury, or mortality

The Access 3 permanent bridge would not require any piers in the stream channel, and there would only be two to five piers for the temporary bridge. The illuminated temporary use area could attract aquatic species to the area during bridge construction. The potential for injury of aquatic species from in-stream equipment would be less under this access alternative than under Access 2, because the temporary in-stream use area would be smaller. These effects would cease upon completion of bridge construction.

Reduction of aquatic resources and damage to aquatic habitats

Under Airport 3a with Access 3, new or improved human access could cause increased fishing in the lakes northeast of Airport 3a and at the proposed Favorite Creek bridge crossing. It is possible that human use would also increase at the small Class 1 streams (Streams 2, 3, 4, 9D-G) that provide coho rearing habitat near this alternative. Because Favorite Creek is the only large Class 1 stream in the area of the action alternatives, this is the only stream expected to receive increased stream fishing and therefore more human use. Any increases in fishing and harvest and the potential for trampling and contamination would be slight (see Table SU5 in section 4.13), and effects to aquatic habitats and species from this increased pressure would be minimal. Because Access 3 would be located inland, away from the Favorite Bay estuary, there would be no increase in harvest of marine invertebrates and seaweed.

Airport 4 with Access 2

Table AHAS4 and Figure AHAS7 show the effects to habitats and species from Airport 4 with Access 2. Discussion of the effects follows the table. The effects to essential fish habitat are summarized in section 4.5.2.3.6.

Table AHAS4. Effects from Airport 4 with Access 2

Potential effect	Measure of effect
Acres of stream habitat removal:	
Long term* (percentage of all streams in the study area)	0.5 (4%)
Temporary (percentage of Favorite Creek stream habitat in the study area)	0.6 (15%)
Stream habitat alteration	Streams 3, 4, and 9D–G
Acres of riparian management area removal (percentage of all riparian management areas in the study area)	91 (6%)
Behavioral change, injury, or mortality from pier installation in Favorite Creek:	
Permanent bridge (number of piers)	2
Temporary bridge (number of piers)	3–10
New or improved human access and the potential for reduction of aquatic resources and damage to aquatic habitats:	
Lakes	Yes
Favorite Creek	Yes
Favorite Bay	Yes

*Due to rounding, the acreages of fish-bearing stream habitats (Class 1 or 2 streams) are the same as the acreages of all stream classes (Class 1–5). It should be noted, however, that Class 3–5 streams are not fish-bearing stream habitats.

Stream habitat removal

Under Airport 4 with Access 2, almost twice as much stream habitat would be removed due to the culverting, rerouting, or filling of stream segments than under either of the Airport 3a alternatives (4% of the streams in the study area instead of 2% or 1%, respectively). As with Airport 3a with Access 2, most of the stream habitat that would be removed is Class 1 (0.5 acre). This alternative would result in the most long-term stream habitat removal of all the alternatives.

As with Airport 3a with Access 2, an estimated 316 square feet of stream habitat removal would occur at Favorite Creek for the permanent bridge piers, and a maximum of 0.6 acre of habitat would be temporarily affected during construction. Permitting under Sections 9 and 10 of the Rivers and Harbors Act would likely be required for this proposed bridge location.

Stream habitat alteration

Under Airport 4 with Access 2, channel changes from increased peak discharge would be expected in Streams 3, 4, and 9D–G. All contain Class 1 stream habitat. The Class 1 stream habitats in these streams might then support fewer fish due to reduced foraging and resting areas, less cover to avoid predation, and decreased habitat suitability. These effects would be indirect and long term.

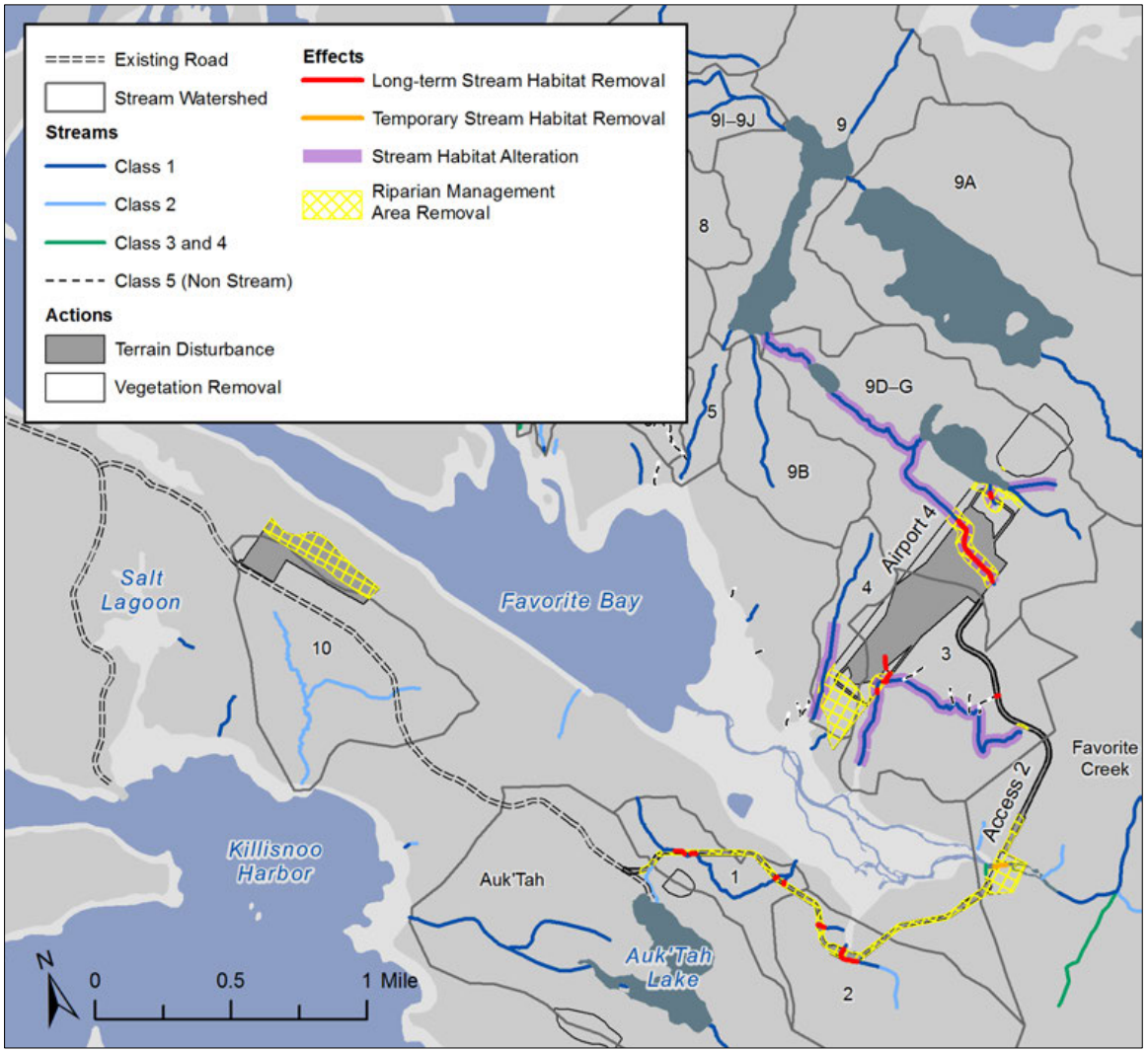


Figure AHAS7. Stream habitat removal and stream habitat alteration for Airport 4 with Access 2.

Effects to the floodplains and stream geomorphology from the two piers supporting the Access 2 permanent bridge are analyzed in section 4.6.3 of Floodplains, Stream Geomorphology, and Hydrology.

Riparian management area removal

The amount of riparian management area removed would be 91 acres (6%), nearly half that removed under Airport 3a with Access 2 (11%), including the same 8 acres for the temporary use area at the proposed Favorite Creek's bridge crossing.

Behavioral change, injury, or mortality

The estimated two piers for the permanent bridge and three to 10 piers for the temporary bridge could cause behavioral change, injury, or mortality to aquatic species during pile driving to install the piers, from in-stream equipment, and as a result of the illumination of the temporary use area. These are direct temporary effects that would cease once the bridge construction was complete.

Reduction of aquatic resources and damage to aquatic habitats

There would be new or improved human access to aquatic habitats near the proposed location of Airport 4 with Access 2 (see Figure SU7 in section 4.13 Subsistence Resources and Uses). As with the Airport 3a alternatives, this new or improved access could lead to increased fishing at the lakes north and northwest of the proposed location of Airport 4 and at the proposed Favorite Creek bridge crossing. It is possible that human use would also increase at the small Class 1 streams (Streams 2, 3, 4, 9D-G) that provide coho rearing habitat near this alternative. Because Favorite Creek is the only large Class 1 stream in the area of the action alternatives, it is the only stream expected to receive increased stream fishing and therefore more human use. Any increases in fishing and harvest and potential for trampling and contamination would be slight (see Table SU5 in section 4.13), and effects to aquatic habitats and species from this increased pressure would be minimal.

Airport 4 with Access 3

Table AHAS5 and Figure AHAS8 show the effects to habitats and species from Airport 4 with Access 3. A discussion of the effects follows the table. The effects to essential fish habitat are summarized in section 4.5.2.3.6.

Table AHAS5. Effects from Airport 4 with Access 3

Potential effect	Measure of effect
Acres of stream habitat removal:	
Long term* (percentage of all streams in the study area)	0.5 (3%)
Temporary (percentage of Favorite Creek stream habitat in the study area)	0.3 (8%)
Stream habitat alteration	Streams 3, 4, and 9D–G
Acres of riparian management area removal (percentage of all riparian management areas in the study area)	75 (5%)
Behavioral change, injury, or mortality from pier installation in Favorite Creek:	
Permanent bridge (number of piers)	None
Temporary bridge (number of piers)	2–5
New or improved human access and the potential for reduction of aquatic resources and damage to aquatic habitats:	
Lakes	Yes
Favorite Creek	Yes
Favorite Bay	No

*The acreage of affected fish-bearing stream habitats (Class 1 or 2 streams) is 0.4 acre or 3% of all stream habitat in the study area. It should be noted, however, that the total acreage of affected stream habitat (all stream classes), including habitat that is not fish-bearing (Class 3–5), is 0.5 acre.

Stream habitat removal

The amount of long-term stream habitat removal (0.5 acre) is the same as under Airport 4 with Access 2; this is because most of the effects would come from the airport's proposed location, not the access road.

No long-term stream habitat removal would occur at the proposed Favorite Creek bridge crossing because there would be no permanent bridge piers. During construction, two to five piers would be placed inside the stream channel, requiring up to 0.3 acre of temporary stream habitat removal at Favorite Creek.

Stream habitat alteration

Streams 3, 4, and 9D–G would have stream channel changes from increased peak discharge; these are the same streams as under Airport 4 with Access 2 because the airport's proposed location would be the same. These effects would be indirect and long term.

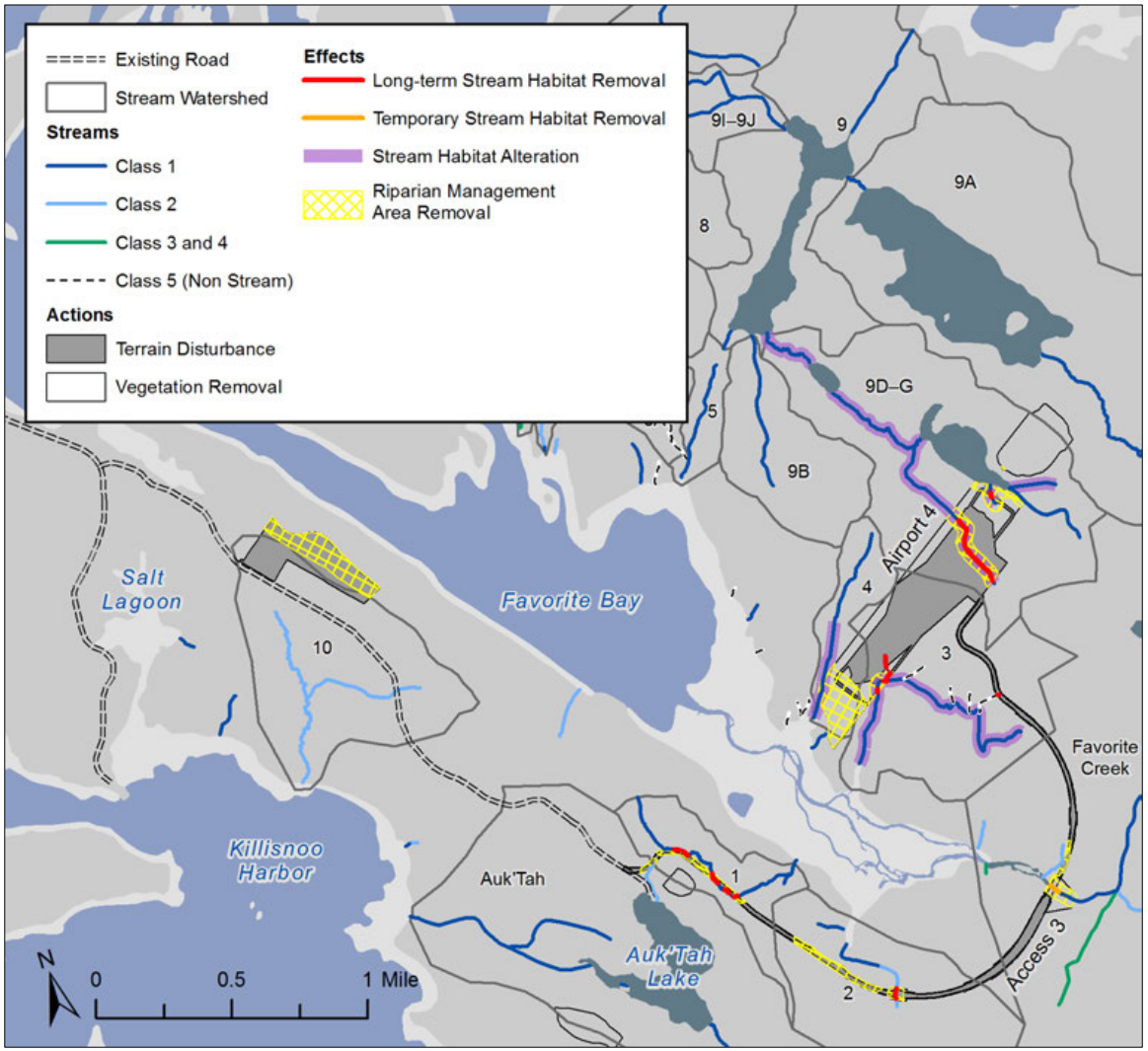


Figure AHAS8. Stream habitat removal and stream habitat alteration for Airport 4 with Access 3.

Riparian management area removal

Because the proposed access road would be located inland, away from the Favorite Bay estuarine riparian management area, this alternative would result in the smallest amount of riparian management area removed of all action alternatives—75 acres, or 5% of the riparian management area in the study area. Of these 75 acres, 3 would be near Favorite Creek, the same as Airport 3a with Access 3.

Behavioral change, injury, or mortality

The behavioral change, injury, or mortality of aquatic species from pile driving and the illuminated temporary use area under this alternative would be the same as under Airport 3a with Access 3 because the permanent and temporary bridge construction at Favorite Creek would be the same. This temporary effect would cease once bridge construction was complete.

Reduction of aquatic resources and damage to aquatic habitats

As with Airport 4 with Access 2, increased fishing at the lakes northwest of the proposed Airport 4 location and at the proposed Favorite Creek bridge crossing could occur under this alternative. It is possible that human use would also increase at the small Class 1 streams (Streams 2, 3, 4, 9D-G) that provide coho rearing habitat near this alternative. Because Favorite Creek is the only large Class 1 stream in the area of the action alternatives, it is the only stream expected to receive increased stream fishing and therefore more human use. Any increases in fishing and harvest and potential for trampling and contamination would be slight (see Table SU5 in section 4.13), and effects to aquatic habitats and species from this increased pressure would be minimal. Because Access 3 would be located inland, away from the Favorite Bay estuary, there would be no increase in harvest of marine invertebrates and seaweed.

Airport 12a with Access 12a (preferred alternative)

Table AHAS6 and Figure AHAS9 show the effects to habitats and species for Airport 12a with Access 12a. Discussion of the effects follows the table. The effects to essential fish habitat are summarized in section 4.5.2.3.6.

Table AHAS6. Effects from Airport 12a with Access 12a

Potential effect	Measure of effect
Acres of stream habitat removal:	
Long term* only (percentage of all streams in the study area)	1.2 (9%)
Temporary (percentage of Favorite Creek stream habitat in the study area)	N/A
Stream habitat alteration	Stream 10
Acres of riparian management area removal† (percentage of all riparian management areas in the study area)	130 (9%)
Behavioral change, injury, or mortality	No effects to aquatic species
New or improved human access and the potential for reduction of aquatic resources and damage to aquatic habitats:	
Lakes	No
Favorite Creek	No
Favorite Bay	No

*This alternative would affect only Class 2 streams, not Class 1 or Class 3–5 streams.

†Riparian management area designations apply only to those streams on lands managed by the U.S. Forest Service; however, for comparison between alternatives, this analysis was also applied to Airport 12a with Access 12a.

Stream habitat removal

This alternative would result in the most long-term stream habitat removal. No Class 1 stream habitat would be affected, but 1.2 acres of Class 2 stream habitat would be removed due to the culverting, rerouting, or filling of stream segments.

Because this alternative would not require a Favorite Creek bridge crossing, there would be no effects to Favorite Creek under this alternative.

Stream habitat alteration

The increased peak discharge in Stream 10 would cause channel changes and habitat alteration under this alternative. Of all the alternatives, Airport 12a with Access 12a would affect the fewest streams.

Riparian area removal

Riparian areas in the Angoon area are relatively undisturbed by humans except for those near the proposed location of Airport 12a, which would not be on lands managed by the U.S. Forest Service and would have different management objectives, and therefore not be technically "riparian *management* areas," but simply "riparian areas" (see section 4.5.2.2.2 for additional details). To allow for comparison between the alternatives, the removal of riparian areas for Airport 12a with Access 12a is analyzed using the same methods as those for the other action alternatives. The riparian areas around

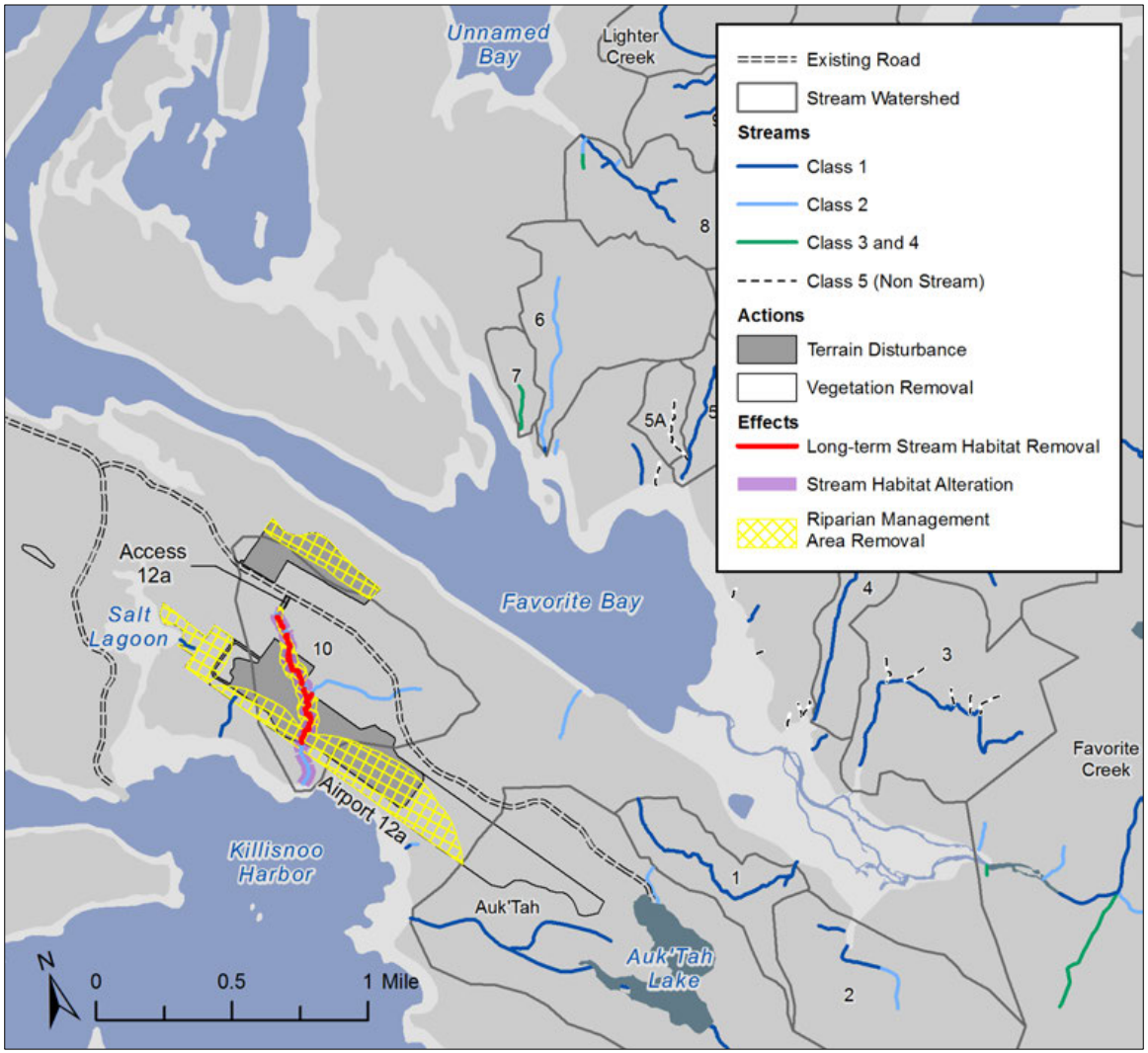


Figure AHAS9. Stream habitat removal and stream habitat alteration for Airport 12 with Access 12a.

the proposed location of Airport 12a with Access 12a are used more frequently by humans, as reflected by trails, land clearing, and pipes directing stream water to homes. Because two streams flow through the proposed Airport 12a location and because that location is within the Killisnoo Harbor marine beach riparian area, this alternative would remove 130 acres of riparian area (9% of the total riparian management area in the study area). Only Airport 3a with Access 2 would remove more riparian management area.

There would be no riparian management area removal at Favorite Creek because Airport 12a with Access 12a would not require a bridge at Favorite Creek.

Behavioral change, injury, or mortality

Because this alternative would not require a Favorite Creek bridge crossing, there would be no potential for behavioral change, injury, or mortality of aquatic species associated with the installation of a bridge.

Reduction of aquatic resources and damage to aquatic habitats

Under this alternative, there would be no potential for increased fishing or harvest of aquatic resources at the lakes northeast of Favorite Bay, at Favorite Creek, or in the Favorite Bay estuary, because no new or improved access to these areas would be created.

4.5.2.3.3. How do the effects to aquatic habitats and species, and therefore also to non-wetland waters of the U.S., compare?

The nature of the effects from the different alternatives is similar, though the extent of the effects differs. These similarities and differences are demonstrated in Table AHAS7.

Table AHAS7. Summary of effects to habitats and species

Potential effect	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Acres of stream habitat removal:						
Long term* (percentage of all streams in the study area)	None	0.3 (2%)	0.2 (1%)	0.5 (4%)	0.5† (3%)	1.2 (9%)
Temporary (percentage of Favorite Creek stream habitat in the study area)	None	0.6 (15%)	0.3 (8%)	Same as Airport 3a with Access 2	Same as Airport 3a with Access 3	None
Number of streams with habitat alteration	None	3	Same as Airport 3a with Access 2	3	Same as Airport 4 with Access 2	1
Acres of riparian management area removal‡ (percentage of riparian management stream areas in the study area)	None	148 (11%)	109 (8%)	91 (6%)	75 (5%)	130 (9%)‡
Behavioral change, injury, or mortality from pier installation in Favorite Creek:						
Permanent bridge (number of piers)	None	2	None	2	None	None
Temporary bridge (number of piers)	None	3–10	2–5	3–10	2–5	None
New or improved human access and the potential for reduction of aquatic resources and damage to aquatic habitats:						
Lakes	No	Yes	Yes	Yes	Yes	No
Favorite Creek	No	Yes	Yes	Yes	Yes	No
Favorite Bay	No	Yes	No	Yes	No	No

*Due to rounding, the acreages of fish-bearing stream habitats (Class 1 or 2 streams) are the same as the acreages of all stream classes (Class 1–5), although Class 3–5 streams are not fish-bearing stream habitats.

†The acreage of affected fish-bearing stream habitats (Class 1 or 2 streams) is 0.4 acre or 3% of all stream habitat in the study area. However, the total acreage of affected stream habitat (all stream classes), including habitat that is not fish-bearing (Class 3–5), is 0.5 acres.

‡Riparian management area designations apply to streams on lands managed by the U.S. Forest Service; to allow for comparison between alternatives this analysis was also applied to Airport 12a with Access 12a.

4.5.2.3.4. Would any effects be irreversible or irretrievable?

There would be irreversible and irretrievable effects where stream habitats or riparian management areas would be directly removed; otherwise, there would be no irreversible or irretrievable effects to aquatic habitats or species during airport construction or its ongoing operation.

4.5.2.3.5. How did the FAA determine the significance of the anticipated effects from the alternatives?

Because aquatic habitats and species involve interrelationships between water, habitats, and certain species, this resource actually falls under several federal regulations, and therefore several agencies have responsibility for managing certain aspects of this resource. For this reason, in this section the FAA used three approaches for determining significance, as follows:

- Effects to fish, wildlife, and plants, as guided by FAA orders
- Effects to non-wetland waters of the U.S., as guided by the Clean Water Act
- Effects to essential fish habitat, as guided by the National Marine Fisheries Service

Two FAA orders, *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) and *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b) identify the thresholds for significant effects on fish, wildlife, and plants. According to FAA Order 5050.4B, these thresholds would be exceeded if any of the following happened:

1. The action would adversely affect the population dynamics, sustainability, reproduction, natural or artificial mortality, or the minimum population size needed to sustain a species.
2. The action would reduce the habitat supporting plant or animal species below that needed to maintain self-sustaining populations of the species.
3. The action would adversely affect the maintenance of natural systems that support wildlife and fish habitat, and/or economically important timber, food, or fiber resources in the affected terrestrial habitats or surrounding systems.
4. The action would be inconsistent with applicable state natural resources management strategies.

In addition to guidance from FAA orders, the Clean Water Act Section 404(b)(1) guidelines for unacceptable adverse effects to waters of the U.S. (see section 4.5.2.1.2) were used to determine whether any of the anticipated effects from the alternatives were significant to non-wetland waters of the U.S.

Guidance from the National Marine Fisheries Service was used to evaluate significance of effects for essential fish habitat. All aquatic habitats in the study area that are accessible to anadromous fish (Class 1 streams and all marine areas) have been designated as essential fish habitat by the National Marine Fisheries Service (see definition in the section titled Magnuson-Stevens Fishery Conservation and Management Act and essential fish habitat in section 4.5.2.1.2). Essential fish habitat is essential to the long-term survival and health of our nation's fisheries and is defined under the Magnuson-Stevens Fishery Conservation and Management Act. Direct or indirect changes that would have a considerable effect on any of the components of essential fish habitat would be significant. Effects to essential fish habitat could also affect the fish dependent on it.

4.5.2.3.6. Would any of the alternatives have significant effects?

Because affected areas would be small compared to the aquatic study area and similar areas in Southeast Alaska, effects to aquatic habitats and species, and therefore also non-wetland waters of the U.S., would not be significant. Development of any airport and access alternative would remove or alter some stream habitats. However, the magnitude and extent of activities under the action alternatives would not reach the significance thresholds identified for aquatic habitats and associated species (see section 4.5.2.3.2) because project activities would not remove or alter existing habitat to the extent that the population dynamics, sustainability, reproduction, mortality, or minimum population size of associated species would be adversely affected. The effects would not reduce the habitat supporting species below that needed to maintain self-sustaining populations. Maintenance of natural systems would not be adversely affected. The action would be consistent with applicable state natural resources management strategies.

The project would not cause any of the unacceptable adverse effects to non-wetland waters of the U.S. using the Section 404(b)(1) guidelines identified in section 4.5.2.1.2.

Except for Airport 12a with Access 12a, all action alternatives would affect small quantities of Class 1 streams and therefore essential fish habitat. None of the action alternatives would have a significant effect on essential fish habitat because the affected areas are small and other similar areas exist throughout Southeast Alaska. As indicated in Table

AHAS8, Airport 4 with Access 2 would affect the most freshwater essential fish habitat. The alternative with the most riparian management areas removed that could indirectly affect essential fish habitat is Airport 3a with Access 2.

Table AHAS8. Summary of effects to essential fish habitat as it relates to significance determination

Potential effect	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Acres of stream habitat removal:						
Long term (percentage of all Class 1 stream habitat in the study area)	None	0.3 (3%)	0.2 (2%)	0.5 (4%)	0.4 (3%)	None
Temporary (percentage of Favorite Creek stream habitat in the study area)	None	0.6 (11%)	0.3 (8%)	Same as Airport 3a with Access 2	Same as Airport 3a with Access 3	None
Number of Class 1 streams with habitat alteration	None	2	Same as Airport 3a with Access 2	3	Same as Airport 4 with Access 2	None
Acres of riparian management area removal near Class 1 streams (percentage of riparian management areas in the study area)*	None	143 (11%)	101 (8%)	90 (7%)	71 (5%)	116 (9%)*
Behavioral change, injury, or mortality from pier installation in Favorite Creek stream channel:						
Permanent bridge (number of piers)	None	2	None	2	None	None
Temporary bridge (number of piers)	None	3–10	2–5	3–10	2–5	None
New or improved human access and the potential for reduction of aquatic resources and damage to aquatic habitats:						
Lakes	No	Yes	Yes	Yes	Yes	No
Favorite Creek	No	Yes	Yes	Yes	Yes	No
Favorite Bay	No	Yes	No	Yes	No	No

*Riparian management area designations apply to those streams on lands managed by the U.S. Forest Service; to allow for comparison between alternatives, this analysis was applied to Airport 12a with Access 12a.

4.5.2.3.7. How could the effects described above be avoided, minimized, or mitigated?

Because no significant effects are anticipated for these resources, no additional mitigation measures beyond those discussed in Chapter 7: Mitigation would be implemented under any action alternative. Chapter 7 describes best management practices that would be implemented during construction. Best management practices are relatively common activities in construction and are intended to prevent pollution, minimize environmental harm, and assure that appropriate response action is taken if unacceptable environmental effects occur. Through the use of these best management practices, effects are reduced during construction. The best management practices described in Chapter 7 were considered during effects analysis for this resource.

4.5.3. Special Status Species

This section addresses the existing conditions of special status species in the area of the airport and access alternatives. It also addresses the potential changes to those conditions from construction and operation of the proposed land-based airport.

The information in this section is summarized from two reports: 1) *Vegetation, Wetlands, and Wildlife Resources Existing Conditions Technical Report for Angoon Airport Environmental Impact Statement Angoon, Alaska* (SWCA 2011a), included as Appendix H, and 2) *Freshwater, Estuarine, and Marine Resources Technical Report for Angoon Airport Environmental Impact Statement Angoon, Alaska* (SWCA 2011b), included as Appendix I.

4.5.3.1. Background information

4.5.3.1.1. What does the term "special status species" mean?

Special status species are species protected by federal or state law or identified by state or federal agencies as requiring special consideration in project planning. Special status designations applicable to this environmental impact statement (EIS) are

- the categories of ***threatened, endangered,*** and ***candidate species*** under the Endangered Species Act;
- species designated by the U.S. Forest Service as ***management indicator species***;
- species designated by the U.S. Forest Service as ***sensitive species***;
- species identified by the State of Alaska as ***state-listed species***; and
- all ***marine mammals*** and all ***migratory birds*** as well as bald and golden eagles (*Haliaeetus leucocephalus* and *Aquila chrysaetos*).

In this section of the EIS, all special status designations are collectively referred to as

What is discussed in this section?

Terms to know

Candidate species: Plants or animals being considered for listing as an endangered or threatened species under the Endangered Species Act.

Endangered species: Species in danger of extinction throughout all or a significant portion of its range.

Management indicator species: Species used by the U.S. Forest Service to assess ecosystem health.

Marine mammals: Mammals that live in saltwater and/or derive their food from a saltwater environment.

Migratory birds: Birds that travel from one place to another at regular times, often over long distances.

Sensitive species: Native plants and animals designated by the U.S. Forest Service as needing special management.

State-listed species: According to the State of Alaska, species whose numbers have decreased to such an extent as to indicate that their continued existence is threatened.

Threatened species: Species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

"special status species," unless discussion of a specific designation is appropriate. For example, species designated as threatened and endangered under the Endangered Species Act are commonly referred to as "federally listed species," whereas species considered candidates for listing under the Endangered Species Act are referred to simply as "candidate species."

4.5.3.1.2. What laws, policies, or regulations apply to special status species in the Angoon area?

Table SSS1 lists and describes the laws, policies, and regulations that determined how the Federal Aviation Administration (FAA) assessed special status species for this EIS. These various laws and policies dictate the categories of special status species that must be considered, the types of coordination with other agencies that must occur, and the types of findings that must be made. Because four of the five action alternatives are located on lands administered by the U.S. Forest Service, the policies of that agency must also be taken into account.

Table SSS1. Special status species laws, policies, and regulations

Law, policy, or regulation	Description
Endangered Species Act of 1973 (as amended; 16 United States Code [USC] 1531 et seq.)	• Establishes the special status categories of threatened, endangered, and candidate species. • Gives the U.S. Fish and Wildlife Service and the National Marine Fisheries Service jurisdiction over federally listed and candidate species, and requires other agencies to consult with them regarding expected project effects on those species. • Allows for designation of ***critical habitat*** (see the Terms to know box below) for special status species. • Prohibits federal agencies from authorizing, funding, or carrying out actions that may 1) "jeopardize the continued existence of" listed endangered or threatened species or 2) cause "adverse modification" to designated critical habitat without a permit to do so.
Marine Mammal Protection Act of 1972 (16 USC 31)	• Protects all marine mammals from harassment, capture, or harvest (with exceptions for subsistence use by Alaska Natives), including adverse effects from federal undertakings. • The U.S. Fish and Wildlife Service and the National Marine Fisheries Service share jurisdiction over marine mammals and must be consulted if a project has the potential to affect marine mammals.
Bald and Golden Eagle Protection Act of 1940 (16 USC 668–668c)	• Prohibits the taking of bald eagles, including any eggs, nest material, or any of their parts without a federal permit. • The act defines "take" as "pursue, shoot, shoot at, wound, kill, capture, trap, collect, molest, or disturb." "Disturb" is further defined as anything that could "agitate or bother a Bald or Golden Eagle to the extent that it is likely to cause 1) injury; 2) decrease in its productivity by interfering with normal biological functions such as feeding, breeding, thermal regulation of chicks/eggs; or 3) nest abandonment" (U.S. Fish and Wildlife Service 2007).

Table SSS1. Special status species laws, policies, and regulations

Law, policy, or regulation	Description
Migratory Bird Treaty Act of 1918 (as amended 1936 and 1972; 16 USC 703–712)	• Prohibits the taking, killing, or possessing of migratory birds, unless authorized by the Secretary of Interior. In this act, "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect." • Protects more than 800 species of native migratory birds. • The list of migratory bird species protected by the Migratory Bird Treaty Act appears in 50 Code of Federal Regulations (CFR) 10.13.
U.S. Forest Service Management Policy: Sensitive Species	• Designates native plant and animal species as needing special management to 1) ensure their viability and 2) avoid reaching a point where they would become federally listed species. • Includes species considered by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service as candidates for federal listing as U.S. Forest Service sensitive species, per U.S. Forest Service Manual Alaska Region Supplement R-10 2600-2005-1, effective September 21, 2005.
U.S. Forest Service Management Policy: Management Indicator Species	• Identifies animal species as management indicator species that are used to assess overall ecosystem health. • Requires management of the habitats of management indicator species to ensure viable species populations.
Alaska Statute 16.20.190	• Gives the Alaska Department of Fish and Game the authority to determine and maintain a list of endangered species in Alaska. • The commissioner of the Alaska Department of Fish and Game determines a species to be endangered when its numbers have decreased to such an extent as to indicate that its continued existence is threatened. • Prohibits the harvest, capture, or propagation of species listed as endangered under Alaska Statute 16.20.190, except under the terms of a special permit issued by the commissioner of the Alaska Department of Fish and Game. • The state endangered species list currently consists of five species, only one of which—the humpback whale (*Megaptera novaeangliae*)—has the potential to occur in the Angoon area (Alaska Department of Fish and Game 2013b).

4.5.3.2. Existing conditions

Special status species that were observed in or that may be found in the terrestrial and aquatic study areas are discussed according to their special status category.

4.5.3.2.1. How did the FAA determine which special status species could be affected and their existing condition?

The study area used to evaluate effects to special status species that occupy or use terrestrial habitats is defined in section 4.5.1 Terrestrial Habitats and Associated Species. The study area used to evaluate special status species that occupy or use aquatic habitats is defined in section 4.5.2 Aquatic Habitats and Associated Species.

Terrestrial and aquatic habitats are shown together below in Figure SSS1. Terrestrial habitats were studied in an approximately 5,071-acre area consisting of the locations of the alternatives and a 500-meter buffer around the estimated edge of disturbance for the alternatives. The 500-meter buffer width was determined using existing information on the typical extent of proximity effects on native vegetation communities (Harper et al. 2005; Rose and Hermanutz 2004), brown bears (*Ursus arctos*) (Mattson et al. 1987), and breeding birds (Kissling and Garton 2008; Rail et al. 1997) from adjacent habitat disturbance. The aquatic study area was determined by estimating the locations and extents of project-related construction, operation, and maintenance activities with the potential to affect aquatic habitats and species. In all, 15 acres of stream habitat were surveyed in the study area. Because water flows downstream, effects to aquatic habitats are anticipated in the immediate vicinity of, and downstream of, project-related activities, but not upstream. The downstream extent of the aquatic study area is based on a conservative estimate the extent of impacts to flowing streams and expected dilution of effects in larger receiving marine water bodies. The upstream extent of the aquatic study area follows freshwater bodies upstream from marine water bodies until arriving upstream of the potential project-related activities. In some cases, this coincides with the watershed boundary, but in other watersheds such as Favorite Creek, it was not necessary to include areas of those watersheds that were upstream of the potential project-related activities.

Existing data and new field studies were used to identify which special status species are present in the terrestrial and aquatic study areas. The *Mitchell Bay Watershed Landscape Assessment* (U.S. Forest Service 2002), the Angoon Airport Master Plan background report (Alaska Department of Transportation and Public Facilities 2006), a conservation assessment of the

What is discussed in this section?

Terms to know

Critical habitat: As defined by the Endangered Species Act, critical habitat is an important geographic area that has biological elements crucial to the preservation of a special status species and that therefore needs to be protected or managed properly to maintain species viability.

coastal forests of Southeastern Alaska (Schoen and Dovichin 2007), the *Angoon Hydroelectric Project Final Environmental Impact Statement* (U.S. Forest Service 2009), and bald eagle nest locations received from the U.S. Fish and Wildlife Service (Schempf 2010) are the primary sources of existing data on the special status species that are known to, or that could, inhabit or use habitats in the study areas. The FAA conducted field studies for this EIS to determine the distributions of special status species and their potential habitats in the study areas (see Appendix H and Appendix I).

4.5.3.2.2. What are special status species in the Angoon area like?

For this EIS, special status species consist of federally listed or candidate species of wildlife, U.S. Forest Service sensitive species of plants and animals, U.S. Forest Service management indicator species of fish and wildlife, Alaska state-listed species, marine mammals, and migratory bird species known to inhabit, use, or have suitable habitat in the study areas (see Figure SSS1). Some species have been directly observed in the study areas. Suitable habitat for other species has been documented, but individuals of those species have not been observed. For the purpose of this EIS, the FAA assumes there could be effects to special status species if the species has been directly observed in the study areas or if suitable habitat exists in the study areas.

Figure SSS1 shows the distribution of terrestrial and aquatic habitats that could be affected by the action alternatives. Terrestrial habitat types are spruce-hemlock forest, bog woodland, fen, bog forest, and existing disturbed lands. Aquatic habitat types are freshwater, estuary, and marine water. The terrestrial habitat types are described in section 4.5.1. The aquatic habitat types are described in section 4.5.2.

The terrestrial and aquatic habitats are largely undisturbed by human developments and activities, and most of the area provides high-quality habitat for special status species. Field studies conducted for this EIS confirm that the habitats that would be affected by Airport 12a with Access 12a are in the same high-quality condition as the habitats that would be affected by Airports 3a and 4 and their access roads, which are located almost entirely in the Admiralty Island National Monument and Kootznoowoo Wilderness Area (referred to in this EIS as the Monument–Wilderness Area). Human access to most habitats in the study areas is currently limited, and therefore the habitats are mostly continuous and largely undisturbed, with little or no fragmentation except for existing developments and roads associated with the community of Angoon. There are approximately 48 acres of existing roadways and other disturbed lands near Angoon. In general, though, because of limited human population and limited motorized activity, there is limited existing disturbance to special status species.

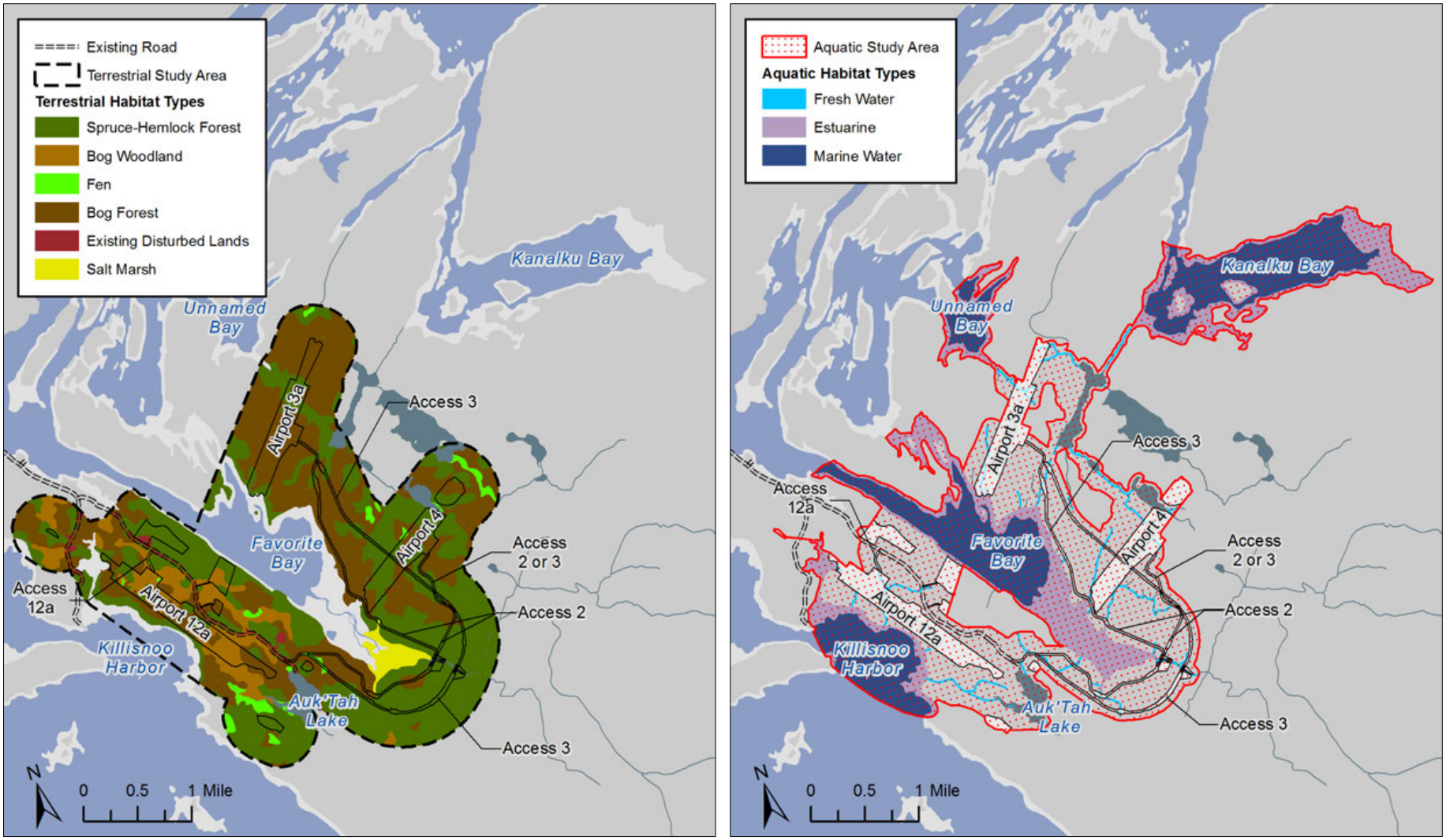


Figure SSS1. Terrestrial study area (500-meter buffer around alternatives) and aquatic study area (as defined in section 4.5.3.2.1).

Subsistence use, tourism, guided hunting and fishing, and commercial fishing likely contribute to some noise and human presence in special status species habitats and likely reduce habitat quality near Angoon or in other habitat areas where these activities occur. Small aircraft also fly near or over the area on a regular basis, exposing special status species to periodic aircraft noise. The Angoon landfill is a source of readily available food for bears, resulting in the presence of bears around Angoon despite the increased noise and presence of people. Bears regularly access the landfill despite the increased noise and presence of people in and near Angoon.

As part of preparing this EIS, the FAA consulted with the state and federal agencies with jurisdiction over special status species in the study areas to confirm the list of species that are found or that have suitable habitat in the study areas. These agencies are the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the Alaska Department of Fish and Game, and the U.S. Forest Service Admiralty Island National Monument.

Tables SSS1, SSS2, SSS3, and SSS4 list and describe the special status species evaluated in this EIS. The tables are arranged by the special status category and include information about observations of the species during field studies or the identification of suitable habitat in the study area. A few species have more than one special status designation; for example, bald eagles are designated as special status under both the Bald and Golden Eagle Protection Act and by the U.S. Forest Service as a management indicator species.

Federally listed or candidate species, and species protected by the Marine Mammal Protection Act

Federally listed species and species protected by the Marine Mammal Protection Act that are found in or that have suitable habitat in the study areas are listed and described in Table SSS2.

There are no known federally listed or candidate plant species with the potential to occur in the study areas because there is no suitable habitat for those particular plants. Additionally, no critical habitat for federally listed or candidate plant species is present in the study areas. For these reasons, federally listed and candidate plant species are not discussed in this section.

Table SSS2. Federally listed, candidate, and Marine Mammal Protection Act species

Species name; protection	Suitable, used, or occupied habitats	Description
Birds		
Kittlitz's murrelet (*Brachyramphus brevirostris*); candidate for listing (U.S. Fish and Wildlife Service 2010:69242–69243, 69285)	Marine water	Kittlitz's murrelet lives year-round in coastal Alaska. There are no known recorded observations of Kittlitz's murrelet in the study areas, and none were observed during the field studies for this EIS. Suitable habitat for this species is present in marine waters along the likely routes of barges that would be used to transport construction materials to Angoon under the action alternatives.
Yellow-billed loon (*Gavia adamsii*); candidate for listing (U.S. Fish and Wildlife Service 2010:69242, 69285)	Marine water	The yellow-billed loon migrates to the marine waters of Alaska in the winter. There are no known recorded observations of yellow-billed loon in the study areas, and none were observed during the field studies for this EIS. Suitable habitat for this species is present in marine waters along the likely routes of barges that would be used to transport construction materials to Angoon under the action alternatives.
Marine Mammals		
Dall's porpoise (*Phocoenoides dalli*); Marine Mammal Protection Act	Estuary Marine water	Dall's porpoise can be found near land but is more often found in seas more than 180 meters deep (Nowak 2003:143). This species was observed often in Chatham Strait and Favorite Bay during the field studies for this EIS.
Harbor porpoise (*Phocoena phocoena*); Marine Mammal Protection Act	Estuary Marine water	Harbor porpoises frequent coastal waters, bays, estuaries, and the mouths of large rivers. Harbor porpoises were observed multiple times in Mitchell Bay and Favorite Bay during the field studies for this EIS.
Harbor seal (*Phoca vitulina*); Marine Mammal Protection Act	Estuary Marine water	Harbor seals are found along shores and in estuarine waters and were commonly observed in Mitchell Bay and Favorite Bay during the field studies for this EIS.
Humpback whale (*Megaptera novaeangliae*); federally listed and Marine Mammal Protection Act*	Marine water	Humpback whales typically use deep marine waters. They occasionally enter Mitchell Bay and have been observed near the mouth of Favorite Bay. Suitable habitat is present in marine waters along the likely routes of barges that would be used to transport construction materials to Angoon under the action alternatives.
Northern sea otter (*Enhydra lutris kenyoni*); Marine Mammal Protection Act	Marine water	Sea otters are not usually observed around Angoon, although one sea otter was reported in Chatham Strait in August 2009 (Frederickson 2009). Suitable habitat is present along the likely routes of barges that would be used to transport construction materials to Angoon under the action alternatives.
Orca (*Orcinus orca*); Marine Mammal Protection Act	Marine water	Orcas are observed year-round in Southeast Alaska but typically use deeper waters than those in the study area. No orcas were observed during the field studies for this EIS, but suitable habitat for this species is present in marine waters along the likely routes of barges that would be used to transport construction materials to Angoon under the action alternatives.
Steller sea lion (*Eumetopias jubatus*); federally listed and Marine Mammal Protection Act	Marine water	Steller sea lions are often observed in the Angoon area, particularly in Favorite Bay, perhaps more so when herring are spawning and when salmon move into the bay in mid-July. Suitable habitat for this species is present along the likely routes of barges that would be used to transport construction materials to Angoon under the action alternatives.

U.S. Forest Service sensitive species

U.S. Forest Service sensitive species that live in, use, or have suitable habitat in the study areas are listed and described in Table SSS3.

Table SSS3. U.S. Forest Service sensitive species

Species name	Suitable, used, or occupied habitats	Description
Birds		
Black oystercatcher (*Haematopus bachmani*)	Estuary	There are no documented occurrences of this species in the study areas, and none were observed during the field studies for this EIS. Limited suitable habitat for this species is present along the shoreline of Favorite Bay.
Queen Charlotte goshawk (*Accipiter gentilis laingi*)	Spruce-hemlock Bog forest Bog woodland	This species was observed near all airport alternatives, and suitable habitat for this species is present throughout the terrestrial study area.
Plants		
Alaska rein orchid (*Piperia unalascensis*)	Various terrestrial habitat types	There are no known populations of U.S. Forest Service sensitive plant species in the terrestrial study area or on Admiralty Island. Suitable habitat differs by species; all terrestrial habitat types in the terrestrial study area provide suitable habitat for one or more sensitive plant species.
Calder's lovage (*Ligusticum calderi*)		
Henderson's checkermallow (*Sidalcea hendersonii*)		
Large yellow lady's slipper (*Cypripedium parviflorum* var. *pubescens*)		
Lesser round-leaved orchid (*Platanthera orbiculata*)		
Moonwort fern (*Botrychium yaaxudakeit*)		
Moosewort fern (*Botrychium tunux*)		
Mountain lady's slipper (*Cypripedium montanum*)		
Sessile-leaved scurvygrass (*Cochlearia sessilifolia*)		
Spatulate moonwort (*Botrychium spathulatum*)		
Spotted lady's slipper (*Cypripedium guttatum*)		
Unalaska mistmaiden (*Romanzoffia unalaschcensis*)		

Source: Goldstein et al. (2009).

U.S. Forest Service management indicator species

Management indicator species identified for the Tongass National Forest that live in, use, or have suitable habitat in the terrestrial and aquatic study areas are listed and described in Table SSS4. One additional species, the marbled murrelet (*Brachyramphus marmoratus*), was added to the management indicator species list for this project because suitable habitat is present in the study area. There have been no confirmed sightings of three of the Tongass National Forest management indicator species (black bear [*Ursus americanus*], wolf [*Canis lupus*], and mountain goat [*Oreamnos americanus*]) on Admiralty Island (MacDonald and Cook 2007: 71, 76, and 104), and so these species are not addressed in this EIS.

Table SSS4. U.S. Forest Service management indicator species

Species name	Suitable, used, or occupied habitats	Description
Birds		
Bald eagle (*Haliaeetus leucocephalus*)	Spruce-hemlock Bog forest Bog woodland Freshwater Estuary Marine water	Admiralty Island is known to have a very high population of nesting eagles (King et al. 1972; Stenhouse 2007). Several bald eagle nests have been documented near the proposed locations of Airport 4 and Airport 12a, and suitable habitat exists throughout the terrestrial study area. See Figure SSS2 for locations of known nests.
Marbled murrelet (*Brachyramphus marmoratus*)	Spruce-hemlock Marine water	There are no documented occurrences of this species in the study areas, and none were observed during the field studies for this EIS. Suitable nesting and foraging habitat is present near all airport alternatives.
Vancouver Canada goose (*Branta Canadensis fulva*)	Spruce-hemlock Bog forest Bog woodland Freshwater	Vancouver Canada goose was observed multiple times in the study areas during field surveys for this EIS, and suitable nesting and foraging habitat is present near all airport alternatives.

Table SSS4. U.S. Forest Service management indicator species

Species name	Suitable, used, or occupied habitats	Description
Cavity-nesting birds		
Brown creeper (*Certhia americana*)	Spruce-hemlock	Three brown creepers were detected during the breeding bird surveys conducted for this EIS, and suitable habitat exists near all airport alternatives.
Hairy woodpecker (*Picoides villosus*)	Spruce-hemlock	Hairy woodpeckers are an uncommon species in Southeast Alaska. One hairy woodpecker was detected during the breeding bird surveys conducted for this EIS, and suitable habitat exists near all airport alternatives.
Red-breasted sapsucker (*Sphyrapicus ruber*)	Spruce-hemlock Bog forest Bog woodland	Twelve red-breasted sapsuckers were detected during the breeding bird surveys for this EIS, and suitable habitat exists near all airport alternatives.
Terrestrial mammals		
Brown bear (*Ursus arctos*)	All terrestrial habitat types Freshwater Estuary	Brown bear density on Admiralty Island is approximately one bear per square mile (Schoen and Beier 1990), making it one of the most densely populated brown bear areas in the world. During the field surveys for this EIS, brown bears and brown bear sign were observed throughout the terrestrial study area. During field surveys in late May, bears were seen almost daily in tidal flats at the mouth of Favorite Creek foraging on vegetation. When salmon runs begin in mid-July, Favorite Creek becomes an important food source for brown bears.
Pacific marten (*Martes caurina*)	Spruce-hemlock	During field studies for this EIS, one live marten and one carcass (roadkill) were observed. Suitable habitat is present in the terrestrial study area.
Red squirrel (*Tamiasciurus hudsonicus*)	Spruce-hemlock	Red squirrels were observed throughout the terrestrial study area during field studies for this EIS but were most common along roadways.
River otter (*Lutra canadensis*)	Spruce-hemlock Freshwater Estuary	River otters are common on Admiralty Island. During the field studies for this EIS, multiple individuals were observed from the shore and from boats in and around Favorite Bay. The river otter hunts on land, in freshwater, and in estuaries and ocean water. Suitable habitat exists throughout the study areas.
Sitka black-tailed deer (*Odocoileus hemionus* var. *sitkensis*)	Spruce-hemlock Bog forest Bog woodland	Sitka black-tailed deer are found throughout Admiralty Island. Most of the forest habitat types in the terrestrial study area constitute suitable wintering habitat. Based on 2009 observations, it is likely that a resident group of deer use these habitats year-round.

Table SSS4. U.S. Forest Service management indicator species

Species name	Suitable, used, or occupied habitats	Description
Fish		
Coho salmon (*Oncorhynchus kisutch*)	Freshwater Estuary Marine water	Favorite Creek contains spawning and rearing habitat for coho salmon, and other freshwater streams in the area contain rearing habitat for juvenile coho. The lake complex that drains to Kanalku Bay also supports coho salmon. Coho salmon use the estuary in the aquatic study area as rearing habitat.
Cutthroat trout (*Oncorhynchus clarkii*)	Freshwater Estuary Marine water	Favorite Creek contains spawning and rearing habitat for cutthroat trout, and other freshwater streams in the area contain rearing habitat for juvenile cutthroat. The lake complex that drains to Kanalku Bay also supports cutthroat trout. Cutthroat trout use the estuary in the aquatic study area as rearing habitat.
Dolly Varden char (*Salvelinus malma*)	Freshwater Estuary Marine water	Favorite Creek contains spawning and rearing habitat for Dolly Varden char, and other freshwater streams in the area contain rearing habitat for juvenile Dolly Varden char. The lake complex that drains to Kanalku Bay also supports Dolly Varden char. Dolly Varden char use the estuary in the aquatic study area as rearing habitat.
Pink salmon (*Oncorhynchus gorbuscha*)	Freshwater Estuary Marine water	Favorite Creek contains spawning and rearing habitat for pink salmon, and other freshwater streams in the aquatic study area contain rearing habitat for juvenile pink salmon. Pink salmon use the estuary in the aquatic study area as rearing habitat.

Source: U.S. Forest Service (2008b).

Among the U.S. Forest Service management indicator species, brown bears and bald eagles receive additional consideration on lands managed by the U.S. Forest Service on Admiralty Island. The Monument–Wilderness Area was established, in part, for the express purpose of providing opportunities for the study and protection of brown bear and eagle populations on Admiralty Island. Eagle nest trees and brown bear use-areas were documented by the FAA in the study areas during field surveys for the EIS. Additional bald eagle nest locations were received from U.S. Fish and Wildlife Service (Schempf 2010). These use-areas, relative to the action alternatives, are shown in Figure SSS2.

Bald and golden eagles

Because bald eagles are also protected as a U.S. Forest Service management indicator species, they are discussed above in that category (see Table SSS4). The golden eagle is described in Table SSS5. The golden eagle has a limited distribution in Southeast Alaska. Because golden eagles require large open spaces to hunt, and because the Angoon area is heavily forested, golden eagles are not likely to use the terrestrial study area. Therefore, this species is not carried forward in the effects analysis.

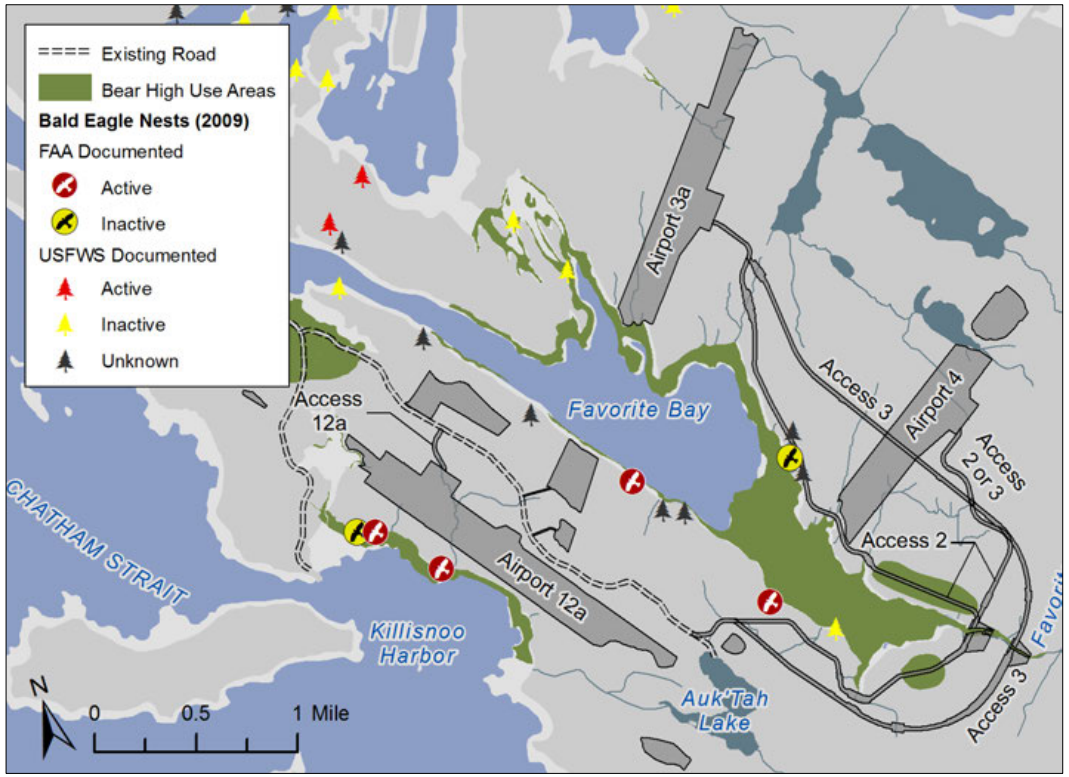


Figure SSS2. Bald eagle nests and bear use-areas near the proposed locations of airport and access alternatives.

Table SSS5. Bald and Golden Eagle Protection Act species

Species name	Habitats used or occupied	Description
Golden eagle (*Aquila chrysaetos*)	Bog woodland Fen	The golden eagle is common in interior Alaska and has a limited distribution in Southeast Alaska, although they occasionally winter in Southeast Alaska.

Migratory birds

There are approximately 100 bird species that migrate from the lower 48 states and from Central and South America to nesting, breeding, and rearing grounds in Alaska. Most of these birds use the Pacific flyway, which crosses over the Angoon area, to interior or northern Alaska and only pass through Southeast Alaska on their way to the breeding grounds. However, many species are also known to breed in the study areas. The U.S. Forest Service sensitive bird species and U.S. Forest Service management indicator species bird species in the study areas are generally non-migratory in Southeast Alaska. The exception is red-breasted sapsucker, which migrates south in the winter. Approximately three dozen species of migratory birds were documented during surveys conducted for this EIS. A list of these species, along with information regarding habitats used by these species, is included in Appendix E of the vegetation, wetlands and wildlife technical report for this EIS (Appendix H). With the exception of sooty grouse (*Dendragapus fuliginosus*), all bird species listed in Appendix E of the technical report are protected by the Migratory Bird Treaty Act.

4.5.3.3. Project effects

For all action alternatives, construction, operation, and maintenance of an airport and access road could affect individual plants and animals representing special status species. These effects would be caused by the removal or alteration of terrestrial and aquatic habitats and by things like vehicle traffic and lighting used during construction and airport operations. Although the nature of effects on special status species would be the same for all action alternatives, the extent of the effects would differ. The sections below explain the methods that the FAA used to analyze these effects, the types of actions causing the effects, the effects themselves, and the similarities and differences in the magnitude and extent of effects across the alternatives.

4.5.3.3.1. How did the FAA determine the effects of the alternatives on special status species?

This analysis of effects on special status species uses the calculations and findings from the two previous biological resources sections: section 4.5.1.3 in Terrestrial Habitats and Associated Species and section 4.5.2.3 in Aquatic Habitats and Associated Species. A brief summary of the actions that could cause effects to terrestrial and aquatic habitats and species, the nature of those effects, and the methods used in sections 4.5.1.3 and 4.5.2.3 to analyze the effects is provided here; readers who would like more detail are referred to those sections.

The actions that could affect habitats and species

The construction actions (vegetation removal, terrain disturbance, paving the runway and road, and possible extraction of construction materials from an on-island materials source) would directly affect both terrestrial and aquatic habitats and their associated species. Where streams would intersect the runway or road, ***culverting***, rerouting, or filling of streams would be necessary. Four of the five action alternatives require bridge construction across Favorite Creek, which involves pile driving to install bridge piers in Favorite Creek and a temporary use area for up to three construction seasons. Some construction could occur during dark hours, requiring illumination in the construction areas. Actions related to airport operation and maintenance would consist of vehicle traffic along the new road, use of navigation lights on the runway, maintenance of vegetation clearing, and maintenance of the road and runway.

What is discussed in this section?

Terms to know

Culverting: The creation of a drain or pipe that allows water to flow under a road, runway, or similar structure.

Summary of direct effects to habitats and species

With few exceptions, such as eagle nest locations or bear use-areas, assessing effects to individual animals or plants is not possible. In other words, determining the specific number of individuals affected by any given alternative is neither feasible nor likely to be accurate. For that reason, in this EIS, the FAA uses acres of habitat removed or altered as a relative measure of the direct effects on the groups of species that share each type of habitat.

Direct effects on **terrestrial habitats and species** would be the removal and alteration of portions of the terrestrial habitats, which would make the locations unfit for the plant and animal species that occupy or use that habitat. The calculated acreage of terrestrial habitat removal consists of locations where runways, roads, and other terrain disturbance and vegetation clearing overlap terrestrial habitats. The calculated acreage of terrestrial habitat alteration consists of the temporary use area for bridge construction at Favorite Creek, where the character of the habitat would be changed but the habitat would not necessarily be removed.

Direct effects on **aquatic habitats and species** would be the removal and alteration of portions of stream habitat, which would make the locations unfit for the plant and animal species that occupy or use that habitat. The calculated acreage of stream habitat removal consists of locations where runways, roads, and other types of disturbance intersect streams, requiring culverting, rerouting, or filling of the stream or, in the case of Favorite Creek, pier installation in the stream channel to support the bridge. For stream habitat alteration, the effects are described as the locations where surface runoff would increase, resulting in potential changes to the shape of the stream channel and the way water flows through it (see sections 4.5.2.3.2 in Aquatic Habitats and Associated Species and 4.6.3.3 in Floodplains, Stream Geomorphology, and Hydrology for more detail on stream channel changes); however, for the purposes of this EIS analysis, no acreages of stream habitat alteration are calculated.

Summary of indirect effects to habitats and species

Indirect effects on **both terrestrial and aquatic habitats and species** could include construction lighting either attracting or disrupting wildlife. Construction and operation noise could disrupt natural behaviors and use of certain locations, and pile driving would generate sound in the water that could result in behavioral change, injury, or mortality to fish. The presence of a new road could result in an increase in collisions between animals and vehicles. Improved human access to previously remote areas could alter natural behaviors and lead to increased mortality from hunting and recreational activities. Although unlikely, collisions between marine mammals and barges transporting construction materials to and from Angoon could occur.

Effects analysis methods specific to special status species

This section is organized by special status designation (to parallel the existing conditions sections above). For each group of species with a certain special status designation, acreages of direct effect and descriptions of indirect effects are provided.

Terms to know

Habitat value: The capacity of a habitat to support the life requirements of a species.

For terrestrial special status species, the direct effects of habitat removal and habitat alteration are combined into one overarching direct affect called ***habitat value lost***, because the affected locations would no longer provide suitable habitat for special status species. For aquatic special status species, effects are also discussed in terms of habitat value lost; however, for aquatic species, this consists only of long-term fish-bearing stream habitat removal. Temporary stream habitat removal (further discussed in section 4.5.2.3.2 in Aquatic Habitats and Associated Species) is not included because upon completion of construction, those affected aquatic habitats would likely return to their original condition. Stream habitat alteration is not included because it would be speculative to include an acreage of stream habitat altered. The stream habitat alteration analysis is further discussed and mapped in section 4.5.2.3.2.

The effect of habitat value lost is evaluated in the context of the viability of special status species populations at the local scale of Admiralty Island and at the regional scale of Southeast Alaska. Indirect effects to special status species are summarized from section 4.5.1.3 in Terrestrial Habitats and Associated Species and from section 4.5.2.3 in Aquatic Habitats and Associated Species.

The analyses of direct and indirect effects to special status species are based on the following assumptions:

- Because the area is largely undisturbed by human developments, and because the habitats are mostly continuous and intact, all acres of a given habitat type are considered of equal quality. Existing disturbed lands are not considered to provide important habitat for terrestrial species and are not included.
- Because special status species that use bog and fen habitats use more than one habitat type, the loss of bog and fen habitats would not disproportionately affect species using these habitats.
- Roadkill and refuse along roads could attract certain special status species—particularly bald eagles and red squirrels—to the roadway, increasing the likelihood of vehicle strikes to those special status species. The new miles of access road are used in this analysis as a proxy for this effect.

- Improved human access to areas as a result of new roads would be limited to within 0.5 mile of the airport parking area or access road because of the area's dense vegetation, fallen trees, and steep-sided drainages. The new miles of access road are used in this analysis to discuss the magnitude of this effect.

4.5.3.3.2. How did the FAA determine the significance of the anticipated effects from the alternatives?

Two FAA Orders, *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) and *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b), identify the thresholds for significant effects on species differently, based on whether a fish, wildlife, and plants species is federally listed or not. According to FAA Order 5050.4B, the significance threshold for federally listed species would be exceeded when the U.S. Fish and Wildlife Service or National Marine Fisheries Service "determines a proposed action would likely jeopardize a species' continued existence or destroy or modify a species' critical habitat."

According to FAA Order 5050.4B, the significance threshold for species that are not federally listed would be exceeded if any of the following happened:

1. The action would adversely affect the population dynamics, sustainability, reproduction, natural or artificial mortality, or the minimum population size needed to sustain a species.
2. The action would reduce the habitat supporting plant or animal species below that needed to maintain self-sustaining populations of the species.
3. The action would adversely affect the maintenance of natural systems that support wildlife and fish habitat, and/or economically important timber, food, or fiber resources in the affected terrestrial habitats or surrounding systems.
4. The action would be inconsistent with applicable state natural resources management strategies.

The significance of effects on special status species is assessed according to this guidance in section 4.5.3.3.6 below.

4.5.3.3.3. How would each alternative affect special status species?

No action alternative

Under the no action alternative, the airport and associated access road and facilities would not be constructed and extraction of on-island materials related to the airport would not occur. Effects to special status species and their habitats would be of the type and extent currently occurring. Currently, there are approximately 48 acres of existing roadways and other existing disturbed lands near Angoon. Existing effects to special status species and their habitats from human activities are from the use and maintenance of these roadways and disturbed lands and in surrounding woodlands and shorelines for subsistence and recreational activities. Vehicle access to most terrestrial and aquatic habitats in the study areas is currently limited, and therefore the habitats are mostly continuous and undisturbed with little or no fragmentation, with the exception of developments and roadways associated with the community of Angoon. Terrestrial and aquatic habitats on private and city lands would continue to be altered over time as vegetation is cleared to accommodate new residences, public facilities, and other structures. Indirect effects on terrestrial habitat and associated species would continue to occur, including aircraft noise from the Angoon Seaplane Base and other aircraft flyovers; noise from the ferry system and other vessels, such as the fuel barge; and artificial light from residential, street, and commercial lights.

Airport 3a with Access 2 (proposed action) or Access 3

Terrestrial habitat value lost as a result of Airport 3a with Access 2 would total 316 acres. Terrestrial habitat value lost under Airport 3a with Access 3 would total 321 acres.

Stream habitat value lost under Airport 3a with Access 2 would total 0.3 acre, and under Airport 3a with Access 3 would total 0.2 acre. Under Access 2 the proposed bridge crossing of Favorite Creek would result in 316 square feet (0.01 acre) of stream habitat value lost due to permanent bridge piers that would be installed on the edges of the Favorite Creek stream channel. Under Access 3 this would not occur because no permanent bridge support piers would be installed for this bridge crossing.

See Figure SSS3 for the acreages directly affected per habitat type.

As discussed in further detail below, some individuals could also be indirectly affected by such things as noise, light, improved human access, or barge or vehicle traffic. Effects to species are described per special status category following Figure SSS3.

Airport 3a with Access 2 Effects

	Spruce-Hemlock	Bog Forest	Bog Woodland	Fen	Salt Marsh	Streams*
Acres habitat value lost	120	179	15	1	1	0.3
% habitat value lost	5%	9%	4%	1%	1%	2%

*For aquatic habitats, habitat value lost consists of only stream habitat removal; it does not include stream habitat alteration.

Airport 3a with Access 3 Effects

	Spruce-Hemlock	Bog Forest	Bog Woodland	Fen	Salt Marsh	Streams*
Acres habitat value lost	142	161	15	3	0	0.2
% habitat value lost	6%	8%	4%	3%	0%	1%

*For aquatic habitats, habitat value lost consists of only stream habitat removal; it does not include stream habitat alteration.

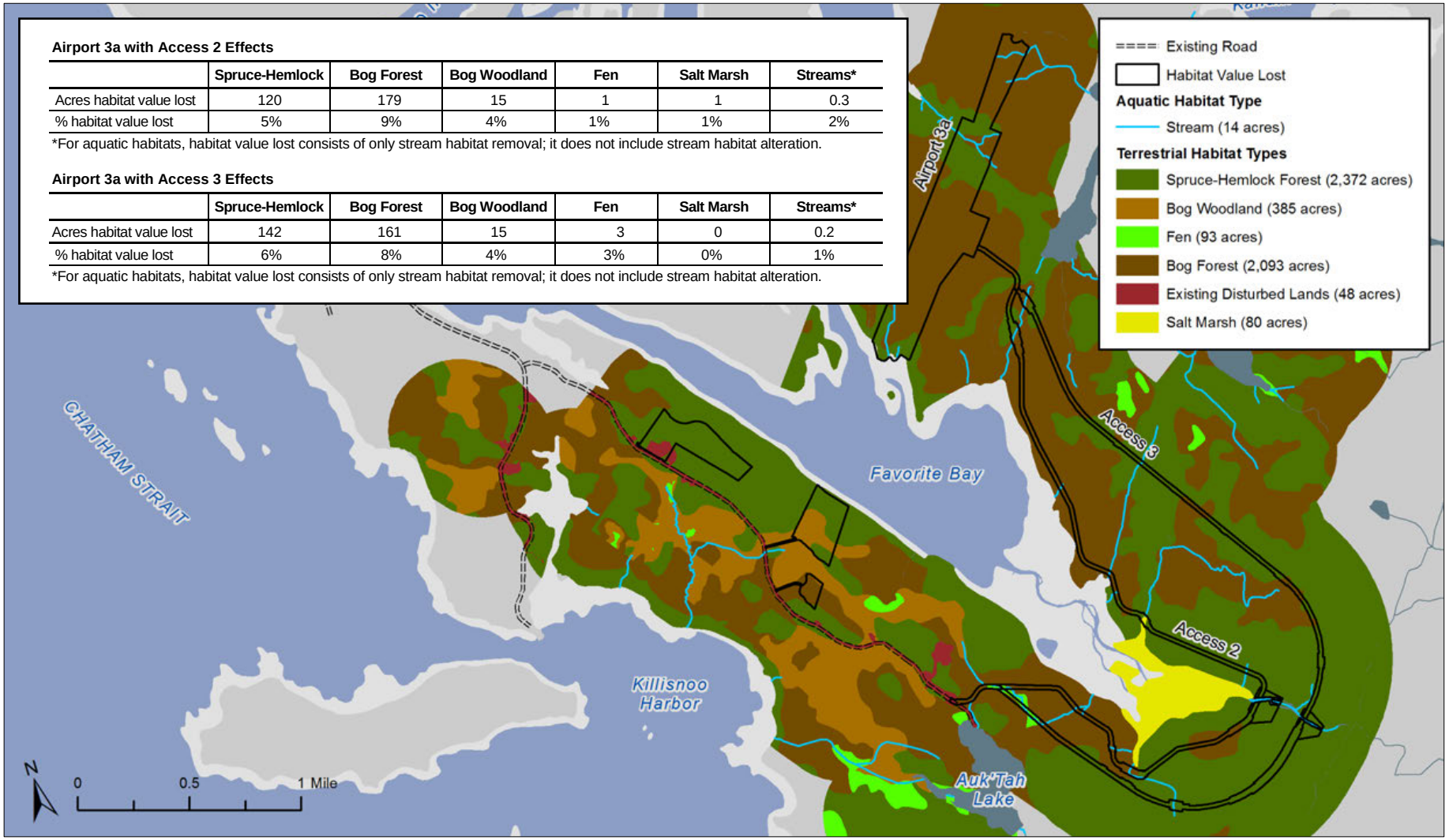


Figure SSS3. Acres of terrestrial and stream habitat value lost for Airport 3a with Access 2 or Access 3.

Effects to federally listed species, candidate species, and species protected under the Marine Mammal Protection Act

Airport 3a with either access alternative would not result in any direct long-term effects to federally listed species, candidate species, or species protected under the Marine Mammal Protection Act. These species use estuaries or marine waters, of which 1 acre of habitat value would be lost under Airport 3a with Access 2—that is, 1% of the salt marsh, or estuarine habitat, in the study area. There would be no estuarine or marine habitat value lost under Airport 3a with Access 3.

The increase in lighting during construction and operation of the airport is not anticipated to affect marine mammals. During construction the active work areas near estuaries or marine waters (including the barge unloading area) could be lit and could temporarily attract individual marine mammals to those areas. However, marine mammals often avoid areas with human activity. Also it is unlikely that marine mammals would be affected because these periods of increased lighting would likely be of short duration, and the activities would be upland and adjacent to, but not located in, estuarine or marine habitats. The light would be attenuated (lessened) underwater. The barge itself would be located in marine habitat during unloading, but because it would be stationary, no effects to marine mammals would be expected. During operation, runway navigation lights would not be near estuaries or marine waters, and there would be no change to the light environment in these habitats.

Operation of the airport would result in periodically increased noise levels in estuaries and marine waters due to airplane flights in and out of the airport. Noise from aircraft would be muted underwater because of the sound-dampening effect of water, and species that remain submerged, such as marine mammals, would not be affected.

Barging of construction materials and equipment to Angoon could affect individual marine mammals through increased barge traffic and the resulting increase in potential for collisions between barges and individual animals. Under either of the Airport 3a alternatives, there would be up to 45 additional barge trips in and out of Angoon during construction. The potential for ship strikes on marine mammals would be minimized or avoided by adhering to a general marine mammal "Code of Conduct," including vigilantly scanning the water's surface and remaining at least 100 yards from any sighted marine mammals (Neilson et al. 2012). The potential for collisions between barges and marine mammals is a temporary effect that would cease at the end of construction. The number of ship strikes to marine mammals as a result of these alternatives would be very low and is not expected to affect marine mammal populations in Southeast Alaska.

Effects to U.S. Forest Service sensitive species

The anticipated direct effects from Airport 3a with either access alternative to U.S. Forest Service sensitive species are summarized in Table SSS6.

Table SSS6. Acres of long-term terrestrial habitat value lost under Airport 3a with Access 2 or Access 3

Species common name	Long-term direct effects habitat value lost Airport 3a with Access 2 (acres)	Percentage of suitable habitat in the study area	Long-term direct effects habitat value lost Airport 3a with Access 3 (acres)	Percentage of suitable habitat in the study area
Black oystercatcher	1	<1%; limited suitable habitat present along the shoreline of Favorite Bay	None	Not calculated; limited suitable habitat present along the shoreline of Favorite Bay
Queen Charlotte goshawk	314	6%	318	7%
Sensitive plants	316	6%	321	6%

Under Airport 3a with Access 2 there would be 1 acre of salt marsh or estuarine habitat value lost that provides suitable habitat for black oystercatcher. Under Airport 3a with Access 3 there would be no estuarine habitat value lost. Airport 3a with either access alternative would not result in any direct long-term effects to this species.

Queen Charlotte goshawk calls were heard near the proposed locations of Airport 3a, Access 2, and Access 3 in response to acoustic surveys conducted for this EIS (Figure SSS4). Nest locations were not observed. Based on the locations of the calls, however, it is likely that two or three active nests are located near Access 2 and 3. Long-term direct effects to goshawk habitat would occur due to habitat value lost for three forested habitats (spruce-hemlock, bog forest, and bog woodland) (see Table SSS6). No known nest trees would be removed. The loss in habitat value could affect individual goshawks using these habitats for foraging, breeding, or cover. However, the affected acreage of forested habitats would be relatively small when compared to the 4,850 acres of these habitats in the terrestrial study area (see Figure SSS1). Furthermore, spruce-hemlock forest and bog forest are the dominant habitat types in the Angoon area and provide abundant suitable habitat for this species. Any individual goshawks displaced by forested habitat value lost would be expected to move into adjacent suitable habitat. Therefore, the direct long-term effects to spruce-hemlock forest, bog forest, and bog woodland under Airport 3a with either access alternative would not affect the Southeast Alaska population of Queen Charlotte goshawks.

Goshawks could be indirectly affected by noise resulting from airport construction and operation and from increased human access resulting from construction of the access road. A temporary increase in the amount of noise and human activity would occur in the area until the completion of construction. Operation of the airport would result in periodically increased noise levels associated with airplane flights in and out of the airport and vehicle traffic in and out of airport facilities. The increase in noise could displace individual goshawks from suitable habitat near the airport or either access alternative. A literature review of raptor responses to aircraft noise conducted cooperatively by the U.S. Fish and Wildlife Service and the U.S. Air Force (Manci et al. 1988) found that most raptors did not show a negative response to aircraft overflights. In another study, long-term reproductive success of eight species of raptors was not affected by aircraft overflights (Ellis et al. 1991). Based on the results of these studies and due to the abundance of suitable habitat in and around the terrestrial study area, no significant effects to the Southeast Alaska population of Queen Charlotte goshawks would be expected as a result of increases in noise from Airport 3a with either access alternative.

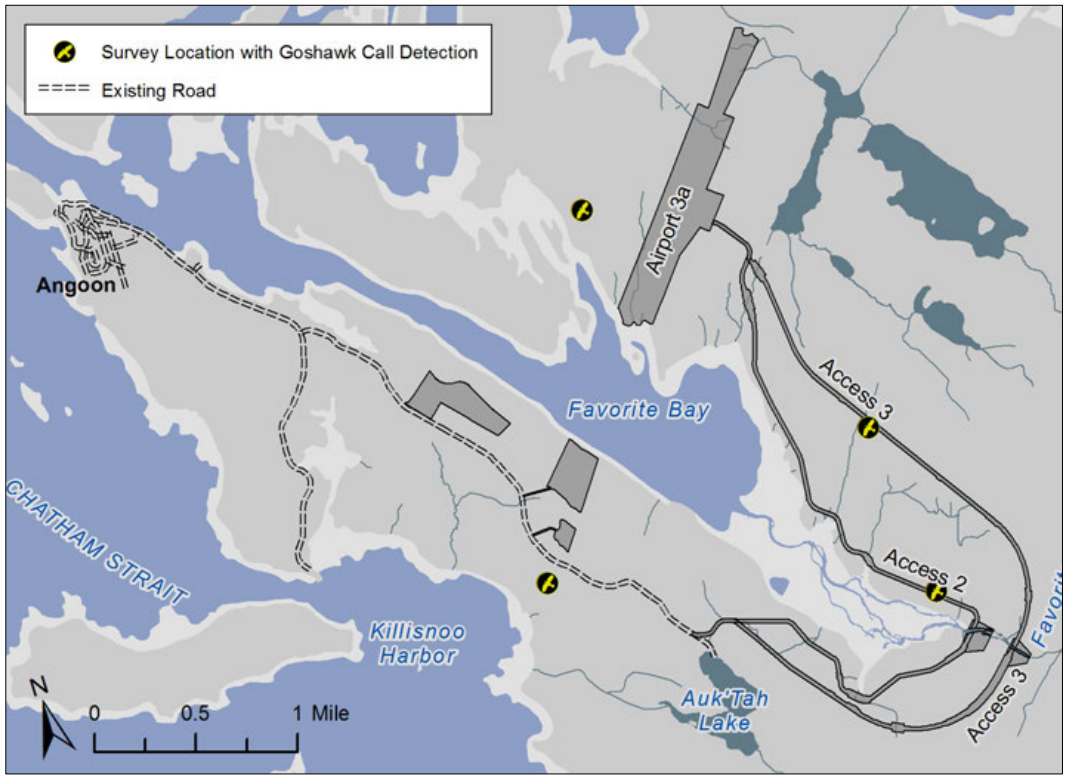


Figure SSS4. Locations of Queen Charlotte goshawk calls heard near proposed location of Airport 3a with Access 2 or Access 3.

During construction, there could be brief periods of lighting during dark hours. This could attract goshawk prey species and therefore individual goshawks to the staging area and active work areas during those periods. There is risk of injury to these individuals from vehicle strikes during these times, but this effect would cease at the completion of construction. Operation of the airport would also result in periodic increases in light from runway navigation lights; however, due to the brief time that runway lights would be in use, individual goshawks would not be displaced.

There are no known populations of U.S. Forest Service sensitive plant species on Admiralty Island, and no sensitive plant species were documented during field surveys for the EIS. Suitable habitat is present, however, in spruce-hemlock forest, bog forest, bog woodland, and fen habitats in the study area. Construction and operation of Airport 3a with Access 2 or Access 3 would result in the long-term habitat value loss of either 316 acres or 321 acres (depending on the access alternative) out of the 5,023 acres of these suitable habitats in the terrestrial study area. If U.S. Forest Service sensitive plant species were present in these suitable habitats, loss of habitat value would affect individuals of these species. However, due to the abundance of suitable habitats in the terrestrial study area coupled with spruce-hemlock forest and bog forest being the dominant habitat types in the Angoon area, the suitable habitat value lost under Airport 3a with either access alternative is not likely to affect sensitive plant species to an extent that would cause a trend toward federal listing or a loss of viability at the Admiralty Island population level.

Effects to U.S. Forest Service management indicator species

The anticipated direct effects from Airport 3a with either access alternative to U.S. Forest Service management indicator species are summarized in Table SSS7.

Table SSS7. Acres of long-term terrestrial and aquatic habitat value lost under Airport 3a with Access 2 or Access 3

U.S. Forest Service management indicator species	Long-term direct effects habitat value lost Airport 3a with Access 2 (acres)	Percentage of suitable habitat in the study area	Long-term direct effects habitat value lost Airport 3a with Access 3 (acres)	Percentage of suitable habitat in the study area
Bald eagle	320	6%	323	6%
Brown bear	321	6%	326	6%
Cavity-nesting birds	121	5%	142	6%
Coho salmon	0.3 (stream)	3%	0.2 (stream)	2%
Cutthroat trout	0.3 (stream)	2%	0.2 (stream)	1%
Dolly Varden char	0.3 (stream)	2%	0.2 (stream)	1%
Marbled murrelet	121	5%	142	6%
Pacific marten	121	5%	142	6%
Pink salmon	0.3 (stream)	3%	0.2 (stream)	2%
Red squirrel	123.4	5%	147	6%
River otter	125	5%	142	6%
Sitka black-tailed deer	314	6%	318	7%
Vancouver Canada goose	314	6%	318	7%

U.S. Forest Service management indicator species documented in forested habitats in the terrestrial study area consist of bald eagle, brown bear, Pacific marten, red squirrel, river otter, Sitka-black tailed deer, and the cavity-nesting birds brown creeper, hairy woodpecker, and red-breasted sapsucker. Bald eagle, brown bear, and river otter also use freshwater and estuarine habitats for foraging.

Bald eagle and brown bear use-areas near Airport 3a with Access 2 or Access 3 are shown in Figure SSS5. Vegetation clearing adjacent to either access alternative and construction of the bridge over Favorite Creek could result in temporary displacement of brown bears from foraging areas along Favorite Creek; however, bears would be expected to relocate to feeding areas downstream of the bridge construction footprint until work is complete. No long-term effects to brown bears from bridge construction would be expected.

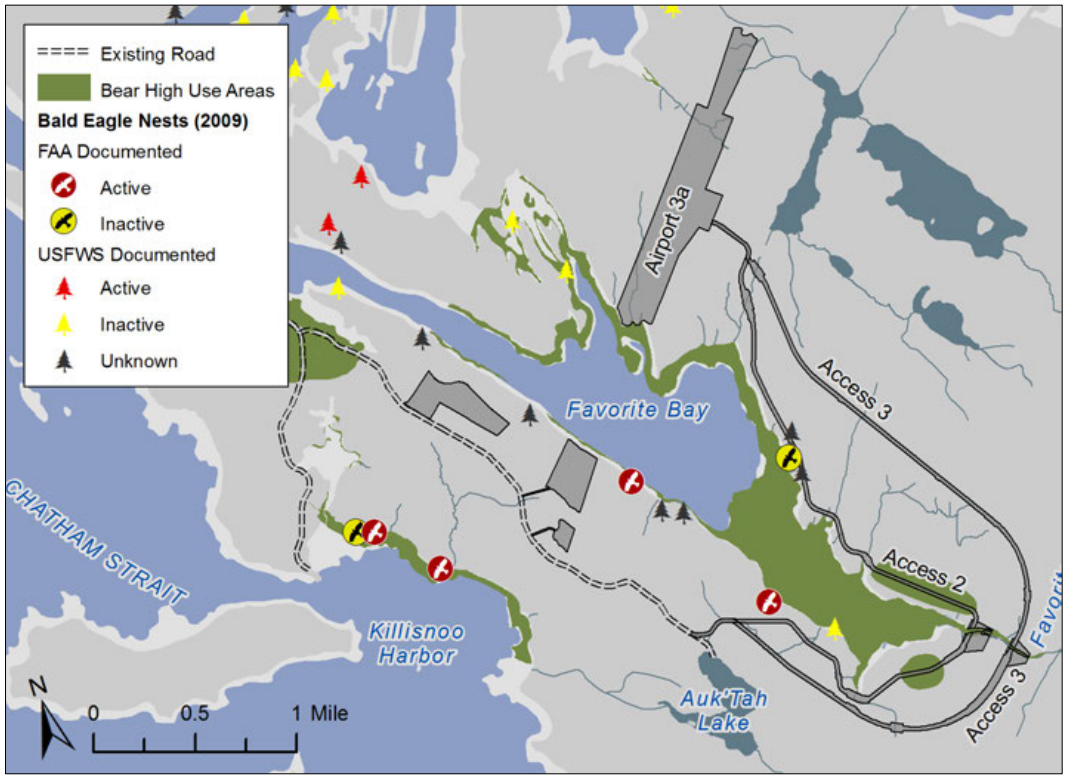


Figure SSS5. Bald eagle nests and bear use-areas near the proposed location of Airport 3a with Access 2 or Access 3.

Under Airport 3a, long-term direct effects to terrestrial habitats used by brown bears would occur due to habitat value loss of either 321 acres or 326 acres (depending on the access alternative) of all terrestrial habitat types.

No bald eagle nest trees would be removed under Airport 3a with Access 2 or Access 3. The acreage of habitats used by eagles that would be affected by Airport 3a would be either 320 acres or 323 acres (depending on the access alternative), which is up to 6% of the total 4,978 acres of forested habitats, salt marsh, and existing disturbed lands in the terrestrial study area. Spruce-hemlock and bog forests are the dominant habitat types in the Angoon area, and individuals using forested habitats affected by the project could relocate to forested habitats outside the affected area. For these reasons, the direct long-term effects under Airport 3a with Access 2 or Access 3 would not affect the Admiralty Island populations of bald eagles and brown bears.

Terms to know

Anadromous: A term describing fish that spawn in freshwater but live most of their adult lives in saltwater.

The loss of forested habitats that would affect bald eagles and brown bears would also affect other U.S. Forest Service management indicator species, specifically Pacific marten, red squirrel, river otter, Sitka-black tailed deer, cavity-nesting birds, and Vancouver Canada goose. The large amount of identical forested habitat types remaining in the terrestrial study area and in the surrounding area would provide ample habitat for any individual animals displaced

in the long term by the airport and access road. As such, the populations of these management indicator species in both the terrestrial study area and on Admiralty Island are not expected to be jeopardized by Airport 3a with Access 2 or Access 3.

Marine water habitat provides suitable foraging habitat for marbled murrelet; however, this habitat type would not be affected under Airport 3a with Access 2 or Access 3. Spruce-hemlock forest provides suitable nesting habitat for this species. If marbled murrelet were present, individuals could be affected due to suitable nesting habitat value lost. However, due to the abundance of suitable habitat in the study area, the direct long-term effects to spruce-hemlock forest under Airport 3a with Access 2 or Access 3 would not affect the Southeast Alaska population of marbled murrelets.

Favorite Creek and other freshwater streams in the aquatic study area provide habitat for coho salmon, cutthroat trout, Dolly Varden char, and pink salmon. As discussed in section 4.5.2, aquatic habitats that are accessible to ***anadromous*** fish are a subset of the fish-bearing stream habitats in the study area. Further, coho and pink salmon use a subset of the habitat used by cutthroat trout and Dolly Varden char. Due to rounding up of numbers from the effects analyses, the acreage of stream habitat value lost would be the same for all of these species. The anadromous habitat subset (coho and pink salmon stream habitat) is not differentiable. Airport 3a with Access 2 would have 0.3 acre of stream habitat value lost; Airport 3a with Access 3 would have 0.2 acre lost. Included in the Access 2 acreage are 316 square feet of Favorite Creek habitat value lost due to the permanent bridge piers that would be placed in the stream channel. Access 3 would not require permanent bridge piers. This EIS assumes that the function of any culverted or rerouted stream segments would be limited to fish passage only, and these streams would no longer be suitable for their other habitat functions for fish, including hatching of eggs and rearing of young. This loss of stream habitat value could affect individuals; however, it would not affect Angoon area populations of coho salmon, cutthroat trout, Dolly Varden char, and pink salmon.

U.S. Forest Service management indicator species could be attracted by construction lighting used at staging areas and active work areas. During construction of the temporary and permanent bridges across Favorite Creek under Airport 3a with either access alternative, the temporary use area could be a lit, active work area during dark hours. Because construction activities during dark hours are expected to be of short duration, this potential wildlife attractant would cease at the end of those brief construction periods.

Indirect effects to U.S. Forest Service management indicator species could occur from noise resulting from airport construction and operation. A temporary increase in the amount of noise in the environment would occur until the completion of construction. Operation of the airport beyond construction would result in periodically increased noise levels associated with airplane flights in and out of the airport. The increase in noise could temporarily displace individual bald eagles from suitable habitat near Access 2 and Access 3; however, any displaced individuals would be expected to move into adjacent suitable habitat. As described for the goshawk, several studies on the effects of aircraft overflights on nesting raptors conclude that long-term reproductive success of raptors is not affected by aircraft noise. Because of the large bald eagle population on Admiralty Island and the abundance of suitable eagle nesting habitat in and around the terrestrial study area, no long-term effects to the Admiralty Island population of bald eagles would be expected as a result of Airport 3a with Access 2 or Access 3.

Operation of the airport would cause brief periods of increased noise as aircraft arrive and depart the airport. Based on the results of the noise modeling in section 4.11.3.3 in Noise, significant increases in noise levels from arriving and departing aircraft would not extend beyond the airport facility; nonetheless, the periodic increase in noise could temporarily disturb or displace individual members of special status species from terrestrial habitats near the airport. The periodic disturbance or displacement of individuals would not cause long-term effects to the Southeast Alaska populations of wildlife species. Construction and operation noise levels are expected to be muted underwater to a point where behavioral changes among management indicator species that remain mostly submerged (such as fish) would not be expected.

Under Airport 3a with Access 2, there would be 4.4 miles of new access road constructed, and under Airport 3a with Access 3, there would be 4.7 miles of new access road constructed. Increased traffic and human access after completion of construction would result in indirect effects to species such as brown bear, Pacific marten, and Sitka-black tailed deer. Improved access could lead to increased human-bear encounters and conflicts. However, brown bears in the Angoon area are already habituated to humans because the bears use the Angoon dump for foraging; therefore, the potential for increased human-bear encounters due to improved access does not represent a change from existing conditions. Although the speed limit and volume of traffic on access roads would be low, there is the potential for mortality from vehicle strikes due to the development of an expanded road structure and increased vehicle traffic on existing roads. In addition, increased vehicle traffic and access would increase the potential for disturbance, injury, and mortality to Sitka black-tailed deer due to hunting and to Pacific marten due to trapping along roadsides. According to Table SU2 in Subsistence Resources and Uses, after the expansion of roads, Sitka black-tailed deer harvest would initially increase (pounds of

harvest per capita) because of improved access, but over time, the per capita harvest would return to existing levels. Although increased vehicle strikes and hunting-related mortality would affect the size of the Sitka black-tailed deer population in the Angoon area, the viability of the local population of this species would not be affected. Pacific marten is not well documented in the terrestrial study area; therefore, it is difficult to determine the magnitude of effects from increased traffic and human access to this species. However, as with other terrestrial animals, road-related mortality for a small number of individual martens would be expected. These losses would be expected to be sufficiently small as to not jeopardize the population of Pacific martens in the terrestrial study area or on Admiralty Island.

Under Airport 3a with Access 2, piers to be installed for the permanent bridge and the temporary bridge would have the potential to cause behavioral change, injury, or mortality of fish species. During pile driving to install the piers, fish species would likely avoid these areas, resulting in a temporary disruption of their normal feeding and migratory patterns. These are direct, temporary effects that would occur only during the pier installation. Airport 3a with Access 3 would cause less behavioral change, injury, or mortality from pile driving than Airport 3a with Access 2. The Access 3 permanent bridge would not require any piers in the stream channel, and fewer piers would be required for the temporary bridge. Fish species would still likely avoid this area during construction, but not to the extent that they would under Access 2. During bridge construction, individuals could be injured by in-stream equipment, especially with the lighted active work area potentially attracting prey insects and aquatic species to this area during dark hours. These effects would cease once bridge construction is completed.

Airport 3a with either Access 2 or Access 3 could increase fishing in the lakes northeast of Airport 3a and in Favorite Creek near the bridge upon completion of construction. As described in section 4.13.3 of Subsistence Resources and Uses, increases in fishing would be slight; therefore, effects to aquatic special status species from this increased pressure would be minimal.

Effects to migratory birds

Long-term direct effects to species protected by the Migratory Bird Treaty Act could occur under Airport 3a with Access 2 or Access 3 due to the habitat value lost of either 316 acres or 321 acres (depending on the access alternative) of forested and fen habitats. This loss of habitat value could affect individuals by reducing the amount of habitat available for foraging, breeding, or cover. The combined affected acreage of these habitats would be only 6% of the 5,023 total acres of these habitats in the terrestrial study area. Because of the relative abundance of these habitat types in the terrestrial study area and beyond, and because of the small amount of each type of habitat that would be affected, this alternative is not expected to affect any migratory bird species in Southeast Alaska at the population level.

Although individual migratory birds could be attracted to the lighted staging area or active work areas and could be injured by construction equipment, this potential effect would cease at the completion of construction. Operation of the airport would result in brief, periodic increases in the amount of light from navigation lights on the runway. A communication tower would not be constructed as part of this project, thereby eliminating the potential for attraction of migratory birds to lighted airport facilities. The potential still exists, however, for incidental bird strikes to individuals as aircraft approach and depart the airport. As part of the airport's certification process, a wildlife hazard assessment would be conducted and, if necessary, an airport wildlife hazard management plan would be developed to minimize bird and wildlife hazards to airplanes. Due to the low frequency of flights in and out of the airport, however, these individual bird strikes pose no long-term effects to the Southeast Alaska populations of migratory bird species.

Airport 4 with Access 2 or Access 3

Terrestrial habitat value lost as a result of Airport 4 with Access 2 would total 263 acres. Terrestrial habitat value lost as a result of Airport 4 with Access 3 would total 271 acres. See Figure SSS6 for the breakdown of direct effects by habitat.

Stream habitat value lost as a result of Airport 4 with Access 2 would total 0.5 acre, and under Airport 4 with Access 3 would total 0.4 acre. As discussed for Airport 3a with Access 2, the bridge crossing of Favorite Creek would result in 316 square feet of stream habitat value lost due to permanent bridge piers that would be installed on the edges of the Favorite Creek stream channel. Under Access 3, this would not occur because no permanent bridge support piers would be installed for this bridge crossing.

As discussed in further detail below, some individuals could be indirectly affected by such things as noise, light, improved human access, or barge or vehicle traffic. Effects to species are described per special status category following Figure SSS6.

Airport 4 with Access 2 Effects

	Spruce-Hemlock	Bog Forest	Bog Woodland	Fen	Salt Marsh	Streams*
Acres habitat value lost	178	90	0	3	0	0.5
% habitat value lost	7%	4%	0%	3%	0%	4%

*For aquatic habitats, habitat value lost consists of only stream habitat removal; it does not include stream habitat alteration.

Airport 4 with Access 3 Effects

	Spruce-Hemlock	Bog Forest	Bog Woodland	Fen	Salt Marsh	Streams*
Acres habitat value lost	194	78	0	4	0	0.4
% habitat value lost	8%	3%	0%	4%	0%	3%

*For aquatic habitats, habitat value lost consists of only stream habitat removal; it does not include stream habitat alteration.

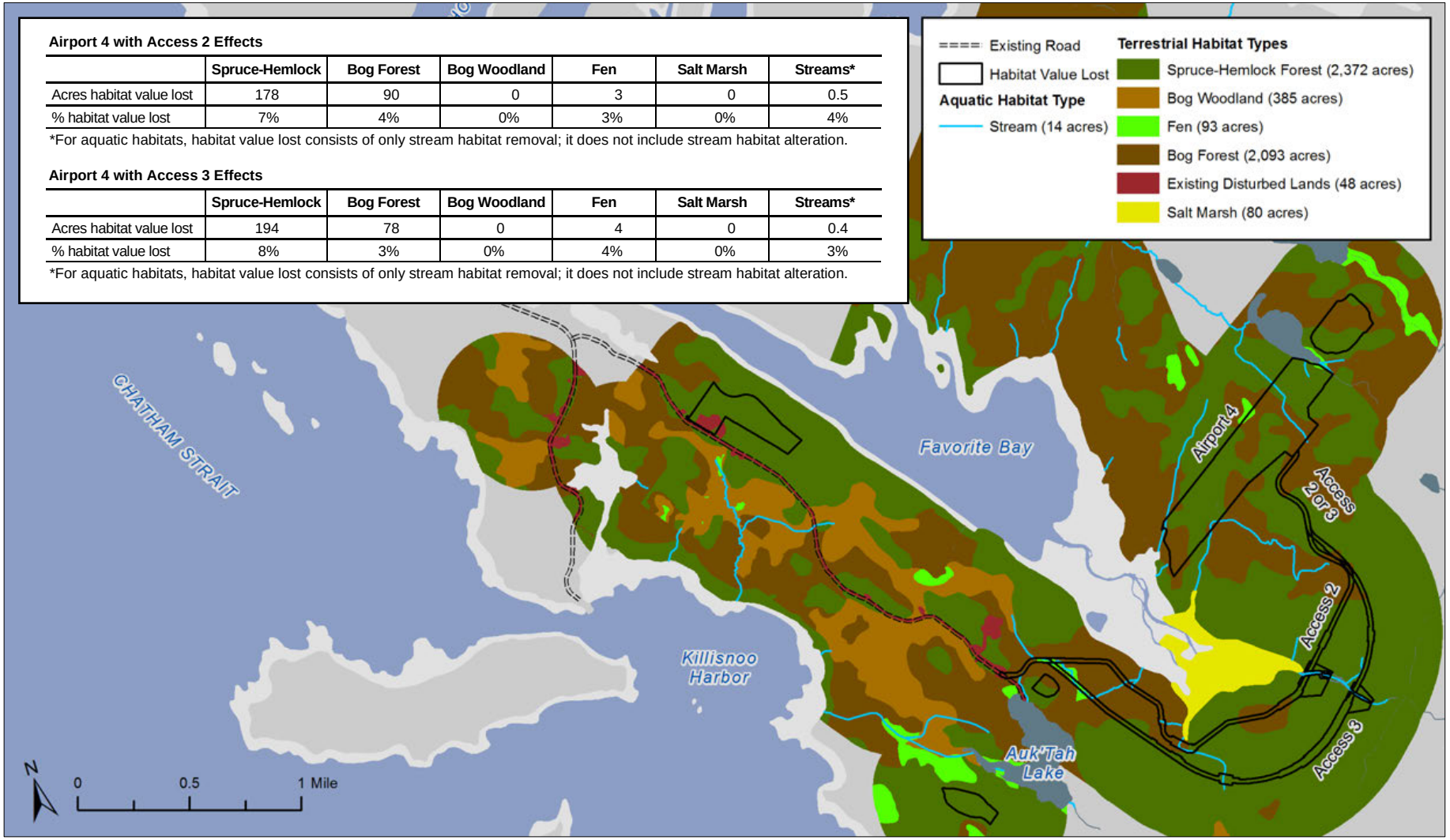


Figure SSS6. Acres of terrestrial and stream habitat value lost for Airport 4 with Access 2 or Access 3.

Effects to federally listed species, candidate species, and species protected under the Marine Mammal Protection Act

Airport 4 with Access 2 or Access 3 would not result in any direct long-term effects to federally listed species, candidate species, or species protected under the Marine Mammal Protection Act because these species use estuaries or marine waters, none of which would be affected under Airport 4 with Access 2 or Access 3.

The increase in lighting during construction and operation of the airport is not anticipated to affect marine mammals. During construction the active work areas near estuaries or marine waters (including the barge unloading area) could be lit and could temporarily attract individual marine mammals to that area. However, marine mammals often avoid areas with human activity. Also it is unlikely that marine mammals would be affected because these periods of increased lighting would likely be of short duration, and the activities would be upland and adjacent to, but not located in, marine habitats. The light would be attenuated (lessened) underwater. The barge itself would be located in marine habitat, but because it would be stationary, no effects to marine mammals would be expected. During operation because runway navigation lights would not be near estuaries or marine waters, there would be no change to the light environment in these habitats.

As described above under Airport 3a with Access 2 or Access 3, aircraft noise would be muted underwater from the sound-dampening effect of water, and species that remain submerged, such as marine mammals, would not be affected.

Barging of construction materials and equipment to Angoon could affect individual marine mammals through increased barge traffic and the resulting increase in potential for collisions between barges and individual animals. Under either of the Airport 4 alternatives, there would be up to 40 additional barge trips in and out of Angoon during construction. The potential for ship strikes on marine mammals would be minimized or avoided by adhering to a general marine mammal "Code of Conduct," such as vigilantly scanning the water's surface and remaining at least 100 yards from any sighted marine mammals (Neilson et al. 2012). The potential for collisions between barges and marine mammals is a temporary effect that would cease at the end of construction. The number of ship strikes to marine mammals as a result of these alternatives would be very small and is not expected to affect marine mammal populations in Southeast Alaska.

Effects to U.S. Forest Service sensitive species

The anticipated direct effects from Airport 4 with either Access 2 or Access 3 to U.S. Forest Service sensitive species are summarized in Table SSS8.

Table SSS8. Acres of long-term terrestrial habitat value lost under Airport 4 with Access 2 or Access 3

U.S. Forest Service sensitive species	Long-term direct effects habitat value lost Airport 4 with Access 2 (acres)	Percentage of suitable habitat in the study area	Long-term direct effects habitat value lost Airport 4 with Access 3 (acres)	Percentage of suitable habitat in the study area
Black oystercatcher	None	Not calculated; limited suitable habitat present along the shoreline of Favorite Bay	None	Not calculated; limited suitable habitat present along the shoreline of Favorite Bay
Queen Charlotte goshawk	268	6%	272	6%
Sensitive plants	271	5%	276	5%

There would be no suitable habitat value lost for black oystercatcher under Airport 4 with Access 2 or Access 3; therefore, this alternative would not result in any direct long-term effects to this species.

Queen Charlotte goshawk calls were heard near the Airport 4 with Access 2 and Access 3 locations in response to acoustic surveys conducted for this EIS (Figure SSS7). Nest locations were not observed. Based on the locations of the calls, however, it is likely that two or three active nests are located near Access 2 and 3. Long-term direct effects to goshawk habitat would occur due to habitat value lost for three forested habitats (spruce-hemlock, bog forest, and bog woodland) (see Table SSS8). No known nest trees would be removed. The loss in habitat value could affect individual goshawks using these habitats for foraging, breeding, or cover. However, the affected acreage of forested habitats would be relatively small when compared to the 4,850 acres of these habitats in the terrestrial study area (see Figure SSS1). Furthermore, spruce-hemlock forest and bog forest are the dominant habitat types in the Angoon area and provide abundant suitable habitat for this species. Any individual goshawks displaced by the forested habitat value lost would be expected to move into adjacent suitable habitat. Therefore, the direct long-term effects to spruce-hemlock forest, bog forest, and bog woodland under Airport 4 with Access 2 or Access 3 would not affect the Southeast Alaska population of Queen Charlotte goshawks.

As described above under Airport 3a with Access 2 or Access 3, goshawks could be indirectly affected by noise resulting from airport construction and operation and from increased human access resulting from construction of the access road. However, literature reviews of raptor responses to aircraft noise (Ellis et al. 1991; Manci et al. 1988) find that most raptors did not show a negative response to aircraft overflights. Based on the results of these studies and due to the abundance of suitable habitat in and around the terrestrial study area, no significant effects to the Southeast Alaska population of Queen Charlotte goshawks would be expected as a result of increases in noise from Airport 4 with Access 2 or Access 3.

During construction, there could be brief periods of lighting during dark hours. This could attract goshawk prey species and therefore individual goshawks to the staging area and active work areas during those periods. There is risk of injury to these individuals from vehicle strikes during these times, but this effect would cease at the completion of construction. Operation of the airport would also result in periodic increases in light from runway navigation lights; however, due to the brief duration for which these runway lights would be in use, individual goshawks would not be displaced.

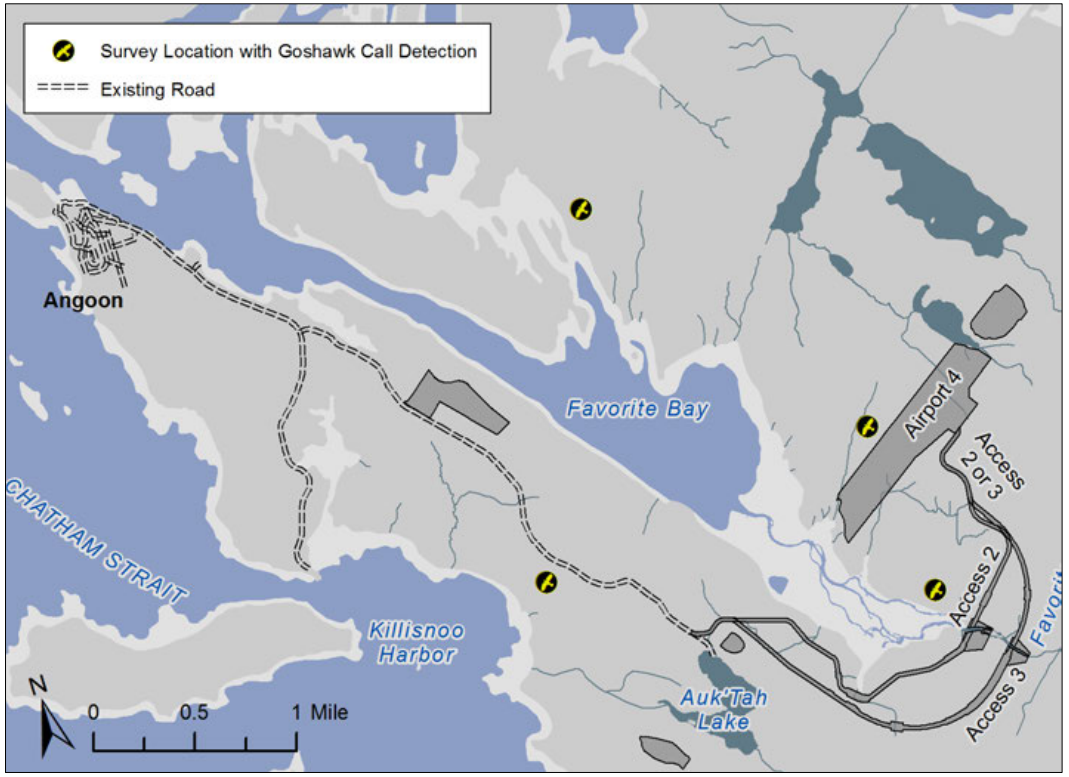


Figure SSS7. Locations of Queen Charlotte goshawk calls heard near proposed location of Airport 4 with Access 2 or Access 3.

There are no known populations of U.S. Forest Service sensitive plant species on Admiralty Island, and no sensitive plant species were documented during field surveys for the EIS. Suitable habitat is present, however, in spruce-hemlock forest, bog forest, bog woodland, and fen habitats in the terrestrial study area. Airport 4 with Access 2 or Access 3 would result in the habitat value loss of either 271 acres or 276 acres (depending on the access road) out of the 5,023 acres of these suitable habitats in the terrestrial study area, which is less than would occur under Airport 3a with Access 2 or Access 3. If U.S. Forest Service sensitive plant species were present in these suitable habitats, loss of habitat value would affect individual

sensitive plants. However, due to the abundance of suitable habitats in the terrestrial study area, coupled with spruce-hemlock forest and bog forest being the dominant habitat types in the Angoon area, the suitable habitat value lost under Airport 4 with Access 2 or Access 3 is not likely to affect sensitive plant species to an extent that would cause a trend toward federal listing or a loss of viability at the Admiralty Island population level.

Effects to U.S. Forest Service management indicator species

The anticipated direct effects from Airport 4 with either Access 2 or Access 3 to U.S. Forest Service management indicator species are summarized in Table SSS9.

Table SSS9. Acres of long-term terrestrial and aquatic habitat value lost under Airport 4 with Access 2 or Access 3

U.S. Forest Service management indicator species	Long-term direct effects habitat value lost Airport 4 with Access 2 (acres)	Percentage of suitable habitat in the study area	Long-term direct effects habitat value lost Airport 4 with Access 3 (acres)	Percentage of suitable habitat in the study area
Bald eagle	273	5%	277	6%
Brown bear	276	5%	281	6%
Cavity-nesting birds	178	8%	194	8%
Coho salmon	0.5 (stream)	4%	0.4 (stream)	3%
Cutthroat trout	0.5 (stream)	4%	0.4 (stream)	3%
Dolly Varden char	0.5 (stream)	4%	0.4 (stream)	3%
Marbled murrelet	178	8%	194	8%
Pacific marten	178	8%	194	8%
Pink salmon	0.5 (stream)	4%	0.4 (stream)	3%
Red squirrel	183	8%	199	8%
River otter	178	8%	194	8%
Sitka black-tailed deer	268	6%	272	6%
Vancouver Canada goose	268	6%	272	6%

Under this alternative, long-term direct effects from habitat value lost to U.S. Forest Service management indicator species documented in terrestrial habitats would be the same type as those that would occur under Airport 3a with Access 2. However, depending on the species, the magnitude of effects under Airport 4 with Access 2 or Access 3 would differ because a different acreage of terrestrial habitats would be affected. Because of the relative abundance of these habitat types in the terrestrial study area and beyond, and because of the small amount of each type of habitat that would be affected, Airport 4 with either access alternative would not affect populations of management indicator species in the terrestrial study area or on Admiralty Island.

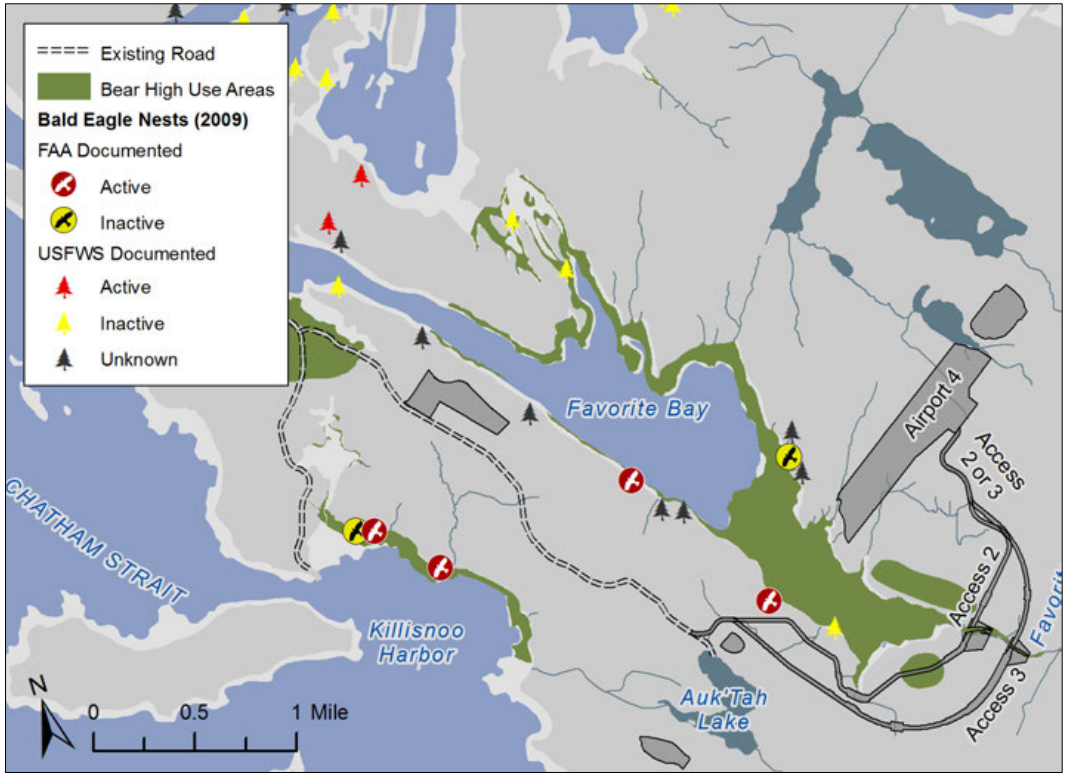


Figure SSS8. Bald eagle nests and bear use-areas near proposed location of Airport 4 with Access 2 or Access 3.

Bald eagle and brown bear use-areas near Airport 4 with Access 2 or Access 3 are shown in Figure SSS8. Favorite Creek stream habitat and estuarine habitats provide foraging habitat for bald eagles and brown bears. Airport 4 with Access 2 or Access 3 would not result in any estuarine habitat value lost. Airport 4 with Access 2 would result in 316 square feet of stream habitat value lost from Favorite Creek due to permanent bridge piers in the stream channel. Vegetation clearing adjacent to Access 2 or Access 3 and construction of the bridge over Favorite Creek could result in temporary displacement of brown bears from foraging areas along Favorite Creek; however, bears would be expected to relocate to feeding areas downstream of the bridge construction footprint, and this effect would likely cease at the end of bridge construction. No long-term effects to brown bears from bridge construction are expected.

Marine water habitat provides suitable foraging habitat for marbled murrelet; however, this habitat type would not be affected under Airport 4 with Access 2 or Access 3. Spruce-hemlock forest provides suitable nesting habitat for this species. However, due to the abundance of suitable habitat in the study area, the direct long-term effects to spruce-hemlock forest under Airport 4 with Access 2 or Access 3 would not affect the Southeast Alaska population of marbled murrelets.

Favorite Creek and other freshwater streams in the study area provide habitat for coho salmon, cutthroat trout, Dolly Varden char, and pink salmon. Due to the rounding up of numbers from the effects analyses, the acreage of stream habitat value lost would be the same for all of these species. The anadromous habitat subset (coho and pink salmon stream habitat) is not differentiable. Airport 4 with Access 2 would have 0.5 acre of stream habitat value lost. Airport 4 with Access 3 would have 0.4 acre lost. Included in the Access 2 acreage are 316 square feet of Favorite Creek habitat value lost due to the permanent bridge piers that would be placed in the stream channel. Access 3 would not require permanent bridge piers. This EIS assumes that the function of any culverted or rerouted stream segments would be limited to fish passage only, and these streams would no longer be suitable for other habitat functions for fish, including hatching of eggs and rearing of young. This loss of stream habitat value could affect individuals; however, it would not affect Angoon area populations of coho salmon, cutthroat trout, Dolly Varden char, and pink salmon.

U.S. Forest Service management indicator species could be attracted by construction lighting used at staging areas and active work areas. During construction of the temporary and permanent bridges across Favorite Creek under Airport 4 with either access alternative, the temporary use area could be a lit, active work area during dark hours. Because these construction activities during dark hours are expected to be of short duration, this potential wildlife attractant would cease at the end of those brief construction periods.

As described under Airport 3a with Access 2 or Access 3, indirect effects to U.S. Forest Service management indicator species could occur from noise resulting from airport construction and operation. Several studies on the effects of aircraft overflights on nesting raptors conclude that long-term reproductive success of raptors is not affected by aircraft noise. Due to the large bald eagle population on Admiralty Island and the abundance of suitable eagle nesting habitat in and around the terrestrial study area, no long-term effects to the Admiralty Island population of bald eagles would be expected as a result of Airport 4 with Access 2 or Access 3.

Operation of the airport would cause periodic increases in noise as aircraft arrive and depart the airport. Based on the results of the noise modeling in section 4.11.3.3, significant increases in noise levels from arriving and departing aircraft would not extend beyond the airport facility; nonetheless, the periodic increase in noise could temporarily disturb or displace

individuals of special status species from terrestrial habitats near the airport. The disturbance or displacement of individuals would not cause long-term effects to the Southeast Alaska populations of wildlife species. Construction and operation noise levels are expected to be muted underwater to a point where behavioral changes among management indicator species that remain mostly submerged (such as fish) would not be expected.

Under Airport 4 with Access 2, there would be 2.9 miles of new access road constructed, and under Airport 4 with Access 3, there would be 3.2 miles of new access road constructed. Increased traffic and human access after completion of construction would result in indirect effects to brown bear, Pacific marten, and Sitka-black tailed deer; however, these effects would be less than those under Airport 3a with Access 2 or Access 3 because either access road under Airport 4 would be shorter. These effects include the potential for increased human-bear encounters and conflicts; potential mortality from vehicle strikes; and disturbance, injury, and mortality to Sitka black-tailed deer due to hunting and to Pacific marten due to trapping along roadsides. According to Table SU2 in section 4.13 Subsistence Resources and Uses, after the expansion of roads, Sitka black-tailed deer harvest would initially increase (pounds of harvest per capita) because of improved access, but over time, the per capita harvest would return to existing levels, Although increased vehicle strikes and hunting-related mortality would affect the size of the Sitka black-tailed deer population in the Angoon area, the viability of the local population of this species would not be affected. Pacific marten is not well documented in the terrestrial study area; therefore, it is difficult to determine the magnitude of effects from increased traffic and human access to this species. However, as with other terrestrial animals, road-related mortality for a small number of individual martens would be expected. These losses would likely be highest immediately after completion of the access road, but would be expected to decrease over time as the animals acclimate to the presence of the road. These losses would also be expected to be sufficiently small as to not jeopardize the population of Pacific martens in the study area or on Admiralty Island.

The behavioral change, injury, or mortality of fish species from pile driving under this alternative would be the same as would occur under the Airport 3a alternatives because the installation of bridge piers in the Favorite Creek stream channel would be the same as would occur under Airport 3a with Access 2 or Access 3. During bridge construction, individuals could be injured by in-stream equipment, especially with the lighted active work area potentially attracting prey insects and aquatic species to this area during dark hours. These effects would cease once bridge construction is completed.

As with the Airport 3a alternatives, increased fishing at the lakes northwest of Airport 4 could occur under Airport 4 with Access 2 or Access 3 and at the Favorite Creek bridge crossing because of improved access to these areas.

Effects to migratory birds

Long-term direct effects to species protected by the Migratory Bird Treaty Act could occur under Airport 4 with Access 2 or Access 3 due to the habitat value lost of either 271 acres or 276 acres (depending on the access road) of forested and fen habitats. The combined affected acreage of these habitats would be only 5% of the 5,023 total acres of these habitats in the terrestrial study area, which is less than would occur under Airport 3a with either access alternative. Because of the relative abundance of these habitat types in the study area and beyond, and because of the small amount of each type of habitat that would be affected, this alternative would not affect any migratory bird species in Southeast Alaska at the population level.

Although individual migratory birds could be attracted to the lighted staging area or active work areas and could be injured by construction equipment, this potential effect would cease at the completion of construction. Operation of the airport would result in brief, periodic increases in the amount of light from navigation lights on the runway. A communication tower would not be constructed as part of this project, thereby eliminating the potential for attraction of migratory birds to lighted airport facilities. The potential still exists, however, for incidental bird strikes to individuals as aircraft approach and depart the airport. As part of the airport's certification process, a wildlife hazard assessment would be conducted and, if necessary, an airport wildlife hazard management plan would be developed to minimize bird and wildlife hazards to airplanes. Due to the low frequency of flights in and out of the airport, however, these individual bird strikes pose no long-term effects to the Southeast Alaska populations of migratory bird species.

Airport 12a with Access 12a (preferred alternative)

Terrestrial habitat value lost as a result of Airport 12a with Access 12a would total 252 acres.

Stream habitat value lost as a result of Airport 12a with Access 12a would total 1.2 acres. Because this alternative would not require a Favorite Creek bridge crossing, there would be no effects to Favorite Creek under this alternative.

See Figure SSS9 for the acreages directly affected per habitat type.

As discussed in further detail below, some individuals could also be indirectly affected by such things as noise, light, improved human access, or barge or vehicle traffic.

Effects to species are described per special status category following Figure SSS9.

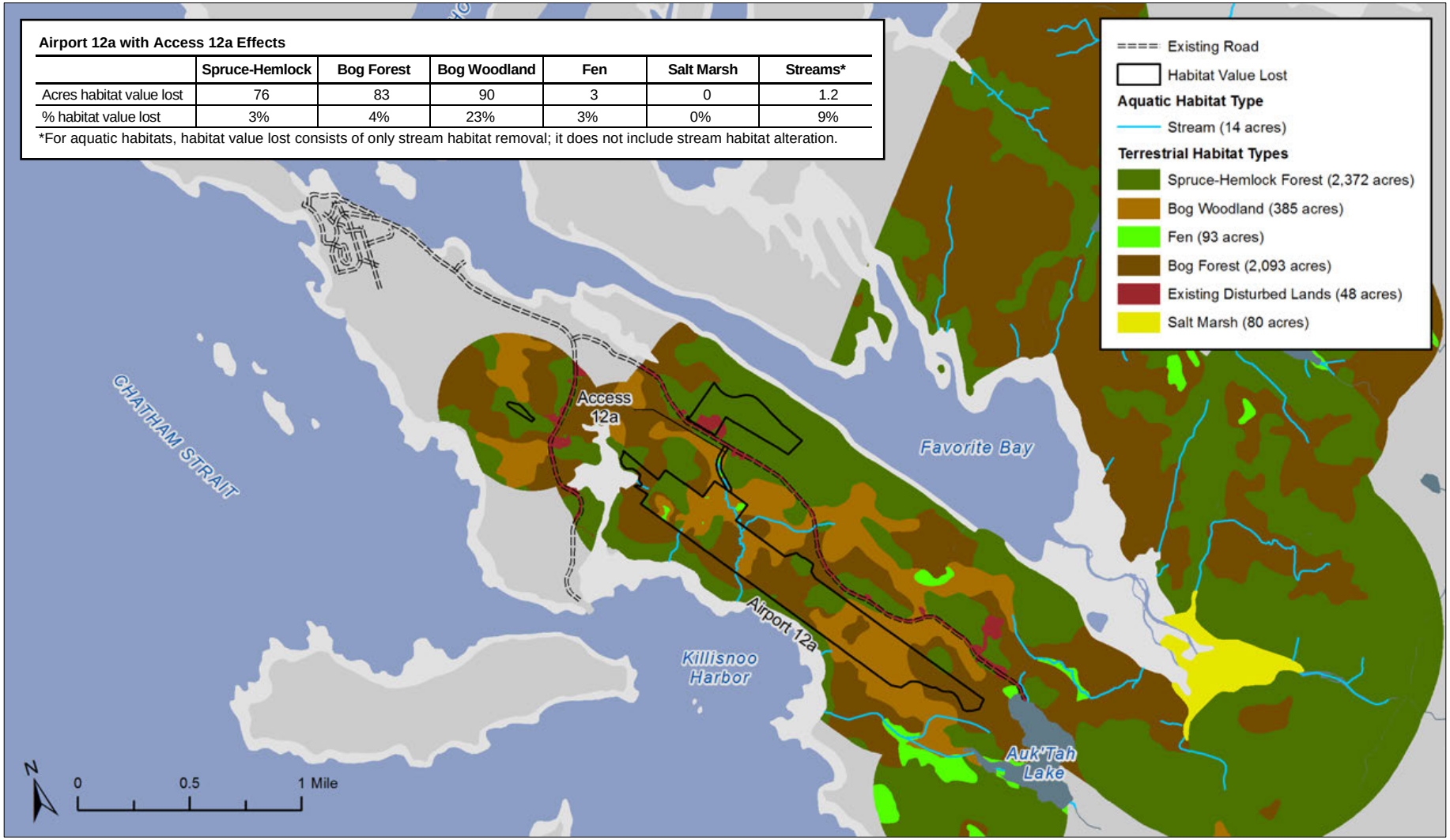


Figure SSS9. Acres of terrestrial and stream habitat value lost for Airport 12a with Access 12a.

Effects to federally listed species, candidate species, and species protected under the Marine Mammal Protection Act

Airport 12a with Access 12a would not result in any direct long-term effects to federally listed species, candidate species, or species protected under the Marine Mammal Protection Act because these species use estuaries or marine waters, none of which would be affected under this alternative.

During construction the active work areas near estuaries or marine waters (including the barge unloading area) could be lit and could temporarily attract individual marine mammals to that area. However, marine mammals often avoid areas with human activity. Also it is unlikely that marine mammals would be affected because these periods of increases lighting would likely be of short duration, and the activities would be upland and adjacent to, but not located in, marine habitats. The light would be attenuated (lessened) underwater. The barge itself would be located in marine habitat during unloading, but because it would be stationary, no effects to marine mammals would be expected. The increase in lighting during operation of the airport is not anticipated to affect marine mammals because runway navigation lights would not be near estuaries or marine waters and there would be no change to the light environment in these habitats.

As described above for the Airport 3a and Airport 4 alternatives, aircraft noise levels would be expected to be muted underwater due to the sound-dampening effect of water, and species that remain submerged such as marine mammals are not expected to be affected.

Barging of construction materials to Admiralty Island could affect individual marine mammals, due to increased barge traffic and the resulting increase in potential for collisions between barges and individual animals. Under Airport 12a with Access 12a, there would be up to 30 additional barge trips in and out of Angoon during construction. The potential for ship strikes on marine mammals would be minimized or avoided by adhering to a general marine mammal "Code of Conduct," such as vigilantly scanning the water's surface and remaining at least 100 yards from any sighted marine mammals (Neilson et al. 2012). The potential for collisions between barges and marine mammals is a temporary effect that would cease at the end of construction. Because Airport 12a with Access 12a is the preferred alternative, the FAA prepared a *Biological Assessment of Listed Species for the Angoon Airport Project* (SWCA 2014c, included in this EIS as Appendix R) determining that this alternative may affect but is not likely to adversely affect humpback whales and Steller sea lions. The National Marine Fisheries Service concurred with the FAA's determination. The number of ship strikes to marine mammals as a result of this alternative would be very low and is not expected to affect marine mammal populations in Southeast Alaska.

Effects to U.S. Forest Service sensitive species

The anticipated direct effects from Airport 12a with Access 12a to U.S. Forest Service sensitive species are summarized in Table SSS10.

Table SSS10. Acres of long-term terrestrial habitat value lost under Airport 12a with Access 12a

Species common name	Long-term direct effects habitat value lost (acres)	Percentage of suitable habitat in the study area
Black oystercatcher	None	Not calculated; limited suitable habitat present along the shoreline of Favorite Bay
Queen Charlotte goshawk	249	5%
Sensitive plants	252	5%

There would be no suitable habitat value lost for black oystercatcher under Airport 12a with Access 12a; therefore, this alternative would not result in any direct long-term effects to this species.

Queen Charlotte goshawk calls were heard near the proposed location of Airport 12a in response to acoustic surveys conducted for this EIS (Figure SSS10). Nest locations were not observed. Based on the locations of the calls, however, it is likely that an active nest is located near Airport 12a. Long-term direct effects to goshawk habitat would occur from habitat value lost for the three forested habitats (spruce-hemlock, bog forest, and bog woodland) (see Table SSS10). No known nest trees would be removed. The loss in habitat value could affect individual goshawks using these habitats for foraging, breeding, or cover. However, the affected acreage of forested habitats is relatively small when compared to the 4,850 acres of these habitats in the terrestrial study area (see Figure SSS1). Furthermore, spruce-hemlock forest and bog forest are the dominant habitat types in the Angoon area and provide abundant suitable habitat for this species. Any individual goshawks displaced by the forested habitat value lost would be expected to move into adjacent suitable habitat. Therefore, the direct long-term effects to spruce-hemlock forest, bog forest, and bog woodland under Airport 12a with Access 12a would not result in long-term effects to the Southeast Alaska population of Queen Charlotte goshawks.

As described above under the Airport 3a and Airport 4 alternatives, goshawks could be indirectly affected by noise resulting from construction and operation of the airport and from increased human access from construction of the access road. However, literature reviews of raptor responses to aircraft noise (Ellis et al. 1991; Manci et al. 1988) found that most raptors did not show a negative response to aircraft overflights. Based on the results of these studies and due to the abundance of suitable habitat in and around the terrestrial study area, no significant effects to the Southeast Alaska population of Queen Charlotte goshawks would be expected as a result of increases in noise from to Airport 12a with Access 12a.

During construction, there could be brief periods of lighting during dark hours. This could attract goshawk prey species and therefore individual goshawks to the staging area and active work areas during those periods. There is risk of injury to these individuals from vehicle strikes during these times, but this effect would cease at the completion of construction. Operation of the airport would also result in periodic increases in light from runway navigation lights; however, due to the brief time these lights would be in use, individual goshawks would not be displaced.

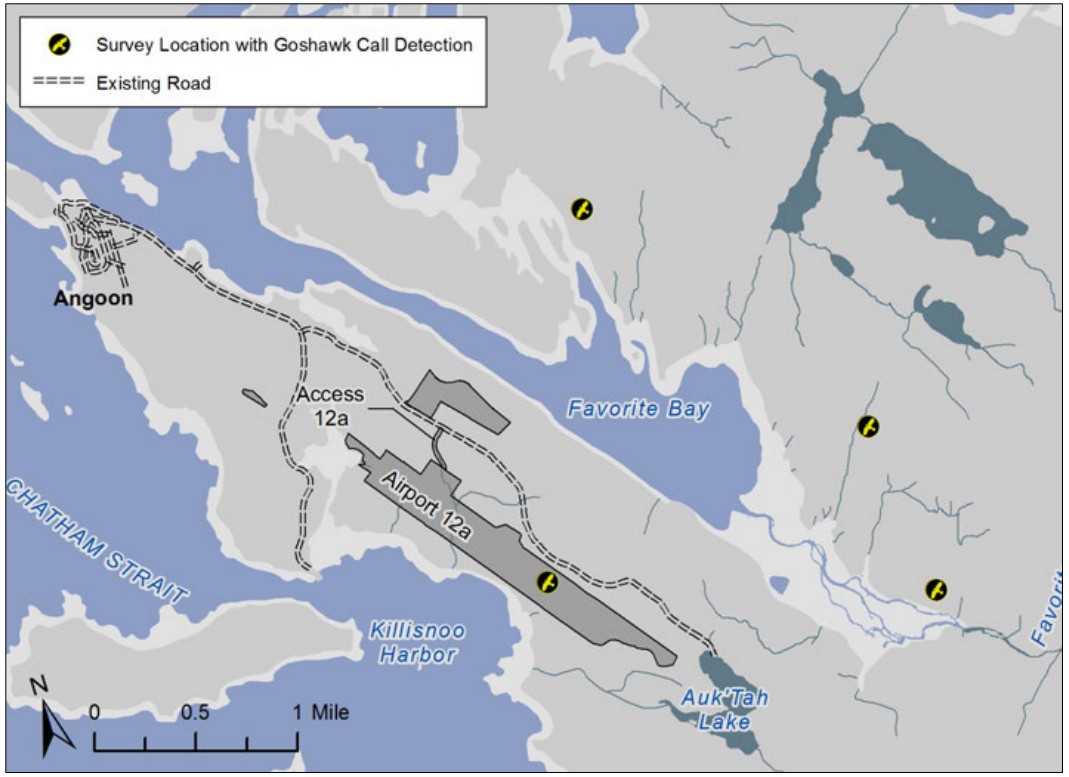


Figure SSS10. Locations of Queen Charlotte goshawk calls heard near proposed location of Airport 12a with Access 12a.

There are no known populations of U.S. Forest Service sensitive plant species on Admiralty Island, and no sensitive plant species were documented during field surveys for the EIS. Suitable habitat is present, however, in spruce-hemlock forest, bog forest, bog woodland, and fen habitats in the study area. The construction and operation of Airport 12a with Access 12a would result in the long-term habitat value loss of 252 acres out of the 5,023 acres of these suitable habitats in the terrestrial study area, which is less than would occur under the Airport 3a or Airport 4 alternatives. If U.S. Forest Service sensitive plant species were present in these suitable habitats, loss of habitat value would affect individuals of these

species. However, due to the abundance of suitable habitats in the study area, coupled with spruce-hemlock forest and bog forest being the dominant habitat types in the Angoon area, the suitable habitat value lost under Airport 12a with Access 12a is not likely to affect sensitive plant species to an extent that would cause a trend toward federal listing or a loss of viability at the Admiralty Island population level.

Effects to U.S. Forest Service management indicator species

The anticipated direct effects from Airport 12a with Access 12a to U.S. Forest Service management indicator species are summarized in Table SSS11.

Table SSS11. Acres of long-term terrestrial and aquatic habitat value lost under Airport 12a with Access 12a

Species common name	Long-term direct effects habitat value lost (acres)	Percentage of suitable habitat in the study area
Bald eagle	253	5%
Brown bear	256	5%
Cavity-nesting birds	76	3%
Coho salmon	0 (stream)	0%
Cutthroat trout	1.2 (stream)	9%
Dolly Varden char	1.2 (stream)	9%
Marbled murrelet	76	3%
Pacific marten	76	3%
Pink salmon	0 (stream)	0%
Red squirrel	80	3%
River otter	76	3%
Sitka black-tailed deer	249	5%
Vancouver Canada goose	249	5%

Under this alternative, long-term direct effects from habitat value lost to U.S. Forest Service management indicator species documented in terrestrial habitats would be of the same type as those that would occur under the Airport 3a and Airport 4 alternatives. However, the magnitude of effects under Airport 12a with Access 12a would be less than would occur under all of the other action alternatives because fewer acres of terrestrial habitats would be affected due to the shorter length of the access road required to reach Airport 12a. Because of the relative abundance of the affected habitat types in the study area and beyond, and because of the small amount of each type of habitat that would be affected, this alternative would not affect populations of management indicator species in the study area or on Admiralty Island.

Bald eagle and brown bear use-areas near Airport 12a with Access 12a are shown in Figure SSS11. Because this alternative would not require a Favorite Creek bridge crossing, there would be no effects to Favorite Creek, which provides foraging habitat for bald eagles and brown bears.

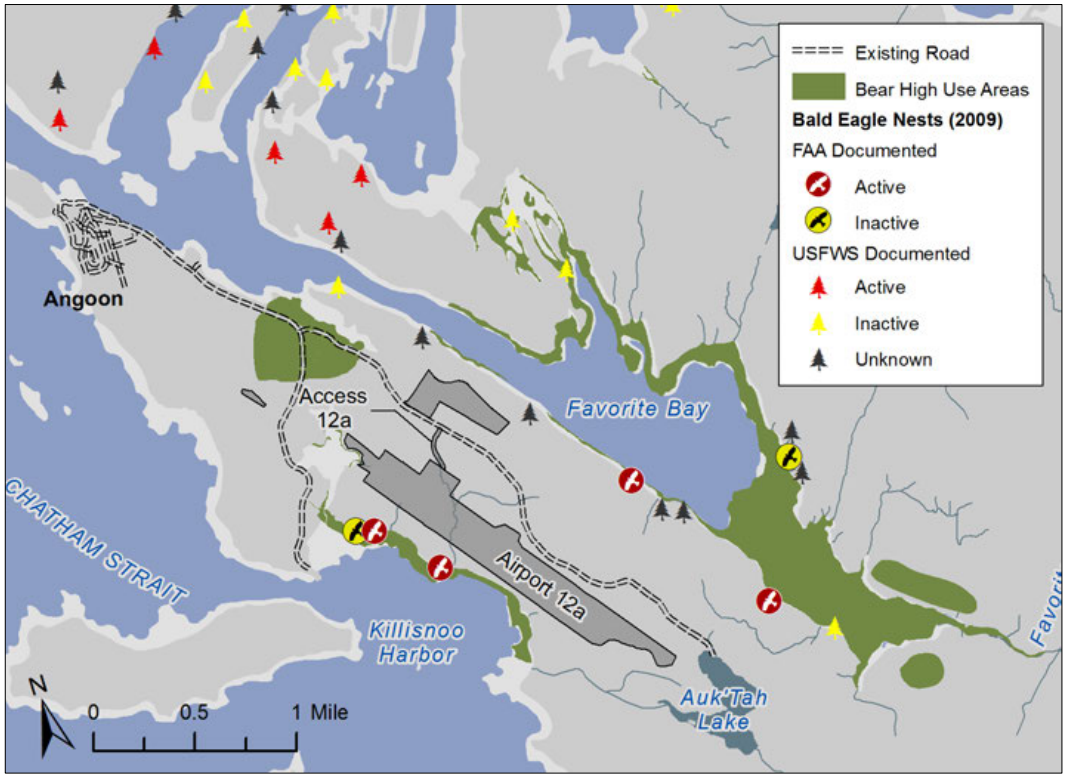


Figure SSS11. Bald eagle nests and bear use-areas near proposed location of Airport 12a with Access 12a.

Marine water habitat provides suitable foraging habitat for marbled murrelet; however, this habitat type would not be affected under Airport 12a with Access 12a. Spruce-hemlock forest provides suitable nesting habitat for this species. However, due to the abundance of suitable habitat in the study area, the direct long-term effects to spruce-hemlock forest under Airport 12a with Access 12a would not affect the Southeast Alaska population of marbled murrelets.

Favorite Creek and other freshwater streams in the study area provide habitat for coho salmon, cutthroat trout, Dolly Varden char, and pink salmon. Airport 12a with Access 12a would not affect any coho or pink salmon stream habitat, but would result in the habitat value loss of 1.2 acres of cutthroat trout and Dolly Varden char stream habitat in the aquatic study area. This EIS assumes that the function of any culverted or rerouted stream segments would be limited to fish passage only, and these streams would no longer be suitable for their other habitat functions for fish, including hatching of eggs and rearing of young. This loss of stream habitat value could affect individuals; however, it would not affect Angoon area populations of cutthroat trout or Dolly Varden char.

Under Airport 12a with Access 12a U.S. Forest Service management indicator species could be attracted by construction lighting used at staging areas and active work areas. Because these construction activities during dark hours are expected to be of short duration, this potential wildlife attractant would cease at the end of those brief construction periods.

As described under Airport 3a with Access 2 or Access 3, indirect effects to U.S. Forest Service management indicator species could occur from noise resulting from construction and operation of the airport. Several studies on the effects of aircraft overflights on nesting raptors conclude that long-term reproductive success of raptors is not affected by aircraft noise. Due to the large bald eagle population on Admiralty Island and the abundance of suitable eagle nesting habitat in and around the terrestrial study area, no long-term effects to the Admiralty Island population of bald eagles would be expected as a result of Airport 12a with Access 12a.

Operation of the airport beyond construction would cause brief periods of increased noise as aircraft arrive and depart the airport. Based on the results of the noise modeling in section 4.11.3.3, significant increases in noise levels from arriving and departing aircraft would not extend beyond the airport facility; nonetheless, there is potential that the periodic increases in noise would temporarily disturb or displace individuals of special status species from terrestrial habitats near the airport. The disturbance or displacement of individuals would not cause long-term effects to the Southeast Alaska populations of wildlife species. Construction and operation noise levels are expected to be muted underwater to a point where behavioral changes among management indicator species that remain mostly submerged (such as fish) would not be expected.

Under Airport 12a with Access 12a, 0.2 mile of new access road would be constructed, which is several miles shorter than either road for Airport 3a or Airport 4. It is unlikely that construction of this short segment of new road would result in an increase in wildlife mortality from vehicle strikes. It is also unlikely that increased vehicle traffic and access after

construction would increase the potential for disturbance, injury, and mortality to Sitka black-tailed deer or Pacific marten due to hunting or trapping, or would lead to increased human-bear encounters and bear mortality that is not related to hunting (for example, safety-related mortality).

Airport 12a with Access 12a would not require a Favorite Creek bridge crossing; therefore, no behavioral change, injury, or mortality to fish species from pier installation or bridge construction would occur under this alternative.

Under this alternative, there would be no increased fishing at the lakes northeast of Favorite Bay, at Favorite Creek, or in the Favorite Bay estuary because no additional access to these areas would be constructed.

Effects to migratory birds

Long-term direct effects to species protected by the Migratory Bird Treaty Act could occur under Airport 12a with Access 12a due to the habitat value lost of 252 acres of forested and fen habitats. This loss of habitat value would be only 5% of the 5,023 total acres of these habitats in the terrestrial study area, which is less than would occur under Airport 3a or Airport 4. Because of the relative abundance of these habitat types in the study area and beyond, and because of the small amount of each type of habitat that would be affected, this alternative would not affect any migratory bird species in Southeast Alaska at the population level.

Although individual migratory birds could be attracted to the lighted staging area or active work areas and could be injured by construction equipment, this potential effect would cease at the completion of construction. Operation of the airport would result in brief, periodic increases in the amount of light from navigation lights on the runway. A communication tower would not be constructed as part of this project, eliminating the potential for attraction of migratory birds to lighted airport facilities. The potential still exists, however, for incidental bird strikes to individuals as aircraft approach and depart the airport. As part of the airport's certification process, a wildlife hazard assessment would be conducted and, if necessary, an airport wildlife hazard management plan would be developed to minimize bird and wildlife hazards to airplanes. Due to the low frequency of flights in and out of the airport, however, these individual bird strikes pose no long-term effects to the Southeast Alaska populations of migratory bird species.

4.5.3.3.4. How do the effects to special status species compare?

Direct effects to special status species from long-term terrestrial and stream habitat value lost would be similar under all action alternatives. Only the no action alternative, which would not result in habitat value lost, would have substantively different effects. Under all action alternatives, the same types of habitats would be affected during construction, operation, and maintenance of the airport and access road. The alternatives would differ in the following ways:

- The potential to affect more or fewer terrestrial special status animals or plants relative to the number of acres of terrestrial habitat value lost.
- The potential to affect more or fewer special status aquatic species relative to the number of acres of stream habitat value lost.
- The number of miles of new road, which increases vehicle traffic, improves access, and, in turn, increases potential for disturbance, injury, or mortality for individual animals.

Table SSS12 summarizes acres of terrestrial and stream habitat value lost for all alternatives, including the no action alternative. The table ranks the alternatives from least to most effects. Although the acres of habitat value lost differ among the action alternatives, the alternative with the most effects does not differ significantly from the action alternative with the least effects.

Table SSS12. Summary of direct and indirect effects by action alternative for special status species

Alternative	Direct effect: Long-term terrestrial habitat value lost		Direct effect: Long-term stream habitat value lost		Indirect effects: Increased traffic and access	
	Acres	Rank*	Acres	Rank*	Miles	Rank*
No action	0	1	0	1	0	1
Airport 3a with Access 2	316	5	0.3	3	4.4	5
Airport 3a with Access 3	321	6	0.2	2	4.7	6
Airport 4 with Access 2	271	3	0.5	5	2.9	3
Airport 4 with Access 3	276	4	0.4	4	3.2	4
Airport 12a with Access 12a	252	2	1.2	6	0.2	2

* 1 = least effects; 6 = most effects.

4.5.3.3.5. Would any effects be irreversible or irretrievable?

Irreversible or irretrievable effects to federally listed species, candidate species, or species protected under the Marine Mammal Protection Act are unlikely. Irreversible and irretrievable effects to U.S. Forest Service sensitive species, U.S. Forest Service management indicator species, and migratory birds would include the loss of terrestrial and stream habitat value and the loss of individuals during construction and ongoing operation of the airport.

4.5.3.3.6. Would any of the alternatives have a significant effect on special status species?

There would be no long-term direct effects to federally listed species, candidate species, or species protected under the Marine Mammal Protection Act. None of the action alternatives would "jeopardize a species' continued existence or destroy or modify a species' critical habitat." During transport of construction materials via barge to and from Angoon, the potential for collisions between barges and marine mammals would be reduced or avoided by adhering to a general marine mammal "Code of Conduct," such as vigilantly scanning the water's surface and remaining at least 100 yards from any sighted marine mammals (Neilson et al. 2012). The potential for collisions between barges and marine mammals is a temporary effect that would cease at the end of construction. The number of ship strikes to marine mammals as a result of the airport project would be very low and is not expected to affect marine mammal populations in Southeast Alaska. Because Airport 12a with Access 12a is the preferred alternative, the FAA prepared the *Biological Assessment of Listed Species for the Angoon Airport Project* (Appendix R), determining that this alternative may affect but is not likely to adversely affect humpback whales and Steller sea lions. The National Marine Fisheries Service concurred with the FAA's determination.

Development of any of the airport alternatives would result in terrestrial and stream habitat value lost for U.S. Forest Service sensitive species, management indicator species, and migratory birds. In addition, periodic increases in noise and light would cause indirect effects to terrestrial habitats and species during construction and operation of the airport. However, none of the effects from the action alternatives would be significant because the total habitat affected under even the alternative affecting the most acres of habitat is such a small proportion of the available habitat in the study area (6%). The effects would not be so extensive as to alter the population dynamics, sustainability, reproduction, mortality, or minimum population size needed to sustain a species. The effects would not reduce the habitat supporting species below that needed to maintain self-sustaining populations. Maintenance of natural systems would not be adversely affected. The action would be consistent with applicable state natural resources management strategies (see section 4.5.3.3.2 for more information on significance criteria).

4.5.3.3.7. How could the effects described above be avoided, minimized, or mitigated?

Because no significant effects are anticipated for these resources, no additional mitigation measures beyond those discussed in Chapter 7: Mitigation would be implemented under any action alternative. Chapter 7 describes best management practices that would be implemented during construction. Best management practices are relatively common activities in construction and are intended to prevent pollution, minimize environmental harm, and ensure that appropriate response action is taken if unacceptable environmental effects occur. Through the use of these best management practices, effects are reduced during construction. The best management practices described in Chapter 7 were considered during effects analysis for this resource.

4.6. Floodplains, Stream Geomorphology, and Hydrology

This section addresses the existing conditions of floodplains, ***stream channel*** geomorphology, and hydrology in the area of the airport and access road alternatives. It also addresses the potential changes to those conditions from construction and operation of the proposed land-based airport.

The information contained in this section is summarized from the *Angoon Airport Environmental Impact Statement Water Resources Technical Memorandum* (Vigil-Agrimis 2011), included as Appendix J, and from supporting documents cited in the text.

What is discussed in this section?

4.6.1. Background information

4.6.1.1. What do the terms "floodplain," "stream geomorphology," and "hydrology" mean?

A "floodplain" is flat or nearly flat land adjacent to a stream or river. Floodplains are mostly made of river sediment and can flood during heavy rain or snowmelt. "Stream geomorphology" refers to the physical form of a stream channel and its change over time. "Hydrology" is the science of water; for this environmental impact statement (EIS), hydrology studies were focused on the movement, timing, and distribution of water. These terms help to explain the ***watershed*** characteristics in the Angoon area.

Terms to know

Aquifer: An area below the surface of the earth that contains water.

Flow: The amount of water moving through a stream.

Stream channel: The physical boundaries of a stream, including the bed (bottom) and banks (sides).

Watershed: An area of land from which surface water runoff from rain and melting snow converges, usually at the mouth of a stream. Stream flows tend to increase from a watershed's upper parts (highest elevations) to its lower parts.

4.6.1.2. How do streams and floodplains function?

When rain falls on a landscape, it can be absorbed into the soil and into groundwater ***aquifers***, captured by vegetation, or run off into water bodies like nearby streams. Some of the water that infiltrates the ground eventually makes its way to streams through subsurface movement. During periods of heavy rain, the ground becomes saturated and more water is fed to streams from both surface and subsurface runoff. Although some water evaporates, most of it travels through streams to the oceans. Streams generally accumulate ***flow*** by merging with other streams of equal or smaller size known as tributaries. Streams are typically largest when they reach the ocean. See Figure FGH1 for an illustration of how these processes work.

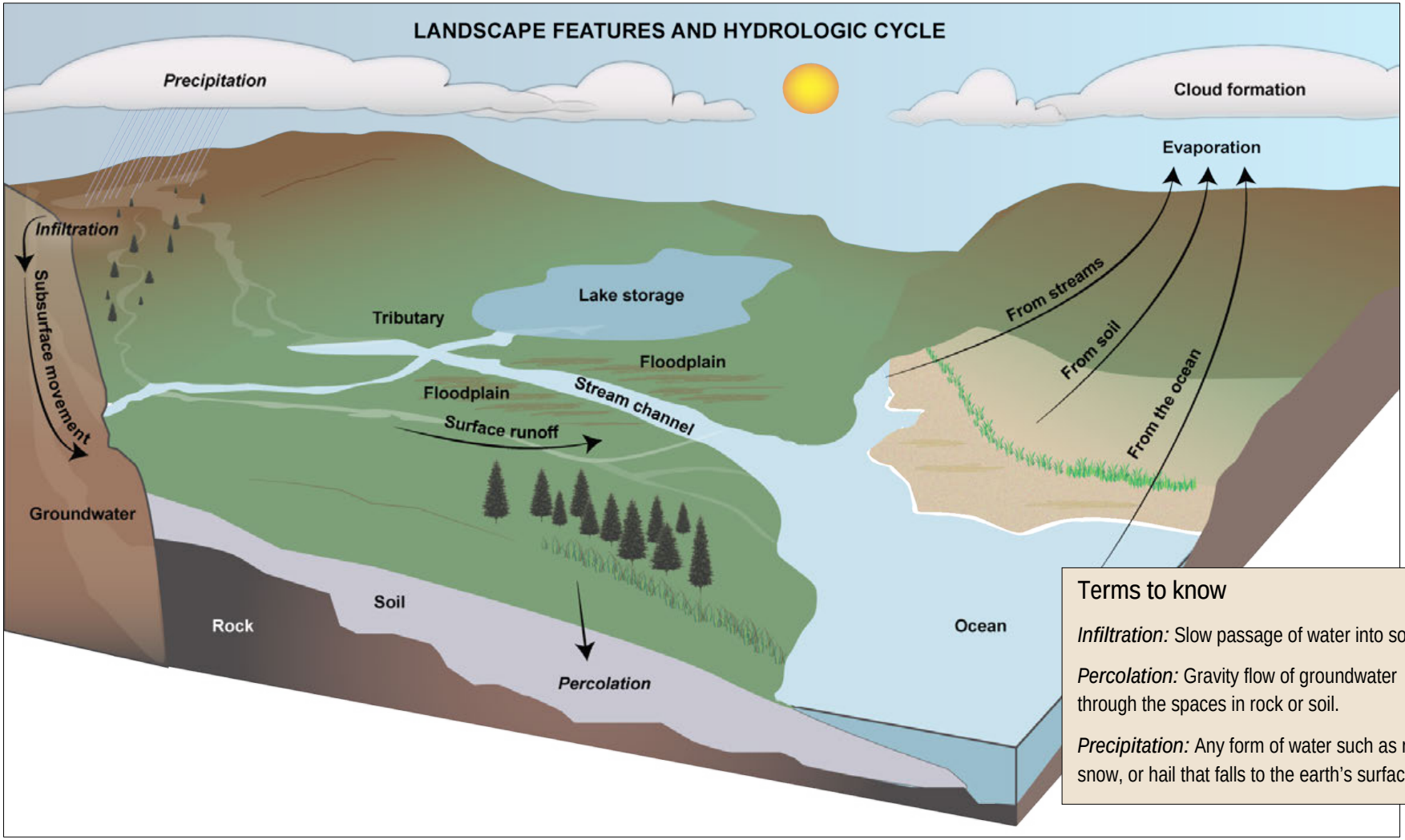


Figure FGH1. The processes related to studies of floodplains, stream geomorphology, and hydrology.

The flow of water through a stream is measured in units of cubic feet per second (cfs). Because the amount of precipitation that falls in a watershed varies seasonally and annually, the amount of water flowing through a stream fluctuates. Over a given period of time, the flow in a stream can be described in terms of ***low flow*** during dry times or ***peak discharge*** during storm or snowmelt events. Examining peak discharges with different probabilities of occurring or ***recurrence intervals*** (2-year, 10-year, and 100-year) shows the likelihood of different flooding events occurring in a given year.

Favorite Creek and its tributaries are ***alluvial streams*** that build and maintain ***channel form*** and floodplains during high flow events. The channel is formed through erosion and deposition of sediment and large wood associated with flood events. The channel form is characterized by the movement of the channel over time, channel slope, features such as ***pools*** and ***riffles***, and channel substrate. Floodplains are areas adjacent to streams that are subject to natural flooding. Floodplains provide natural and beneficial functions, including storing and slowly releasing flood waters (thereby moderating the intensity of flooding downstream), conveying flood waters and reducing flooding depth, recharging groundwater, discharging groundwater during periods of low flow, filtering water entering the stream, and providing habitat for plants and animals.

4.6.1.3. What laws, policies, or regulations apply to floodplains and related resources in the Angoon area?

Executive Order (EO) 11988, Floodplain Management, requires federal agencies to avoid to the extent possible the long-term and short-term adverse effects associated with occupying and modifying floodplains. If there is no practicable alternative and effects cannot be avoided, federal agencies must develop measures to minimize the effects and restore and preserve the floodplain as appropriate.

No laws regulate effects to or the analysis of the hydrology or geomorphology of streams in the area. However, direct effects to streams are regulated by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act (Public Law [PL] 107-303), as discussed in section 4.5.2.1.2 Aquatic Habitats and Associated Species.

Terms to know

Alluvial stream: A stream whose bed and banks are made from large amounts of sediments and other debris transported by flow. These stream features will change as the rate of flow changes.

Channel form: The three-dimensional shape of a channel, including its sides, bed, sinuosity (the curves it makes through a landscape), and other physical features.

Low flow: The flow in a stream that involves the least amount of water. The water during low flow events is often supplied by groundwater surfacing in the stream channel.

Peak discharge: The maximum amount of flow in a stream during a single flood event. Discharge is typically measured in cubic feet per second (cfs).

Pools: Used here, portions of a river with deeper and slower-moving water.

Recurrence interval: Estimated time between a particular peak discharge (flood) event of a given size. A 100-year flood event will occur on average one in 100 years, and has a 1% chance of occurring in any given year.

Riffles: Sections of river where the water is faster moving, shallower, and usually flowing over cobbles or larger gravel. Riffles are often used by certain fish for spawning.

4.6.2. Existing conditions

4.6.2.1. How did the FAA determine which floodplains and streams could be affected, and their existing conditions?

What is discussed in this section?

The study area consists of the watersheds of all streams that could be affected by at least one action alternative (see Figure FGH2). Mapped locations of streams in watersheds were identified via the National Hydrography Dataset and modified based on fieldwork conducted for this EIS.

Several of the shorter coastal streams do not have watershed boundaries for this analysis. These streams are extremely small and drain relatively flat terraced areas above the intertidal area, making delineating these watersheds difficult or speculative. These streams do not have floodplains. Because their watersheds are small and dominated by wetlands, and because their peak discharge is minor compared to the other watersheds analyzed in this section, effects to their hydrology are discussed in section 4.15.3 Wetlands. In some cases, the stream geomorphology of these small streams might be directly affected, and these effects are discussed per alternative in section 4.6.3.3.

In the Favorite Creek watershed, the topography at the southeastern end of Favorite Bay has a gentle gradient. Similarly, the streams draining into Favorite Creek also have a gentle gradient, with the slopes upstream and downstream of the access road crossings ranging from 0.5% to 3.0% slope (Appendix J). Watershed elevations of the streams draining to Favorite Creek range from 145–435 feet at their highest to sea level at their outlet. Floodplains and hydrologic features of rivers, streams, or lakes are affected by what occurs in the watershed. Any change to the landscape can affect the water bodies downstream. Modifications to the stream channel (for example, anything that constricts or widens it) can affect stream sections both upstream and downstream. Stream sections and floodplains that are upstream and downstream of any of the proposed airports or access roads are included in the analysis because stream channels can be constricted or otherwise altered. Finally, the tidal flat where Favorite Creek meets Favorite Bay is included because it is downstream from the proposed location of two access road alternatives.

4.6.2.2. What are the characteristics of floodplains in the study area?

As shown in Figure FGH3 on the next page, the only floodplains in the study area are along Favorite Creek upstream from Favorite Bay. The Federal Emergency Management Agency (FEMA) is responsible for mapping regulatory floodplain boundaries in the United States. No FEMA flood hazard data or maps are available for Favorite Creek. The floodplains evaluated in this EIS were identified during fieldwork by the FAA's consultant team (Vigil-Agrimis 2011). These floodplains would be crossed by either Access 2 or Access 3. The floodplains are on each side of the stream and heavily vegetated. Both proposed access locations have a high flow channel on the north side that carries excess water during floods. However, at the proposed Access 3 location, the floodplain is narrower and bounded by steep canyon walls, causing it to flood more deeply than broadly during rare floods. There are other floodplains along Favorite Creek, but they are not described in this section because they would not be affected by any of the alternatives.

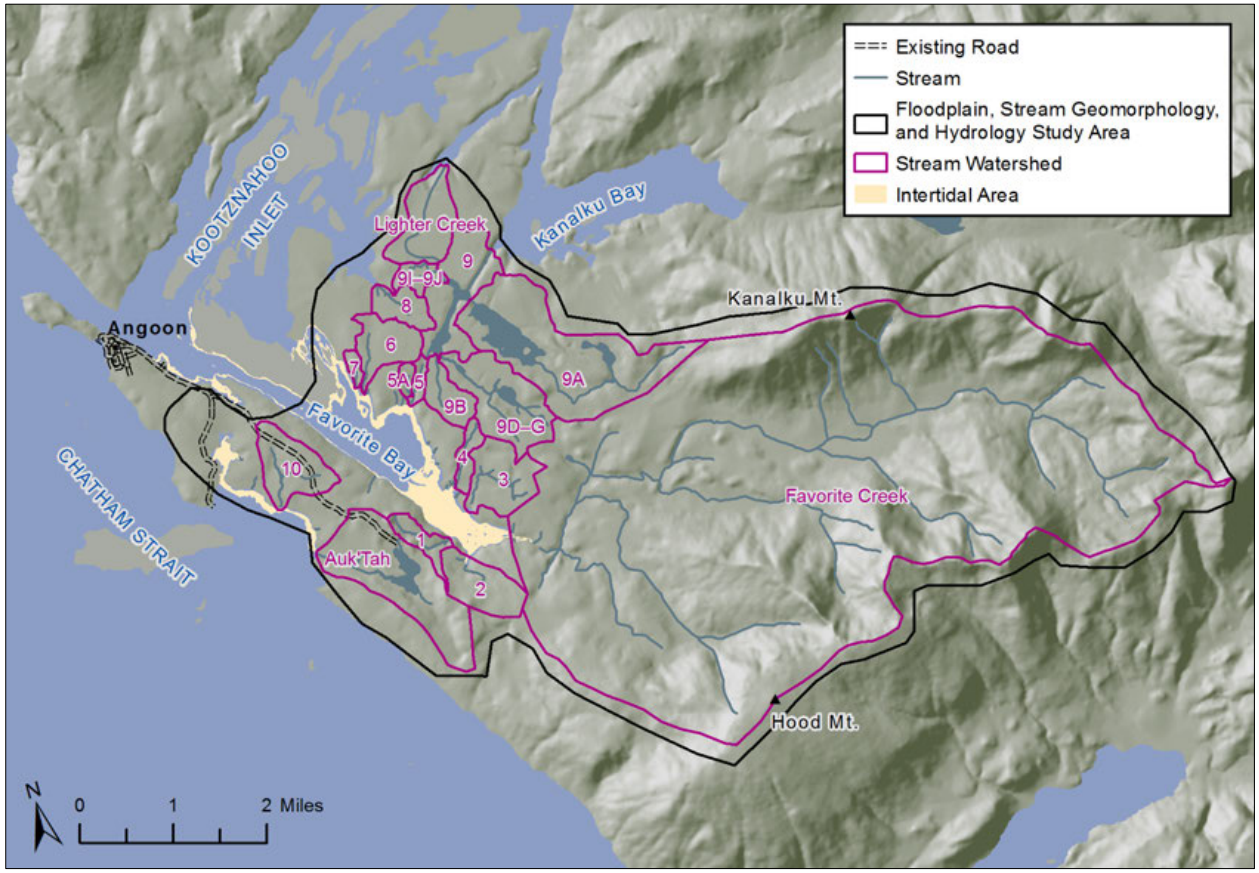


Figure FGH2. The study area for floodplains, stream geomorphology, and hydrology.

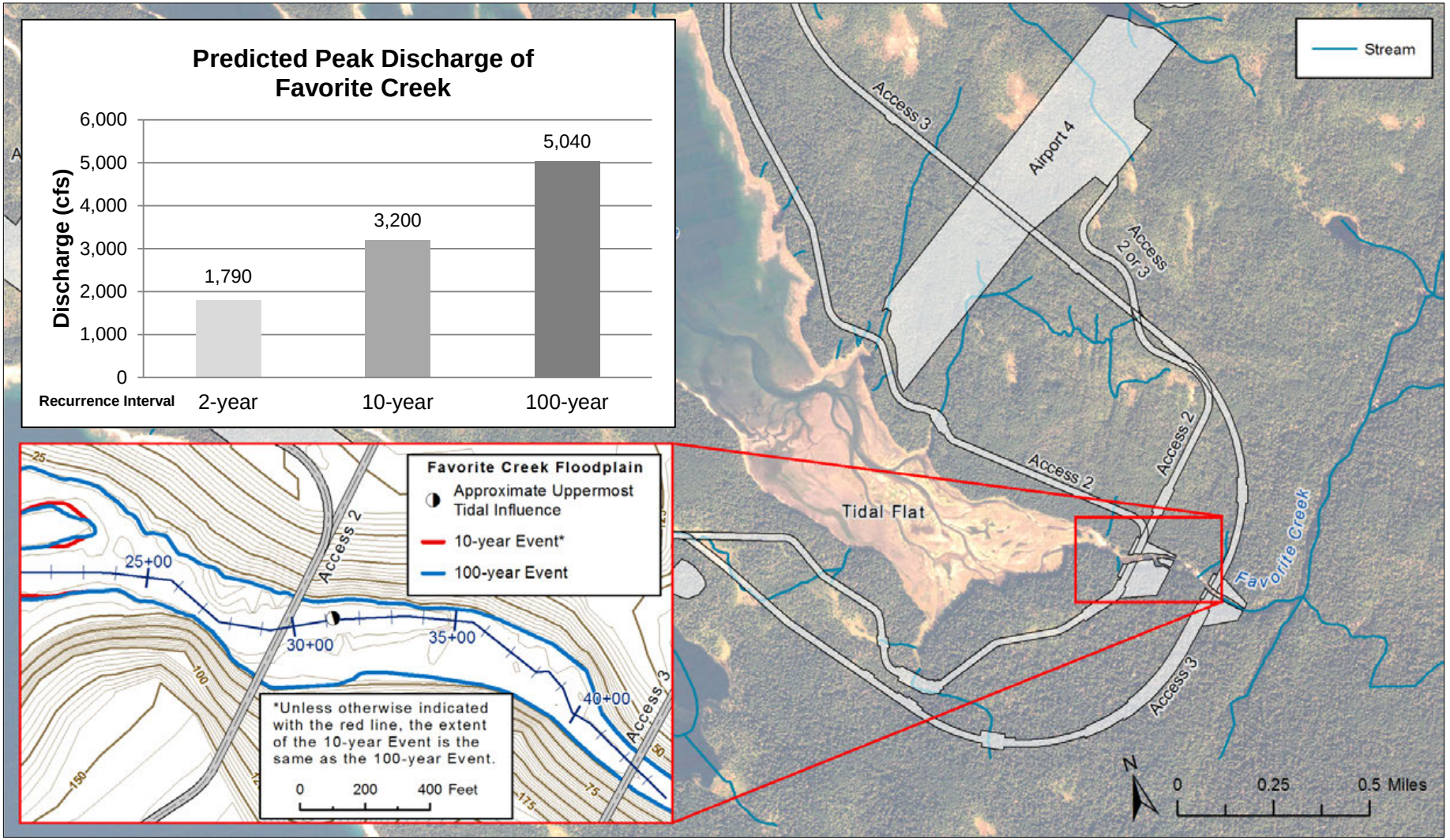


Figure FGH3. Favorite Creek stream channel, peak discharge recurrence intervals, and floodplain.

The southeast corner of Favorite Bay is a tidal flat created through the action of tides and Favorite Creek depositing sediments. The tidal flat extends upstream to meet the Favorite Creek floodplain (see Figure FGH3). This tidal flat is shallower than the rest of Favorite Bay, and winding channels have formed to carry stream flow from Favorite Creek to Favorite Bay. Favorite Creek's floodplains currently provide many of the natural and beneficial functions typical of floodplains (see section 4.6.1.1).

4.6.2.3. What are the physical characteristics of stream channels (stream geomorphology) in the Angoon area?

The lower stretch of Favorite Creek (from the Favorite Bay tidal flat to 1,250 feet upstream) is characterized by a series of riffles and pools connected by ***transition zones*** (Figure FGH4). This type of stream provides good habitat for ***anadromous*** fish and other aquatic organisms (for more on stream habitats for fish in the area, see section 4.5.2 Aquatic Habitats and Associated Species).

Favorite Creek is also categorized as a wide, low-gradient floodplain channel under the Tongass National Forest Channel Type Classification system (Paustian et al. 2010). The upstream portion of Favorite Creek is characterized by hill slopes and mountain slopes directly above the channel, and the valley floors become narrow with few terraces. Short waterfalls, cascades, and boulder runs are common. The channel bottom of Favorite Creek is composed of sand, gravel, cobbles, and, in some places, outcrops of bedrock. In most places along the stream, the channel bottom is affected by ***stream slope***. The steeper the slope, the faster the water will flow and typically wash smaller ***substrate*** (such as sand and small gravel) farther downstream. When the stream slope becomes less steep, the water slows down and this substrate settles to the stream bottom.

Large wood present in a stream environment is important for geomorphic processes and stream habitat. A large wood survey was completed for this EIS (Appendix B in Vigil-Agrimis 2011, included in this EIS as Appendix J), and large wood

Terms to know

Anadromous: A term describing fish that spawn in freshwater but live most of their adult lives in saltwater.

Stream slope: The change in elevation of the water from upstream to downstream over a given length. Steeper stream slopes (a large change in elevation) have faster-moving currents.

Substrate: The material on the bottom of a water body, such as sediment or bedrock underlying wetlands and stream channels. In aquatic habitats, substrate provides the surface material on which a species lives, grows, or feeds.

Transition zones: Used here, areas in a waterway where water flow changes from smooth to turbulent.

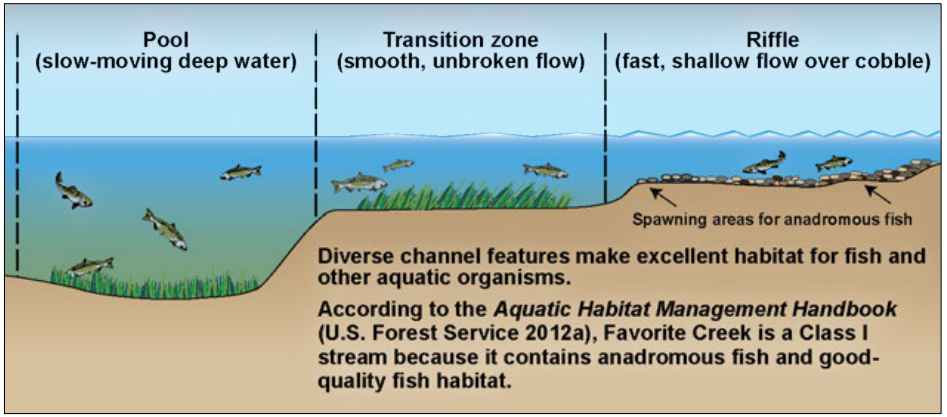


Figure FGH4. An example of channel characteristics found in Favorite Creek.

accumulations at various locations in and alongside the stream channel were measured. The location of such large wood in the stream system is important for the stability of streambanks and for the rate and amount of sediment moving in the water. The location of large wood also plays a vital role in the development of stream habitat and sediment retention; any changes in the type, location, or density of the wood could alter stream channel characteristics and aquatic species habitat.

4.6.2.4. What is the hydrology (the movement, timing, and distribution of water) like in the study area? How does water move through the study area, and how much water flows through the streams?

As shown in Figure FGH2, Favorite Creek is fed by runoff from Kanalku Mountain on the north end of the Favorite Creek watershed and Hood Mountain to the south. This runoff passes through many unnamed tributaries before joining Favorite Creek. Limited data are available to support a detailed analysis of the existing hydrologic conditions, and there are currently no gages to measure stream flow on Favorite Creek. The only historical hydrology data available were gathered by U.S. Geological Survey Gage 15102200 from 2000 to 2003 (U.S. Geological Survey 2008).

Based on a review of the historical gage data and other studies (Curran et al. 2003; Wiley and Curran 2003), Favorite Creek appears to behave like other streams in Southeast Alaska. Peak discharge occurs during large storm events most typical in December and January, as well as during heavy seasonal precipitation that typically occurs in September and October. The stream likely also receives some water from shallow groundwater aquifers even during rainless periods. Favorite Creek's flow ranges widely between peak discharges and low flow events. Peak discharge in Favorite Creek ranges from 1,790 cfs at the 2-year recurrence interval to 5,040 cfs at the 100-year recurrence interval.

The smaller unnamed streams in the study area (shown on Figure FGH5) have peak discharges approximately 10 times lower than those in Favorite Creek. For this EIS, the unnamed streams and their respective watersheds have been given alphanumeric designations.

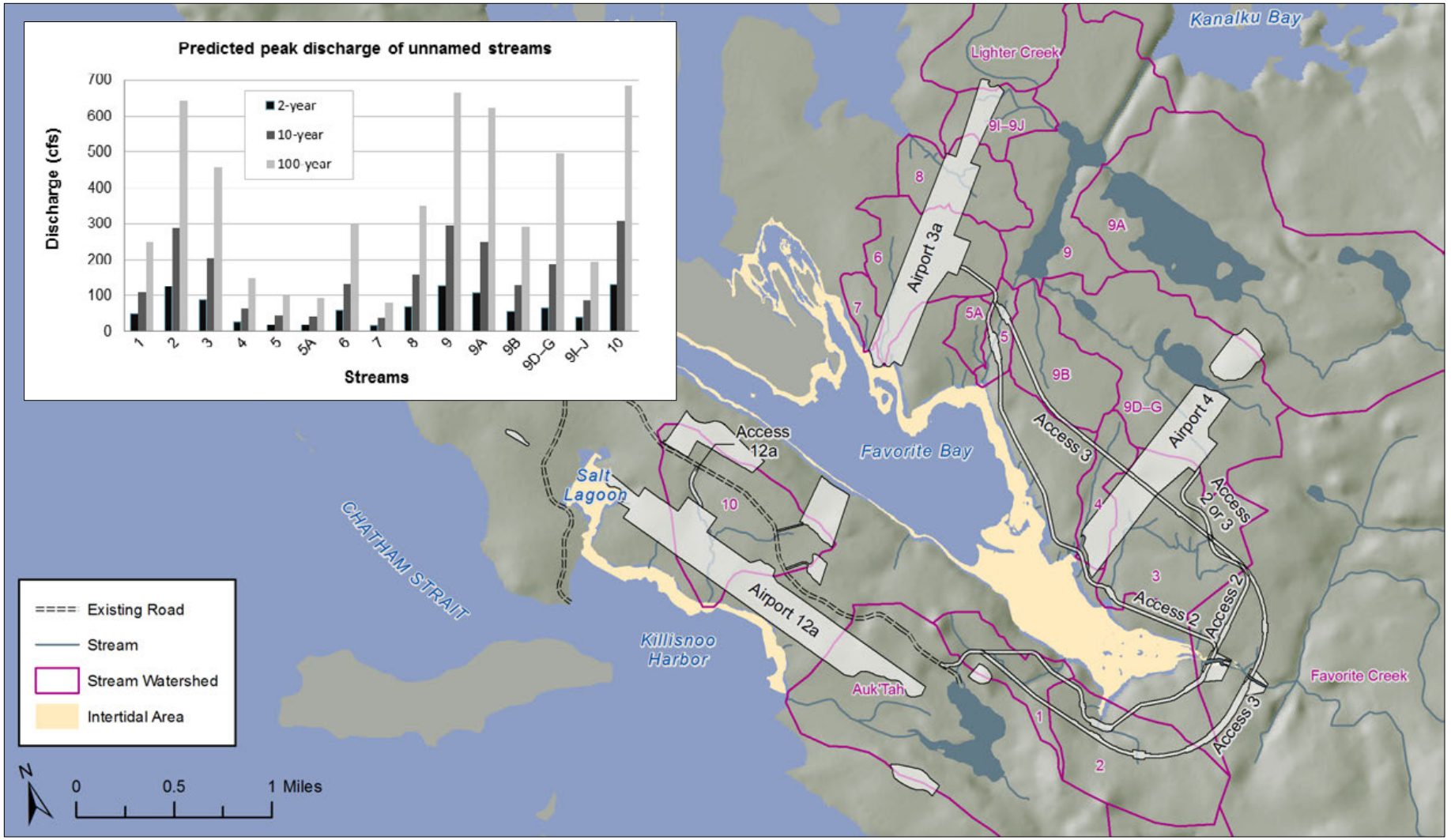


Figure FGH5. Unnamed streams with their watersheds and their peak discharges at key recurrence intervals.

4.6.3. Project effects

What is discussed in this section?

For all action alternatives, construction, operation, and maintenance of an airport and access road would affect floodplains, stream geomorphology, and hydrology. Although the nature of the effects would be the same for all action alternatives, the magnitude and extent of effects would differ per alternative.

The sections below describe the actions causing the effects, the nature of the effects, the methods for analyzing effects, any assumptions used in the analysis, and the magnitude and extent of effects for each alternative.

Floodplains and stream channels are often associated with wetlands or Waters of the U.S. that are regulated by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act (PL 107-303). Information on effects as they relate to Section 404 is found in section 4.5.2 Aquatic Habitats and Associated Species.

4.6.3.1. How did the FAA determine the effects of the alternatives on floodplains, stream geomorphology, and hydrology?

As described in section 4.1, the introduction to Chapter 4, construction actions for all action alternatives would involve vegetation removal related to the airport, road, and avigation easements (clearing of all vegetation for construction, line of sight, and open areas for flight approach and takeoff); terrain disturbance (grading and recontouring the ground surface through cut and fill to create flat surfaces for the road and runway); paving the runway and road; creation of impervious surfaces; and potential extraction of construction materials such as gravel, soil, and rock from an on-island materials source. Four of the five action alternatives would require bridge construction across Favorite Creek.

For the purposes of analyzing effects on floodplains, stream geomorphology, and hydrology, the construction and operation actions are grouped into three categories:

- Landscape modification
- Topographic modification of streams
- Construction and infrastructure in the Favorite Creek floodplain

The effects caused by these actions and the methods used in analyzing these effects are described below.

Landscape modification consists of adding impervious surfaces and disturbing the terrain to construct the airport facilities and access road. Landscape modification also includes clearing trees in rights-of-way and avigation easements. For the sake of effects analysis, it is assumed that all trees within avigation easements would be cut down.

Terms to know

Culverting: The creation of a drain or pipe that allows water to flow under a road, runway, or similar structure.

Pier: Upright support for a structure.

These kinds of modifications would directly affect hydrology by altering the amount of time it takes precipitation from a storm to reach streams and other water bodies. In most cases, the flow would be faster due to a lack of soils and vegetation that would absorb or otherwise slow the flow. Because more surface water would reach water bodies more quickly, the volume of water would also generally increase, as would the peak discharge in streams, as measured for 2-year, 10-year, and 100-year storms.

These effects were quantified using the TR-55 hydrologic model (NRCS 2009a, 2009b). The TR-55 model is widely used in small watersheds due to its flexibility and reliability. This model calculated peak discharges for 2-year, 10-year, and 100-year storms, assuming a specified amount of rain falling uniformly for a specified length of time and considering variables such as local soil types, the amount of vegetation that could stop or slow rain from hitting the soil, and the amount of impervious area. For each alternative, differences in peak discharge for the existing conditions and for the anticipated changes were interpreted and used to describe the expected changes to stream channel form and low flow conditions.

Landscape modification would indirectly affect stream geomorphology in streams where the 2-year peak discharge would increase. This is because the stream channel would slowly change its form and size to adjust to the greater volume of water flowing through it. This adjustment could include widening or deepening the channel, or reducing the channel's sinuosity. Each of these adjustments would result in some erosion as the channel form changed.

Topographic modification of streams consists of ***culverting***, rerouting, or filling streams, or installing bridge support ***piers*** (in the case of Favorite Creek) in areas where construction and long-term use of the airport would require grading or fill to install airport facilities or the access road.

These stream segment modifications would directly affect stream geomorphology because naturally formed riffles and pools could be altered. Per regulation, however, modified stream segments would be designed to allow fish passage where appropriate and to pass water and sediment.

Terms to know

Scour: The action of water eroding a stream channel, typically in areas with increased velocity, power, or slope. This can occur on the bottom of the channel or on the banks.

These topographic modifications would change stream flow, causing indirect effects to stream segments immediately downstream and upstream from culverts or other modifications. ***Scour*** would occur downstream of modified stream segments due to the slope of the streambed becoming steeper and straighter (in other words, the natural sinuosity has been removed) from culverting or rerouting or flow being redirected by bridge piers (at Favorite Creek). Stream segments immediately upstream from culverts, artificial channels, or bridge piers may be subject to pooling and sediment deposition because stream flows would be slower above these structures. These changes would start during the construction phase through land grading and topographic alterations, and would continue during ongoing operation. The effects would generally be limited to the section of stream where these structures were installed, and to a short segment upstream and downstream.

Another type of indirect effect caused by topographic modification of streams would be a reduction in the downstream passage of large wood. This reduction would likely be limited because large wood would still be provided by trees adjacent to the downstream sections, and most of the streams that would be affected by the action alternatives are too small to transport large amounts of wood. However, in larger streams where the alternatives would result in a measurable decrease in large wood downstream, the reduction in wood passage would reduce habitat complexity and the amount of local scouring of the bed. These indirect effects would occur within a short time after construction and would continue as the stream slowly adjusted to new water flow patterns and volumes until reaching a stable form.

These effects from topographic modification were assessed qualitatively with computer mapping software to overlay areas proposed for stream crossings with known streams. The area of streams that would be culverted, rerouted, filled, or have bridge piers installed was then calculated as direct effects, and the results were also interpreted to describe the related indirect effects, such as loss of natural channel form and reduction in the downstream passage of wood. This analysis assumes that stream segments overlapped by terrain disturbance or impervious surfaces associated with the airport or access road alternatives would have a bridge installed (in the case of Favorite Creek) or be culverted, rerouted, or filled.

Construction and infrastructure in the Favorite Creek floodplain consist of the use of construction equipment and the installation of both temporary and permanent bridge support piers. Four of the five action alternatives (Airports 3a and 4) would involve bridge construction over Favorite Creek as part of the access road. The Access 2 permanent bridge would have an estimated two piers surrounded by ***riprap*** at the edge of the stream channel. The Access 3 permanent bridge would not have piers in the stream channel. Construction of the permanent bridge at either access location would require a temporary use area that would likely involve vegetation removal, terrain disturbance, construction of a temporary access road, installation of a temporary bridge, and bridge piers in the stream channel for up to 3 years.

Terms to know

Ordinary high water mark: The line on a shore or streambank created by the rise and fall of water levels. It can be indicated by impressions or shelving on the bank, changes in soil, destruction of vegetation, or the presence of debris.

Riprap: Large rocks protecting a structure, such as a bridge pier, from erosion.

The temporary bridge could be used to move equipment, facilitate construction of the permanent bridge, and as a haul route. To accommodate these uses, the temporary bridge could require numerous in-stream piers. The piers would be installed by a crane situated above the ***ordinary high water mark*** and outside of the stream channel, but within the 100-year floodplain. This analysis assumes that the entire temporary use area would be disturbed because the exact number and location of piers would not be determined until the design phase of the project. The temporary bridge support piers would be located in the Favorite Creek stream channel and floodplains for up to 3 construction seasons, depending on the length of construction.

By altering the existing soil and vegetation conditions in the floodplain, the two permanent piers for Access 2 would cause long-term effects, specifically an increased potential for local erosion of the floodplains during peak discharges and the loss of natural and beneficial floodplain functions, such as habitat, flood storage capacity, groundwater recharge and discharge, and filtration function (the floodplains' ability to improve water quality by filtering out impurities or sediment) in the small areas occupied by the permanent bridge piers. For Access 2 and Access 3, short-term effects would be of the same type as the long-term effects, but would occur in the vicinity of the temporary bridge piers and in the temporary construction use area in addition to the area occupied by the permanent bridge piers.

These effects were assessed by overlaying areas proposed for temporary construction and permanent bridge piers relative to the floodplain and Favorite Creek stream channel, and calculating how much of the floodplain would be physically altered for bridge construction. This analysis assumes that any bridge built to cross Favorite Creek would require piers be placed above the active stream channel or ordinary high water mark due to log jam potential. Due to the width of the Favorite Creek 100-year floodplain and the engineering limitations of bridge construction, this analysis

assumes that bridge piers would need to be placed in the 100-year floodplain. This analysis further assumes that best management practices for site reclamation and revegetation would be implemented in temporary use areas located in floodplains.

4.6.3.2. How did the FAA determine the significance of the anticipated effects from the alternatives?

For floodplains, the threshold for significance is based on the Federal Aviation Administration (FAA) *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b), as well as on EO 11988, which bars floodplain encroachment unless no practicable alternative exists and measures to minimize unavoidable short-term and long-term effects are taken. In accordance with FAA Order 5050.4B and the U.S. Department of Transportation Floodplain Management and Protection Order 5650.2, effects that would be considered significant are those that would result in a high probability of the loss of human life, could cause future extensive damage to transportation facilities, or could cause notable adverse effects to natural and beneficial floodplain functions. For the purposes of this analysis, "notable" effects are considered to be any adverse effects that result in measurable increases in flooding, measurable decreases in the associated water body's support of aquatic life, or a violation of water quality standards.

For stream geomorphology and hydrology, FAA Order 5050.4B does not provide significance thresholds. For this reason, this EIS discusses only the magnitude of effects on the maintenance of natural stream systems and their ability to support wildlife and fish habitat. (Effects to aquatic habitats, themselves, are addressed in section 4.5.2.3 in Aquatic Habitats and Associated Species.)

4.6.3.3. How would each alternative affect floodplains, stream geomorphology, and hydrology?

4.6.3.3.1. No action alternative

There would be no new airport or access road construction or materials extraction from an on-island source under the no action alternative. Effects to floodplains, stream geomorphology, and hydrology would be of the type and extent currently occurring.

4.6.3.3.2. Airport 3a with Access 2 (proposed action) or Access 3

Effects to hydrology and stream geomorphology

As described in section 4.6.3.1, landscape modification would directly affect hydrology by increasing the flow of water across the ground surface, the volume of water in downstream water bodies, and the peak discharge during storms. Topographic modification of streams would directly affect stream geomorphology by altering streambed features such as riffles and pools. Downstream segments could experience indirect effects due to scour, and upstream segments could experience indirect effects due to pooling and sediment deposition. In watersheds where the peak discharge would be increased, the stream channels could widen, deepen, or straighten.

Under Airport 3a, long-term hydrologic changes would have measureable effects in eight streams, regardless of the access road (see Figures FGH6 and FGH7). Three watersheds—6, 8, and 9I–9J—would experience the greatest changes in landscape modification, resulting in peak discharge increases of greater than 10% to those streams over the long term. The greatest change would be in Stream 6, where the 2-year peak discharge would increase by approximately 33% over current conditions (the no action alternative). An increase of 33% would change the stream channel over time as the channel adjusts to the greater volume of water flowing through it. The hydrologic changes resulting from these effects would likely be noticeable to the casual observer and would exist over the long term.

For the Airport 3a access alternatives, the long-term hydrologic change from the Kootznoowoo, Inc. materials source would be the same, with a 5% increase in the 2-year peak discharge occurring in Stream 10. In general, the long-term hydrologic changes would be the same for either Access 2 or Access 3 except in Stream 5. In most streams, the changes would be small enough to likely go unnoticed by the casual observer, and may not be measureable given that a change of less than 10% would be well within the natural annual variability in flows, and would therefore cause little channel adjustment.

Long-term direct effects to stream geomorphology under Airport 3a would result from both the airport and access roads (Figures FGH6 and FGH7). Under Airport 3a with Access 2, a total of 0.3 acre of stream segments on 15 streams would be topographically modified and directly affected by being channeled into culverts, rerouted, filled, or having permanent bridge support piers installed (in the case of Favorite Creek). Under Airport 3a with Access 3, a total of 0.2 acre of stream segments on seven streams would be directly affected by the same types of actions, except that there would be no permanent bridge support piers installed for the Favorite Creek bridge crossing.

Of the stream channels affected under Airport 3a, the greatest area of disturbance to a single stream segment would be 0.1 acre (Stream 2) with Access 2 and 0.1 acre (Stream 1) with Access 3. These long-term direct effects to stream channels would primarily be associated with road crossings and the airport terrain disturbance (Figures FGH6 and FGH7). As compared to Airport 4 and Airport 12a, these relatively short segments would be more easily designed (as culverts or rerouted channels) and mitigated, and less likely to affect upstream and downstream channel characteristics (for example, changes in slope, water velocity, and sediment transport).

Seven (Access 3) or 15 (Access 2) streams would experience long-term indirect effects from limitations on the movement of large wood due to installation of culverts or other modifications, depending on which access road is considered (see Figures FGH6 and FGH7).

At the Access 2 Favorite Creek bridge crossing, it is possible that during construction (estimated to last up to 3 construction seasons) three to 10 piers would be placed in the Favorite Creek stream channel to support the temporary bridge, and that the Access 3 crossing would have two to five piers. As described in section 4.6.3.1, piers in the stream channel can alter water flow direction and intensity, causing scour. The movement of large wood would also likely be restricted by the in-stream piers. These would be temporary indirect effects to the Favorite Creek stream geomorphology that would end once the temporary bridge was removed. Because there would be more in-stream support piers for the Access 2 temporary bridge, it would have greater effects to stream geomorphology than the Access 3 temporary bridge.

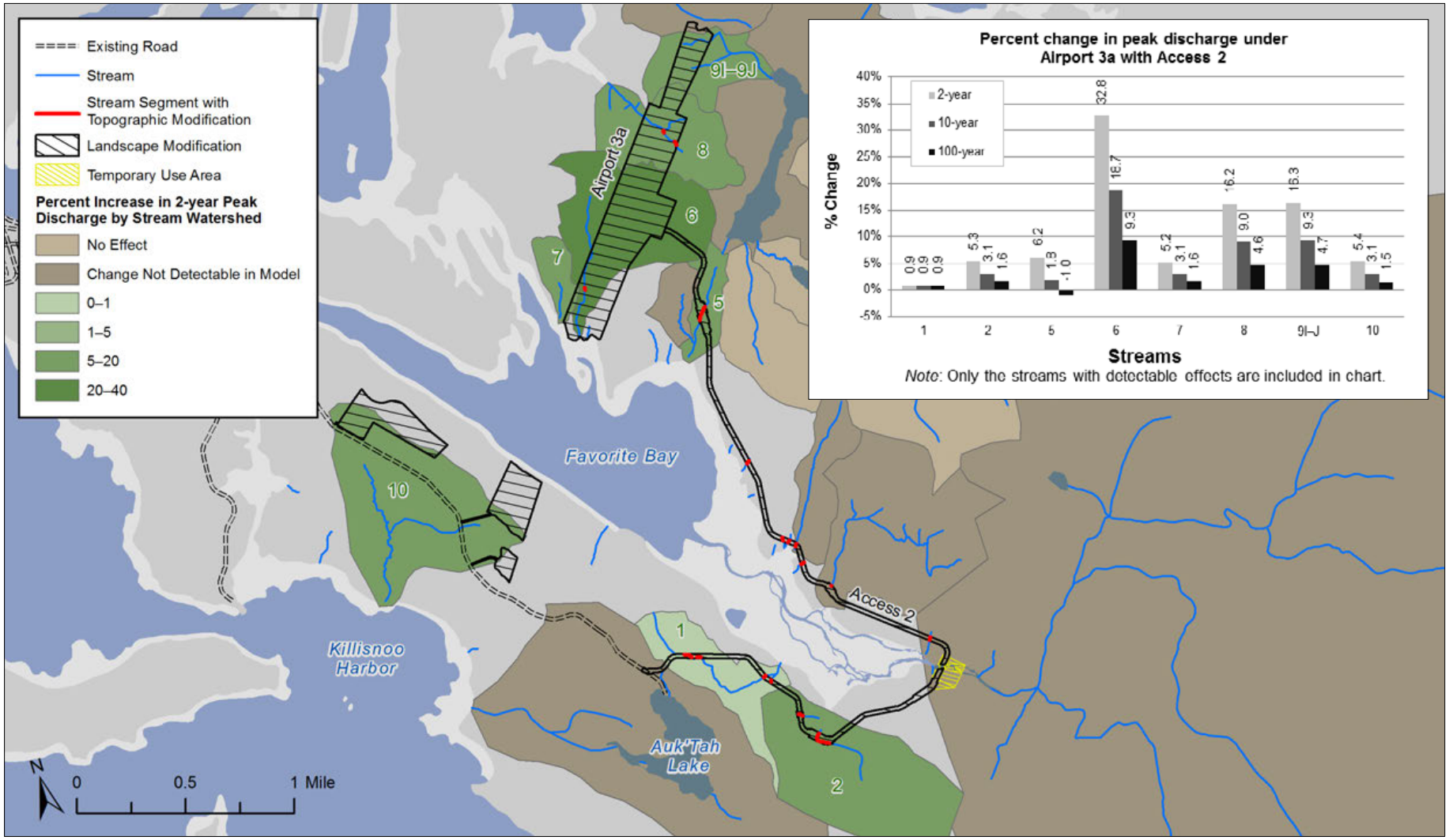


Figure FGH6. Effects to hydrology and stream geomorphology from Airport 3a with Access 2.

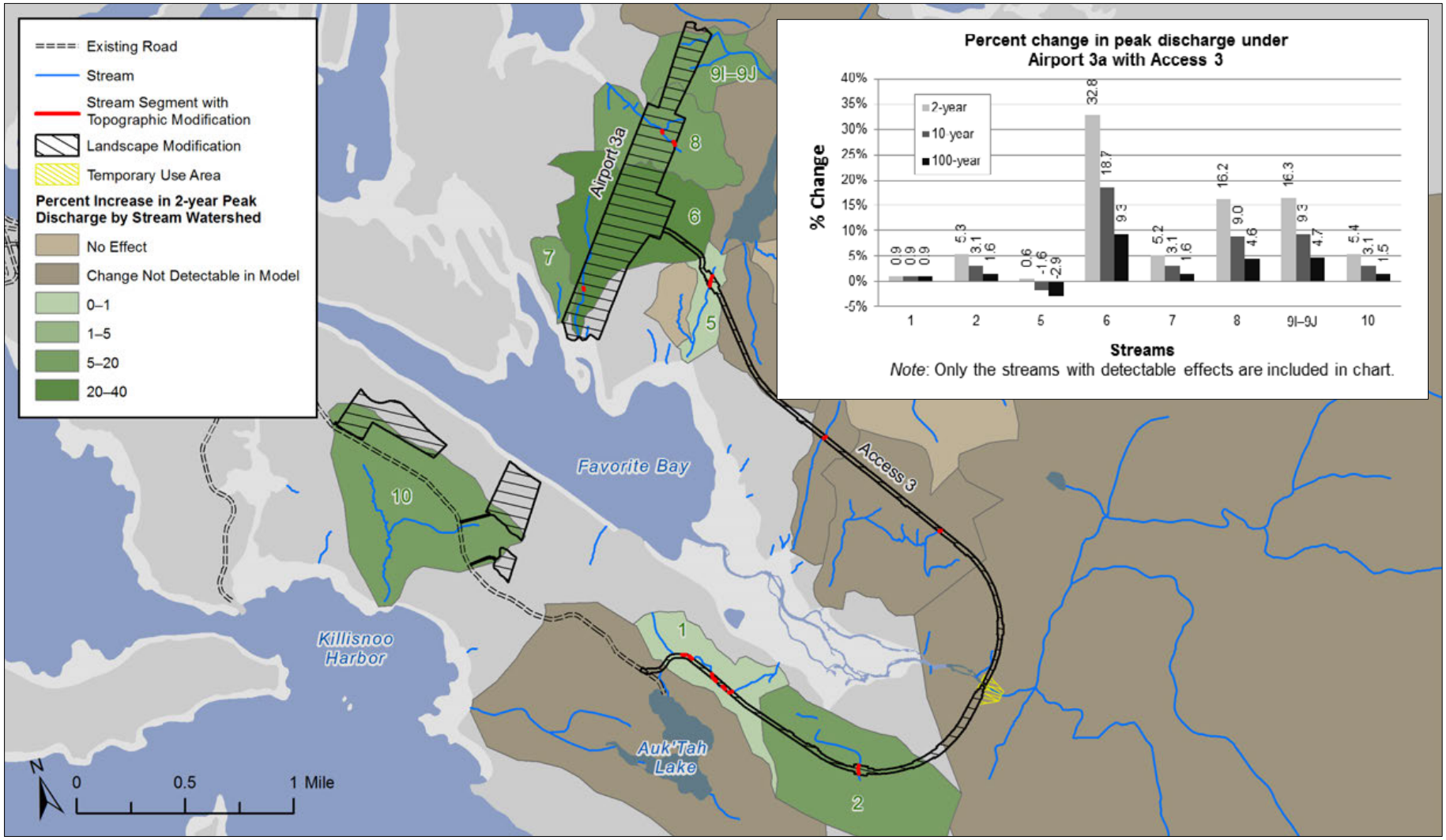


Figure FGH7. Effects to hydrology and stream geomorphology from Airport 3a with Access 3.

Effects to floodplains

As described in section 4.6.3.1, effects to Favorite Creek floodplains would be caused by construction and bridge infrastructure in those floodplains. Construction activities would reduce the filtration function of the floodplains in the short term until vegetation and soils were reclaimed. The long-term effects would be an increased potential for local floodplain erosion during 10-year or 100-year peak discharges, and the loss of natural and beneficial floodplain functions in the small areas occupied by the permanent bridge piers.

Under Airport 3a with either Access 2 or Access 3, the Favorite Creek floodplains would be directly affected by construction activities and the installation of a temporary use area and temporary bridge over Favorite Creek.

Under Access 2, a total of 1.8 acres would be accessed temporarily during construction, resulting in soil compaction, loss or crushing of vegetation, increased erosion, and decreased filtration function. These short-term construction effects would cease as vegetation was reestablished. Approximately 1,310 square feet would be occupied by permanent bridge piers over the long term.

Under Access 3, a total of 0.2 acre would be accessed temporarily during construction, resulting in soil compaction, loss or crushing of vegetation, increased erosion, and decreased filtration function. These short-term construction effects would cease as vegetation was reestablished. There would be no permanent bridge piers located in the Favorite Creek floodplains.

4.6.3.3.3. Airport 4 with Access 2 or Access 3

Effects to hydrology and stream geomorphology

As described in section 4.6.3.1, landscape modification would directly affect hydrology by increasing the flow of water across the ground surface, the volume of water in downstream water bodies, and the peak discharge during storms. Topographic modification of streams would directly affect stream geomorphology by altering streambed features such as riffles and pools. Downstream segments could experience indirect effects due to scour, and upstream segments could experience indirect effects due to pooling and sediment deposition. In streams where the peak discharge would be increased, the stream channels could widen, deepen, or straighten.

Under Airport 4, long-term hydrologic changes would have measureable effects in seven streams, regardless of the access road considered (see Figures FGH8 and FGH9). The effects would be concentrated in Streams 3, 4, and 9D–G, which would have the most landscape modification. The biggest change would be in Stream 4, where the 2-year peak discharge would increase by approximately 23% compared to current conditions (the no action alternative). The hydrologic changes would be similar regardless of the access alternative (Access 2 or Access 3). As with Airport 3a with either access, the hydrologic change from the Kootznoowoo, Inc. materials source under both Airport 4 alternatives would be the same (5% increase in the 2-year peak discharge). Because the long-term hydrologic effects would be greatest in Streams 3, 4, and 9D–G (greater than 10%), the resulting change in channel dimensions to adjust to the new hydrology would be most intense in those streams, would be the most likely to be noticeable to the casual observer, and would exist over the long term. In other streams, the changes would be small enough to most likely go unnoticed by the casual observer, and may not be measureable given that a change of less than 10% would likely be well within the natural annual variability in flows, and would therefore cause little channel adjustment.

Long-term direct geomorphic effects under Airport 4 would result from both the airport and access roads (Figures FGH8 and FGH9). Under either Access alternative, 0.5 acre of stream segments would be channeled into culverts, rerouted, filled, or have permanent bridge support piers installed (in the case of Access 2 across Favorite Creek). This would occur on nine streams for Access 2 and six streams for Access 3. There would be no permanent bridge support piers installed at the Access 3 bridge crossing.

Of the stream channels affected under Airport 4, the greatest area of disturbance to a single stream segment would be 0.3 acre (Stream 9D–G). These long-term direct effects would be associated with both road crossings and the terrain disturbance for the airport (Figures FGH8 and FGH9). Due to the high position of the affected portion of this stream in the watershed with little or no stream channel above the airport location, all natural stream function would presumably be lost in and upstream of the airport area. This channel disturbance would affect approximately 39% of the Stream 9D–G stream channels in the Aquatic Habitats and Associated Species study area (see Figure AHAS2 in Aquatic Habitats and Associated Species). This area of stream would be difficult to design as a natural channel if rerouted, so there would be a risk of downstream changes in channel width, depth, or form (in addition to the direct effects) due to alteration of water velocity or sediment size and volume delivered from disturbed channels.

Six (Access 3) or nine (Access 2) streams would experience long-term indirect effects from limitations on the movement of large wood due to installation of culverts or other modifications, depending on which access road is considered (see Figures FGH8 and FGH9).

The temporary indirect effects to the Favorite Creek stream geomorphology from the Airport 4 with Access 2 or Access 3 temporary bridge support piers would be the same as those described for Airport 3a with Access 2 or Access 3.

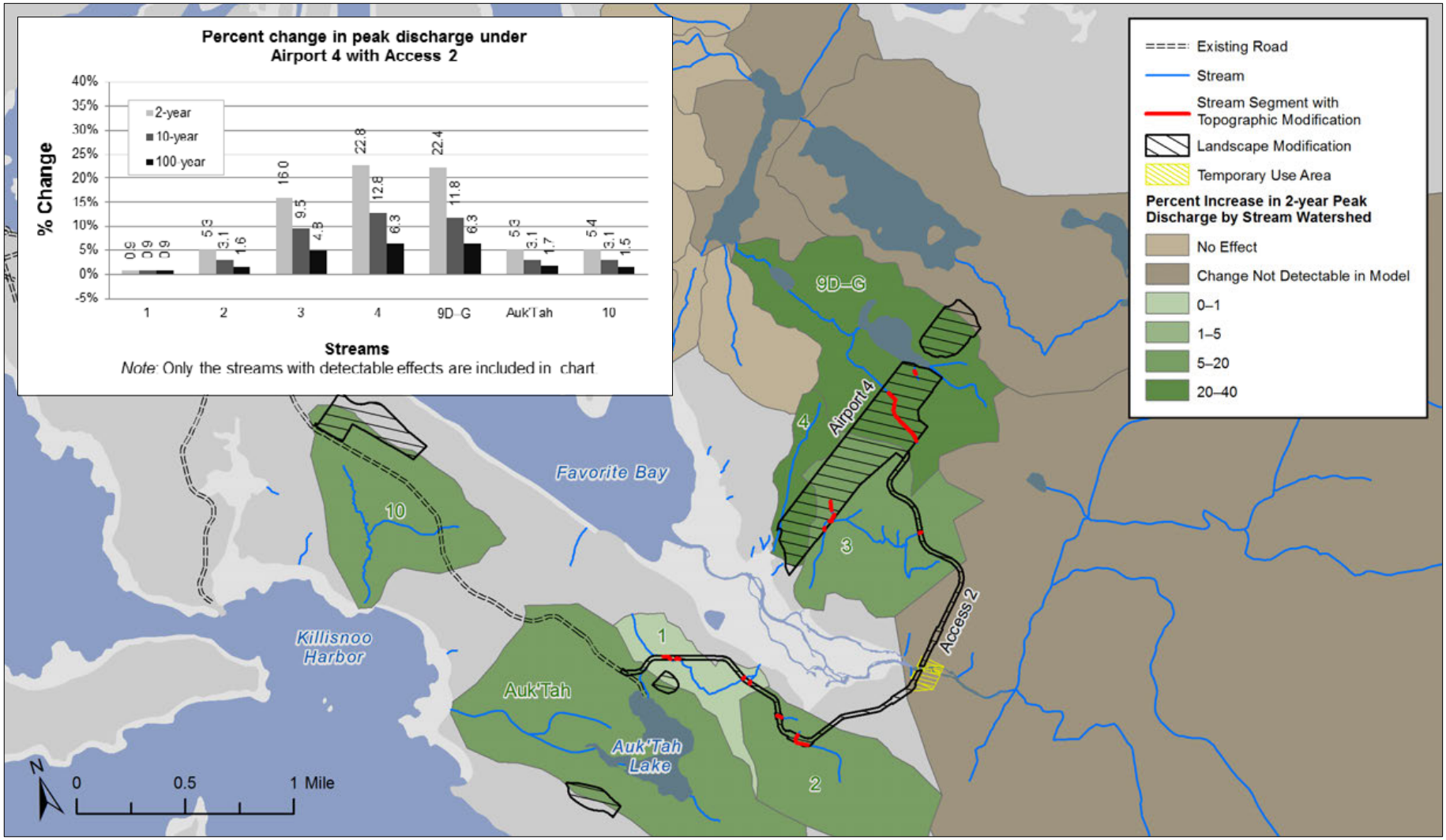


Figure FGH8. Effects to hydrology and stream geomorphology from Airport 4 with Access 2.

Effects to floodplains

As described in section 4.6.3.1, effects to the Favorite Creek floodplains would be caused by construction and bridge infrastructure in those floodplains. Construction activities would reduce the filtration function of the floodplains in the short term until vegetation and soils are reclaimed. The long-term effects would be an increased potential for local floodplain erosion during 10-year or 100-year peak discharges and the loss of natural and beneficial floodplain functions in the small areas occupied by the permanent bridge piers.

Under Airport 4, the floodplain effects to Favorite Creek from either Access 2 or Access 3 would be the same as those described for Airport 3a because Access 2 and Access 3 cross the Favorite Creek floodplains in the same location under either airport alternative.

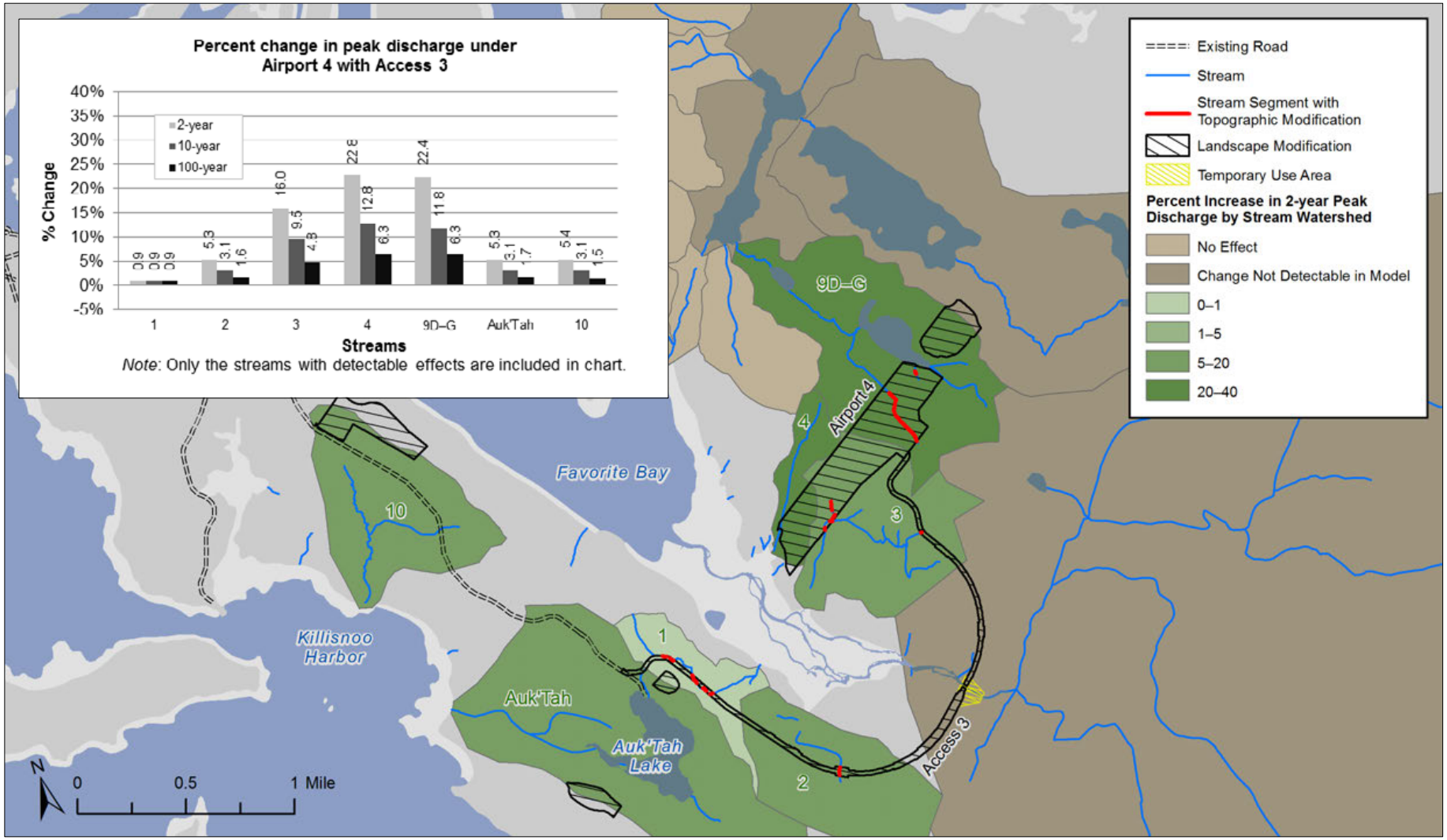


Figure FGH9. Effects to hydrology and stream geomorphology from Airport 4 with Access 3.

4.6.3.3.4. Airport 12a with Access 12a (preferred alternative)

Effects to hydrology and stream geomorphology

As described in section 4.6.3.1, landscape modification would directly affect hydrology by increasing the flow of water across the ground surface, the volume of water in downstream water bodies, and the peak discharge during storms. Topographic modification of streams would directly affect stream geomorphology by altering streambed features such as riffles and pools. Downstream segments could experience indirect effects due to scour, and upstream segments could experience indirect effects due to pooling and sediment deposition. In streams where the peak discharge would be increased, the stream channels could widen, deepen, or straighten.

Under Airport 12a with Access 12a, long-term hydrologic changes would have measureable effects in two streams (see Figure FGH10). The Stream 10 and Auk'Tah watersheds would be affected by landscape modification, where the 2-year peak discharge of those streams would increase by 16% and 5% over existing conditions, respectively. The 5% increase for the Auk'Tah stream is not expected to cause geomorphic changes, which would be anticipated only where an increase greater than 10% is modeled. Because Stream 10 would experience 16% increase in the 2-year peak discharge, long-term geomorphic changes and erosion would be apparent in that stream.

Long-term direct effects to stream geomorphology under Airport 12a would result from both the airport and access road (Figure FGH10). A total of 1.2 acres of stream segments would be directly affected by being channeled into culverts, rerouted, or filled under Airport 12a. Approximately 79% of the Stream 10 channel area would be affected in the study area (see Figures AHAS2 and FGH10). Due to the relatively high percentage of stream channel area affected, all natural stream function would be lost within the airport footprint, and additional changes in channel width, depth, or form would extend noticeably downstream due to alteration of water velocity or sediment size and volume delivered. This area of stream would be difficult to design as natural channels if this stream were rerouted.

Stream 10 would experience long-term indirect effects from limitations on the movement of large wood due to installation of culverts or other modifications (see Figure FGH10).

Effects to floodplains

The Favorite Creek floodplains would not be affected under Airport 12a with Access 12a because a bridge crossing the creek would not be necessary.

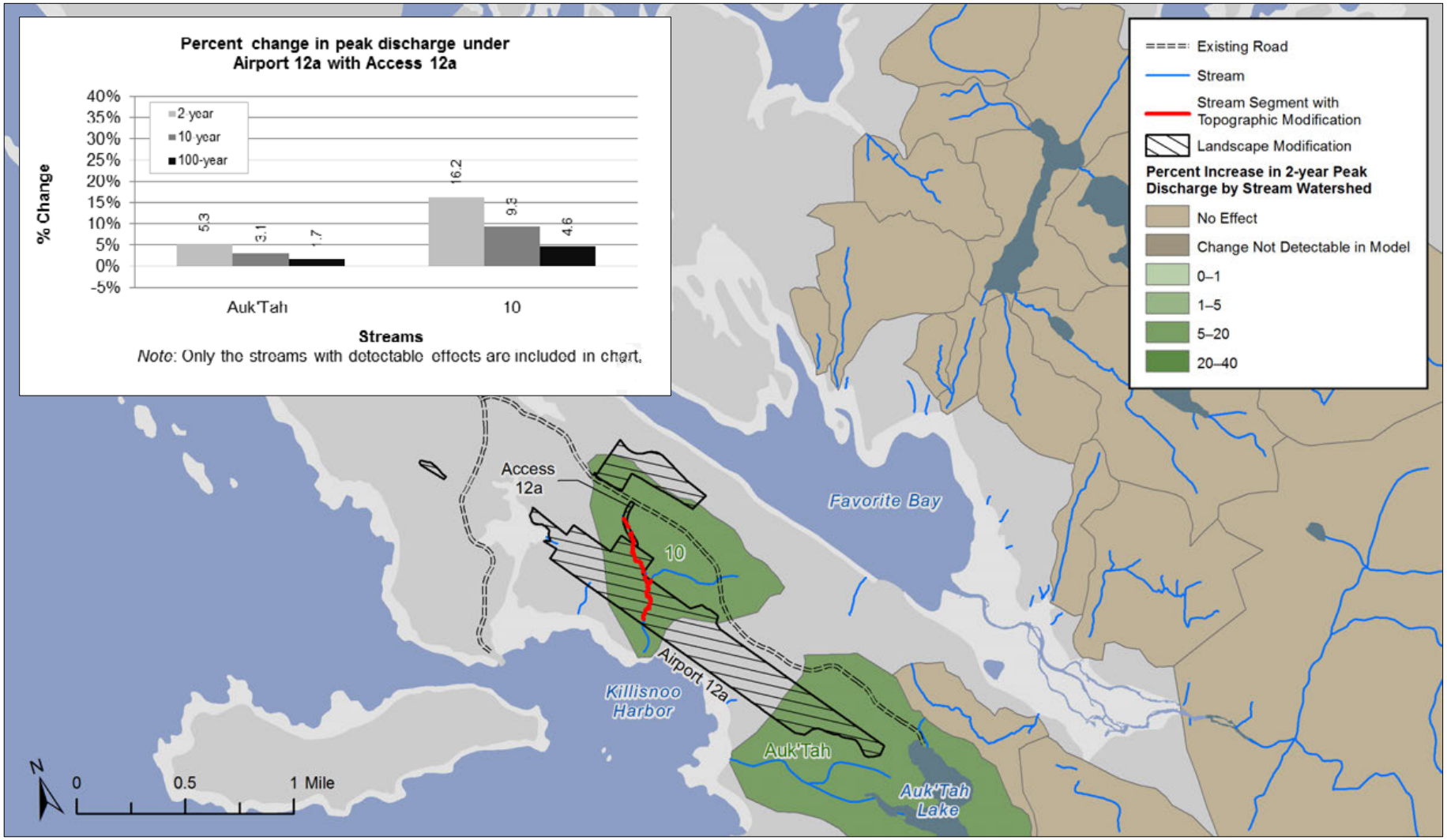


Figure FGH10. Effects to hydrology and stream geomorphology from Airport 12a with Access 12a.

4.6.3.4. How do the effects to floodplains, stream geomorphology, and hydrology compare?

Table FGH1 compares the quantitative effects under each alternative.

Table FGH1. Comparison of effects to floodplains, stream geomorphology, and hydrology

Effect	No action alternative	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Number of streams with measureable hydrologic changes	0	8	8	5	6	2
Number of streams with a greater than 10% change in 2-year peak discharge	0	3	3	3	3	1
Maximum change in 2-year, 10-year, and 100-year peak discharges	0 streams	33%, 19%, 9% in Stream 6	Same as Airport 3a with Access 2	23%, 13%, 6% in Stream 4	Same as Airport 4 with Access 2	16%, 9%, 5% in Stream 10
Total stream channel area directly affected through culvert placement, rerouting, filling, or installation of bridge piers	0	0.3 acre	0.2 acre	0.4 acre	0.5 acre	1.2 acre
Largest single stream effect from bridge piers, culverts, rerouting, or filling streams*	0	36% (Stream 2)	16% (Stream 1)	39% (Stream 9D–G)	Same as Airport 4 with Access 2	79% (Stream 10)
Number of streams directly affected through culvert placement, rerouting, filling, or installation of bridge piers	0	15	7	9	6	1
Number of temporary bridge support piers that would affect Favorite Creek stream geomorphology	0	3–10	2–5	Same as Airport 3a with Access 2	Same as Airport 3a with Access 3	0
Acres of temporary construction use in Favorite Creek floodplains	0	1.8	0.2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 3	0
Square feet of Favorite Creek floodplains occupied by permanent bridge piers	0	1,310	0	Same as Airport 3a with Access 2	Same as Airport 3a with Access 3	0

*These percentages were calculated using the total stream acreages per stream in the Aquatic Habitats and Associated Species study area (see section 4.5.2).

4.6.3.5. Would any effects be irreversible or irretrievable?

There would be no irreversible or irretrievable effects to floodplains, stream geomorphology, or hydrology during construction or ongoing operation.

4.6.3.6. Would any of the alternatives have a significant effect on floodplains, stream geomorphology, and hydrology?

As stated in section 4.6.3.2, the FAA does not have established significance thresholds for stream geomorphology and hydrology, and does not set them in this EIS. Airport 12a would likely result in the greatest effects to hydrology and stream geomorphology. Because approximately 79% of the Stream 10 channel area would be culverted or rerouted under Airport 12a, all natural stream function would presumably be lost within the airport footprint. Changes in channel width, depth, or form would likely extend noticeably downstream due to changes in water velocity or sediment size as well as the volume of water coming from disturbed channels. This area (and large percentage) of rerouted or culverted channel would be difficult to design in a way that would maintain its ability to support wildlife and fish habitat and natural geomorphic systems of sediment and water movement.

The other alternatives would also result in effects to hydrology or stream geomorphology but not of the same magnitude as for Airport 12a. The affected streams would likely maintain their ability to support wildlife and fish habitat in non-affected sections and to support natural sediment and water movement. This is based on the smaller percentages of stream affected, the occurrence of effects on tributary channels, and more easily mitigated effects.

None of the alternatives would result in significant long-term encroachment effects to floodplains as defined in section 4.6.3.2. Airport 3a and Airport 4 with either Access 2 or 3 would change the floodplains only in the locations of bridge piers, causing limited and localized effects to the floodplains' natural and beneficial functions, such as flood storage and filtration. The limited area of the piers would not endanger human lives or reduce floodplain capacity enough to measurably increase flood risk.

4.6.3.7. How could the effects be avoided, minimized, or mitigated?

Because no significant effects are anticipated for these resources, no additional mitigation measures beyond those discussed in Chapter 7: Mitigation would be implemented under any action alternative. Chapter 7 describes best management practices that would be implemented during construction. Best management practices are relatively common activities in construction and are intended to prevent pollution, minimize environmental harm, and assure that appropriate response action is taken if unacceptable environmental effects occur. Through the use of these best management practices, effects are reduced during construction. The best management practices described in Chapter 7 were considered during effects analysis for this resource.

4.7. Hazardous Materials, Pollution Prevention, and Solid Waste

This section describes three issues—hazardous materials, pollution prevention, and solid waste—as they relate to the Angoon Airport project.

What is discussed in this section?

4.7.1. Background information

4.7.1.1. What do the terms "hazardous materials," "pollution prevention," and "solid waste" mean?

Terms to know

Hazardous substances: Substances that are severely harmful to human health and the environment.

Hazardous waste: Solid wastes that are ignitable, corrosive, reactive, or toxic.

The term "hazardous materials" refers to any substances or materials commercially transported that pose unreasonable risk to public health, safety, and property (49 Code of Federal Regulations [CFR] 172). Hazardous materials include ***hazardous waste*** and ***hazardous substances***, as well as petroleum and natural gas.

"Pollution prevention" refers to measures that help prevent uncontrolled releases of hazardous materials into the human and natural environment. These measures include best management practices such as regular cleanup and disposal of waste, preventive maintenance schedules, material management procedures, spill prevention and response procedures, waste reduction and treatment, visual inspections, management of runoff, recordkeeping and reporting, employee training, and material and product substitution.

"Solid waste" broadly refers to waste like garbage and sludge from sewage or water treatment plants. It generally includes any waste product that is not ignitable, corrosive, reactive, or toxic, and that is therefore not considered hazardous.

4.7.1.2. What laws or regulations apply to hazardous materials, pollution prevention, and solid waste in the Angoon area?

Section 10 of Appendix A in the Federal Aviation Administration's (FAA) *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) identifies the Resource Conservation and Recovery Act (40 CFR 239–282) and the Comprehensive Environmental Response, Compensation, and Liability Act (42 United States Code [USC] 103) as the laws of greatest importance when new airport facilities are proposed and operated. To comply with federal law, the FAA requires that an environmental impact statement (EIS) identify and disclose any hazardous materials and solid waste sites that could be disturbed by any of the action alternatives. The EIS must also disclose any hazardous materials or solid wastes that could be used, generated, transported, stored, or disposed of as a result of any action alternative. Pollution prevention measures must be incorporated into the alternatives early in their planning and throughout the project design.

4.7.2. Existing conditions

4.7.2.1. How did the FAA determine the presence, absence, and nature of hazardous materials, pollution prevention, and solid waste?

What is discussed in this section?

Federal and state databases were assessed to determine if any known hazardous material sites are present in the Angoon area, specifically in areas that could be affected by any of the action alternatives. The Alaska Department of Environmental Conservation compiles data on petroleum, landfills, hazardous chemicals, underground storage tanks, and contaminated sites. The Environmental Protection Agency maintains information on some hazardous waste sites, safe drinking water, hazardous waste generators and disposal operations, and toxic releases. Literature from past environmental studies in the Angoon area was reviewed to compare any hazardous materials or solid wastes that might be related to the existing Angoon Seaplane Base with the potential hazardous materials and solid wastes that would be related to a land-based airport. Details on the Angoon Seaplane Base are few, but direct observation of its operations indicates that the amount of hazardous materials or solid waste currently used or generated is small.

No environmental site assessment was conducted for any action alternative; however, field conditions were observed at the alternatives' proposed locations during resource surveys conducted for this EIS. No dump sites, discarded barrels, derilect equipment, or areas of chemical-stained soils were observed. To confirm these observations, an environmental site assessment would be necessary for any lands ultimately purchased, transferred, or leased for the Angoon Airport project.

4.7.2.2. Are there any known hazardous materials or solid waste sites in the area today?

No hazardous materials or solid waste sites are known to exist in proposed location of any alternative. The land is largely undisturbed and lacks signs of past dumping or contamination. There are few roads, and evidence of human activity outside developed areas consists of informal foot trails that residents have created for ***subsistence use***. The proposed location of Airport 12a with Access 12a is closest to the populated area but still nearly inaccessible to humans due to dense vegetation and difficult terrain. Figure HZ1 and Table HZ1 show known hazardous material storage and solid waste disposal locations in the Angoon area. All these sites are located in and near the developed community area of Angoon and on the peninsula to the southeast. No hazardous materials, pollutants, or solid waste sites are known to exist on the lands managed by the U.S. Forest Service in the proposed locations of Airport 3a and Airport 4 and their access alternatives.

Terms to know

Subsistence use: According to Section 803 of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 (PL 96-487), "the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade." See section 4.13 Subsistence Resources and Uses for more information.

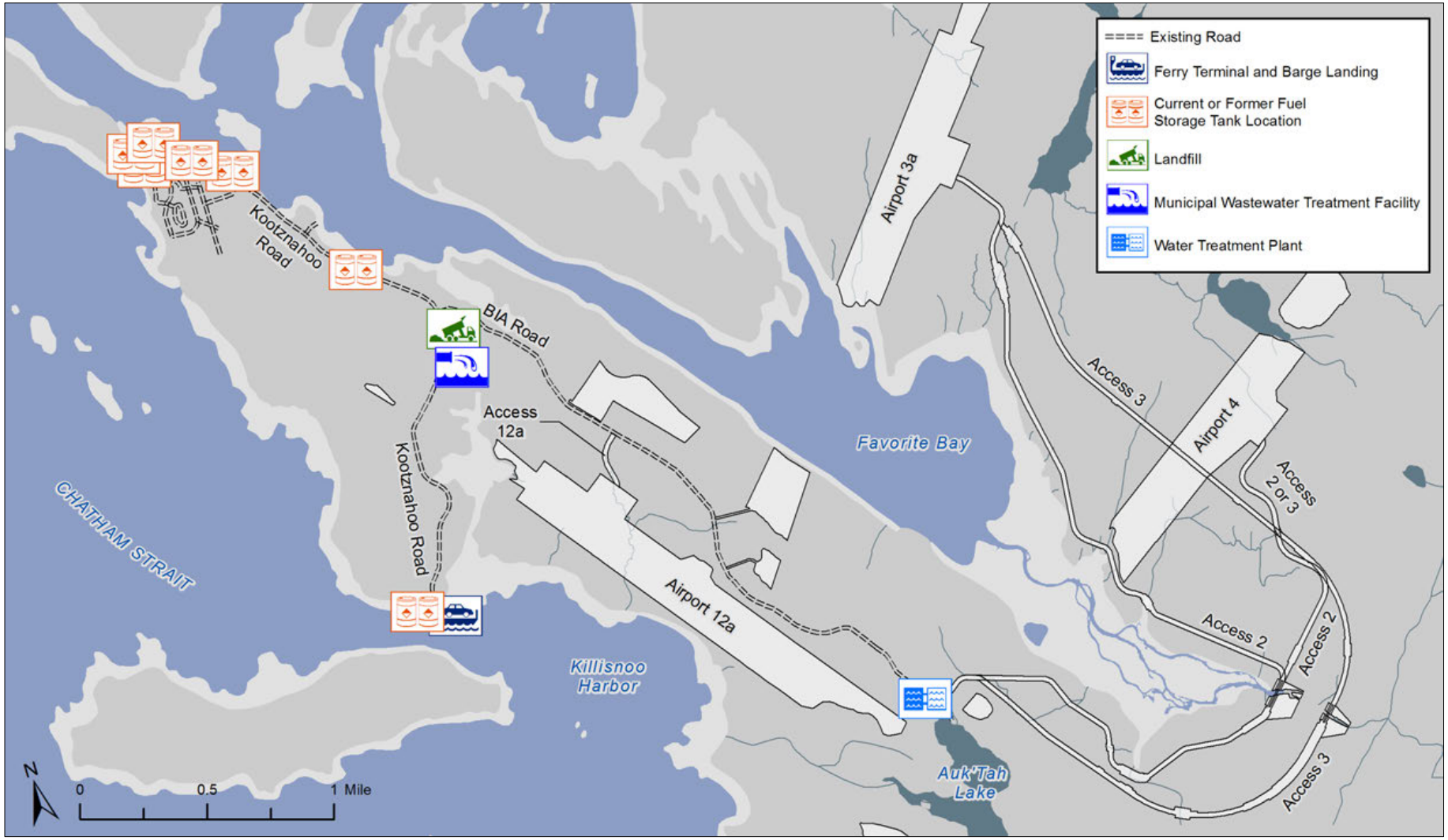


Figure HZ1. Facilities in the Angoon area that relate to hazardous materials, pollution prevention, and solid waste.

Table HZ1. Known hazardous material and solid waste sites in the Angoon area

Site name	Description	Product	Status		
AT&T Alascom Angoon Repeater*	Aboveground storage tanks	Diesel fuel	Cleanup complete		
Angoon Elementary School underground storage tank*	Underground storage tank	Diesel fuel	Cleanup complete		
Angoon Oil and Gas Company*	Underground storage tanks	Diesel fuel and gasoline	Cleanup complete/permanently out of use		
Angoon Oil and Gas Company (Favorite Bay)†	Aboveground storage tanks	Diesel fuel, gasoline, and potentially heating oil	Active		
Angoon Oil and Gas Company (Killisnoo Harbor)†	Aboveground storage tanks	Diesel fuel, gasoline, and potentially heating oil	Active		
Inside Passage Electric Co-Op (IPEC)†	Aboveground storage tanks	Potentially diesel fuel	Active		
Chatham School District‡			Underground storage tank	Likely heating oil§	Permanently out of use
Solid waste landfill			Rural Class III landfill	Municipal solid waste, less than 5 tons/day	Active
Angoon Public Water Treatment Plant & Wastewater Treatment Facility			Community water system	Chlorine-based disinfectant(s), possibly aluminum- or iron-based coagulants#	Active

* From Alaska Department of Environmental Conservation (DEC) Contaminated Sites Database, January 24, 2012 (DEC 2012a).
† From Denali Commission site visit to Angoon (Denali Commission 2011).
‡ From Alaska DEC Underground Storage Tank Database, January 24, 2012 (DEC 2012b).
§ Brinkerhoff 2012.
¶ From DEC solid waste management regulations.
# Hazardous materials assumed to be in use based on common disinfection procedures referenced in DEC drinking water regulations (18 Alaska Administrative Code [AAC] 80).

4.7.2.3. What pollution prevention measures exist in the Angoon area today?

Existing pollution prevention measures are focused on community waste collection efforts, spill control and cleanup, and management of runoff from the solid waste landfill.

- Community waste collection efforts: Hazardous materials such as used motor oil and coolant, spent or leaking batteries, unused paint, solvents, and contaminated fuel (fuel mixed with water or other substances to the point that it is unusable) are collected by the community and periodically shipped out of Angoon to a licensed recycler or disposal facility (Howard 2012).
- Spill control and cleanup: Because refueling at the following locations poses a risk of potential fuel spill and cleanup, pollution prevention measures are currently in place:
    - Inside Passage Electric Co-Op power plant: A 600-foot fuel dock is located on the west side of town and a fuel hose is floated ashore for refueling. In 2001 and 2003, fuel leaks were discovered via pipeline pressure testing. Those fuel spills were cleaned up, and the pipelines were repaired or replaced (Inside Passage Electric Co-Op 2010).
    - City dock: When the fuel barge docks at the city dock in Killisnoo Harbor, fuel is pumped via the header at the dock to nearby storage tanks (Denali Commission 2011).
- Management of runoff from solid waste landfill: An earthen embankment was constructed around the solid waste landfill in late 2009 to control surface water runoff. This action was necessary because runoff and sedimentation from the landfill were adversely affecting water quality in the downstream estuary, as documented in the *Mitchell Bay Watershed Landscape Assessment* (U.S. Forest Service 2002).

4.7.3. Project effects

Under all action alternatives, hazardous materials and solid waste would be used or transported in the vicinity of each alternative's proposed location. Some hazardous materials and solid waste would be transported on existing roads to the ferry terminal, the landfill, and the wastewater treatment facility. Solid waste in the form of construction debris, sewage, and general trash would be generated, and hazardous waste (such as from leaking gasoline) could be generated. Hazardous materials would be barged into Angoon and offloaded at a barge landing in Killisnoo Harbor. Used hazardous materials (including hazardous waste) and solid waste would be barged away during and after construction. Pollution prevention plans and measures would have to be implemented during construction and operation of the airport and access road. Under the no action alternative, hazardous materials and solid waste would continue to be generated as part of existing activities.

4.7.3.1. How did the FAA determine the effects from hazardous materials, solid waste, and pollution prevention?

As described in the introduction to Chapter 4 (section 4.1), all action alternatives would require common construction and operation actions, some of which would be potential sources of hazardous materials and solid waste. These sources could cause either direct effects—through contamination of the natural environment as a result of direct contact with or absorption of hazardous materials or solid waste—or indirect effects, which result from dispersal of hazardous materials or solid waste into the environment in ways other than direct contact, for example, hazardous materials ***bioaccumulating*** in the environment as contaminated plants or animals are consumed by other animals. Direct and indirect effects could occur during construction and during operation. The types of potential effects and their sources are discussed in more detail below.

Under all action alternatives, the Alaska Department of Transportation and Public Facilities (DOT&PF) would be required to include a Storm Water Pollution Prevention Plan as well as other pollution prevention measures in their operations plan for the airport and access road. Much of the plan would be the same for all alternatives, but site-specific measures would also be required to account for the unique environmental attributes of each airport and access road location. Typical pollution prevention measures applicable to projects like the Angoon Airport are discussed in section 7.4.3 in Chapter 7: Mitigation.

What is discussed in this section?

Terms to know

Bioaccumulate: Used here, the process in which living organisms collect or store pollutants or other toxic materials like pesticides in their tissues.

In assessing potential effects regarding hazardous materials, solid wastes, and pollution prevention from the sources discussed above, the FAA assumes the following:

- The potential to encounter buried or undocumented hazardous materials or solid wastes increases as the volume of terrain disturbance increases (that is, the more soil excavated, the greater the risk of uncovering buried materials).
- The longer the duration of construction—which is directly tied to the volume of terrain disturbance and the length of the access road—the greater the generation of solid and human waste.
- The longer the duration of construction, the greater the quantities of hazardous materials, including paints, fuels, and lubricants, that would be consumed.
- The longer the duration of construction, the longer the period of time over which hazardous materials could be spilled or leaked.
- The longer the duration of construction, the greater the potential for accumulation of hazardous materials from leaking construction equipment and vehicles.
- The longer the access road, the greater the travel distance and time over which hazardous materials being transported during airport and access road construction and operation would be at risk of being released into the environment through vehicle accidents.
- The potential risk of introducing hazardous materials into the environment and the generation of human and solid waste would decrease dramatically after construction was complete and would be comparatively low during long-term operations and maintenance of the airport and access road. It is not anticipated that a land-based airport would generate substantially greater waste than is currently generated at the existing Angoon Seaplane Base.
- All construction, operation, and maintenance activities associated with the airport and access road would be subject to the conditions of a Storm Water Pollution Prevention Plan, a spill prevention and response plan, and other best management practices to minimize the risk of spills and the potential for hazardous materials to enter the environment directly or indirectly.

4.7.3.1.1. Direct effects

The potential sources of direct effects from hazardous materials and solid wastes associated with the action alternatives and used in the project effects analysis below consist of the following:

- Terrain disturbance: Construction of an airport and access road would require the excavation of existing terrain to create appropriately level surfaces. Any time excavation occurs, illegally disposed of and improperly documented hazardous materials could be encountered. Given the known past uses of the lands on which the action alternatives would be located and the difficulty in accessing these areas due to terrain and vegetation, the FAA assumes this temporary construction risk to be low for the Angoon Airport project. There is a somewhat higher potential for the presence of undocumented hazardous materials in the construction zone for lands that would be occupied by Airport 12a with Access 12 compared to the other action alternatives. This assessment is based on the fact that the lands that would be occupied by Airport 12a with Access 12 have been used more intensively over the modern and historical periods than the lands that would be occupied by Airport 3a or Airport 4 with either access.
- Asphalt paving: Asphalt is a petroleum-based product that would be used under all action alternatives to construct the airport and the access road, and to maintain the runway and road during operation. Batching of asphalt on-site would be a temporary occurrence during construction. Asphalt paving is subject to localized leaching of petroleum that would be absorbed by the road base material underlying it, but proper road design, construction, and best management practices would prevent leaching into the surrounding environment.
- Accidental spills: Hazardous materials, including petroleum-based fuels and lubricants, coolants, propane, and solvents, would be needed during construction and operation of an airport and access road for the use and maintenance of vehicles and equipment. Such materials could lead to direct contamination of the environment should they be accidentally spilled during transportation or fueling.

- Leaking equipment: Poorly maintained equipment such as construction vehicles, personal automobiles traveling to and from the airport, generators, and aircraft used during construction or operation of the airport could leak hazardous materials onto the paved surfaces of the airport and access road. The project effects analysis presented below assumes that the volume of hazardous materials generated by these types of sources would be very small and would only be introduced into the surrounding environment indirectly through stormwater runoff.
- Construction crews: Construction of an airport and access road would require a large number of workers that would temporarily generate human waste during construction. Based on the DOT&PF's standard construction requirements, the project effects analysis presented below assumes that portable toilets would be used at all construction sites, and that waste water from those toilets would be hauled as needed to the existing sewage treatment facility. The actual transport of sewage would be determined at time of the construction bid, and would likely involve a pump truck. The existing sewage treatment facility is assumed to have sufficient capacity to treat the additional amount of human waste that would be generated during construction (A. Kookesh III 2012b). No restroom facilities are planned for the airport during its initial build-out or foreseeable operation. It is not anticipated that any of the action alternatives would require additional sewage treatment capacity for the Angoon area during on-going operation of the airport.
- Generation of hazardous wastes: Construction activity could result in the generation of hazardous wastes that cannot be sent to a landfill because they are flammable, toxic, reactive, or corrosive (for example, used automotive batteries or leftover runway-marking paint). Hazardous waste and solid waste generated during construction would be removed from Angoon and barged away off-site, as is the current procedure for such materials in the community. For the purposes of this EIS, it is assumed that quantities of hazardous waste used, generated, and transported during operations would not be substantial relative to the amounts of materials used and waste currently disposed of in Angoon.
- Generation of solid waste: Solid waste—floor sweepings, shop rags, lubricant containers, welding rod ends, metal shavings, worn tires, packing material, used filters, and other general trash—would be generated during construction of an airport and access road. Substantially smaller volumes of solid waste would be generated during operation and maintenance of the facilities and would likely include such items as paper and cardboard. Solid waste generated during construction would be barged away from Angoon. Solid waste generated during operations and maintenance would be deposited in the Angoon community landfill. Because the volume of solid waste associated with operation and maintenance is expected to be small, even over the long term, it is not anticipated that any of the action alternatives would require additional landfill capacity beyond what is already available.

- On-site use and storage of common hazardous materials: Hazardous materials such as fuel for the runway-lighting generator and possibly surplus paint for minor repairs of runway markings could be stored on-site at the airport for operations and maintenance. It is anticipated that only 500–1,000 gallons of diesel fuel would be maintained in a tank near the generator. Additionally, the airport plan for initial build-out includes potential lease lots. Development of these lease lots is outside the scope of this analysis. However, the FAA acknowledges that future lessees of these lots may choose to construct hangars or storage buildings, and these structures could be used to store small quantities of hazardous materials, most likely petroleum-based products, for operation and maintenance of lessees' equipment. Storage, use, and disposal of such materials would be subject to the DOT&PF's standard lease conditions. For this analysis, it was assumed that, over the long term, quantities of on-site hazardous materials and solid waste would be the same for all the action alternatives.

Terms to know

Impervious: The quality of not allowing water to pass through a surface. Instead, water collects and can create runoff.

4.7.3.1.2. Indirect effects

Potential sources of indirect effects from hazardous materials and solid wastes consist of the following:

- Increased areas of ***impervious*** surfaces: Under all action alternatives, portions of the airport and all of the access road would be paved. The presence of these impervious surfaces increases the volume of stormwater runoff compared to current conditions, where stormwater is almost entirely absorbed by vegetation and soil. Hazardous materials that have dripped or leaked onto these impervious surfaces can be washed into the surrounding environment during stormwater events. Oil, grease, and fuel are the most common types of materials to leak from equipment and be available for distribution through stormwater runoff.
- Transportation of hazardous materials: Transportation of hazardous materials by barge to Admiralty Island and by truck from the ferry terminal to construction locales and the airport.

4.7.3.2. How did the FAA determine the significance of the potential effects from the alternatives?

According to FAA Order 1050.1E, effects regarding hazardous materials and solid wastes would be significant if

- the action involved a property on or eligible for the Environmental Protection Agency's National Priority List;
- the sponsor had difficulty meeting applicable local, state, or federal laws and regulations on hazardous materials; or
- an unresolved issue arose regarding hazardous materials.

4.7.3.3. What would be the effects of each alternative regarding hazardous materials, solid waste, and pollution prevention?

4.7.3.3.1. No action alternative

Under the no action alternative, there would be no additional risk to the human and natural environment from hazardous materials, pollutants, and solid waste than currently exists in the Angoon area. Petroleum-based products such as lubricants and fuels would still be used for the operation and maintenance of the existing seaplane fleet that serves the Angoon area via the Angoon Seaplane Base.

4.7.3.3.2. Airport 3a with Access 2 (proposed action)

Construction of Airport 3a with Access 2 would not disturb or alter any known hazardous material or solid waste sites (see Table HZ1) nor any properties on the Environmental Protection Agency's National Priority List. Solid and hazardous wastes generated during construction would be barged out of the Angoon area to off-site certified landfills of appropriate type and capacity. The barges would use existing landing and transfer facilities at Angoon and at their final destination.

Table HZ2 summarizes the actions related to Airport 3a with Access 2 that could cause potential effects. Figure HZ2 shows the proposed location of the alternative and its related actions. See Table HZ7 for a comparison of the sources of effects from all action alternatives.

Table HZ2. Sources of potential effects from Airport 3a with Access 2

Source	Measure
Terrain disturbance	150 acres
New impervious surface	29 acres
Construction duration*	up to 3 seasons
Length of road from airport site to barge terminal	8.3 miles

* Construction seasons presented here are conservative estimates. Actual construction seasons would be determined after a build alternative is selected in the record of decision, the airport is designed, and a construction bid is accepted. A construction season typically occurs from May to October, but, due to the mild climate in Angoon, construction could occur year-round depending on weather conditions.

Terrain disturbance during construction increases the likelihood of discovering hazardous materials, and so this alternative would have a somewhat higher likelihood of encountering hazardous materials than most of the other alternatives except one (Airport 3a with Access 3). Overall, however, even considering the size of the disturbance area under Airport 3a with Access 2, the risk of encountering hazardous materials would remain low due to the nature and extent of past land uses in the terrain disturbance areas.

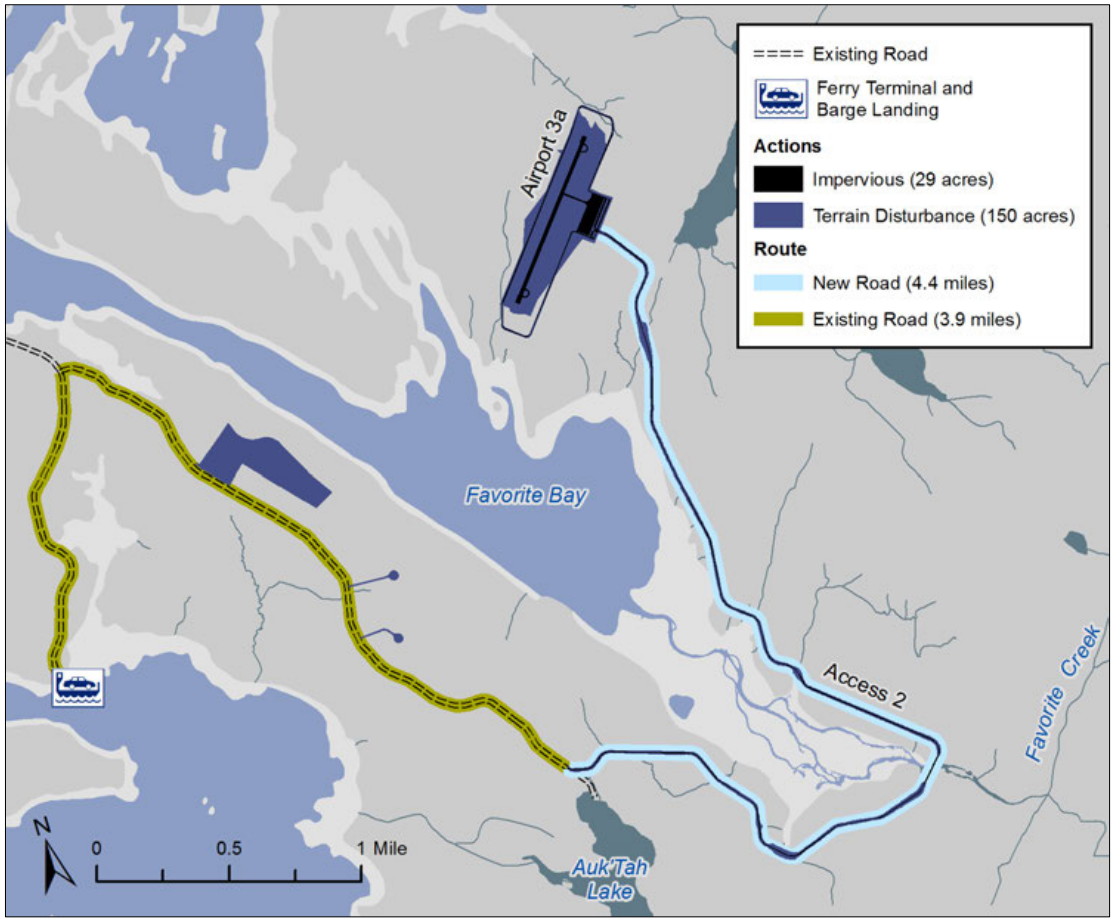


Figure HZ2. Proposed location of Airport 3a with Access 2.

Airport 3a with Access 2 would have the second-longest road. This means that this alternative has the second-highest ranking in terms of risk for exposing vehicles transporting hazardous materials to accidents that could result in spills during both construction and operation of the airport. It also means that this alternative would require the use of the second-highest amount of hazardous materials in the form of road-marking paint as well as fuel and other petroleum-based products to operate and maintain equipment and vehicles. It would also generate more solid waste associated with the larger construction zone and higher volume of materials needed. Because this alternative would have a longer access road, construction crews would be necessary for a longer period of time compared to all other alternatives except Airport 3a with Access 3, and would therefore generate more human waste to be disposed of and treated at the Angoon sewage treatment facility. The longer access road would increase the acreage of impervious surfaces compared to other alternatives. As with all action alternatives, the introduction of impervious surfaces would, when compared to existing conditions, increase stormwater runoff that could carry minor amounts of pollutants leaked from poorly maintained vehicles and

equipment into adjacent lands or waters. See section 4.6.3.3 in Floodplains, Stream Geomorphology, and Hydrology for estimates of increased stormwater runoff under each action alternative.

Given the small quantity of hazardous materials that would be present at the airport or access road sites during operation and maintenance under Airport 3a with Access 2 (and all other action alternatives), the greatest risk of potential environmental contamination during operation and maintenance would come from accidental spills. Given the small volume of hazardous materials that would be used in operations and maintenance combined with the pollution prevention and spill response measures required for all FAA-approved and DOT&PF-operated facilities, the actual risk of significant exposures of hazardous materials from spills would be low.

Significance determination

Airport 3a with Access 2 would not involve a property on or eligible for the Environmental Protection Agency's National Priority List; the project sponsor would not have difficulty meeting applicable local, state, or federal laws and regulations on hazardous materials; and there are no unresolved issues regarding hazardous materials. Therefore, this alternative would not have significant effects as measured against the FAA's significance criteria as described in section 4.7.3.2.

Irreversible and irretrievable effects

Airport 3a with Access 2 would not have irreversible or irretrievable effects related to hazardous materials, pollution prevention, or solid waste.

4.7.3.3.3. Airport 3a with Access 3

Construction of Airport 3a with Access 3 would not disturb or alter any known hazardous material or solid waste sites (see Table HZ1), nor would it disturb any properties on the Environmental Protection Agency's National Priority List. As with Airport 3a with Access 2, solid and hazardous wastes generated during construction would be barged out of the Angoon area to off-site certified landfills of appropriate type and capacity. The barges would use existing landing and transfer facilities at Angoon and at their final destination.

Table HZ3 summarizes the actions related to Airport 3a with Access 3 that could cause potential effects. Figure HZ3 shows the proposed location of the alternative and its related actions. See Table HZ7 for a comparison of the sources of effects from all action alternatives.

Table HZ3. Sources of potential effects from Airport 3a with Access 3

Source	Measure
Terrain disturbance	155 acres
New impervious surface	30 acres
Construction duration*	up to 3 seasons
Length of road from airport site to barge terminal	8.6 miles

* Construction seasons presented here are conservative estimates. Actual construction seasons would be determined after a build alternative is selected in the record of decision, the airport is designed, and a construction bid is accepted. A construction season typically occurs from May to October, but due to the mild climate in Angoon, construction could occur year-round depending on weather conditions.

Airport 3a with Access 3 would have the largest area of terrain disturbance of all action alternatives. This means the risk of discovering and disturbing hazardous materials during construction would be higher under this alternative than all other action alternatives. As with Airport 3a with Access 2, even with the larger area of disturbance under Airport 3a with Access 3, the risk of encountering hazardous materials would remain low due to the nature and extent of past land uses in the terrain disturbance areas.

Of the five action alternatives, Airport 3a with Access 3 would have the longest access road. This means that in comparison to all other action alternatives, this alternative poses a greater risk for exposing vehicles transporting hazardous materials to accidents that could result in spills during both construction and operation. It also means that in comparison to all other action alternatives, this alternative would require the greatest use of hazardous materials in the form of road-marking paint as well as fuel and other petroleum-based products to operate and maintain equipment and vehicles over the short term and long term. It would also generate the most solid waste associated with the larger construction zone and higher volume of materials needed. Construction crews would be required for a longer period of time compared to all other action alternatives, and they would therefore generate more human waste to be disposed of and treated at the Angoon sewage treatment facility over the short term.

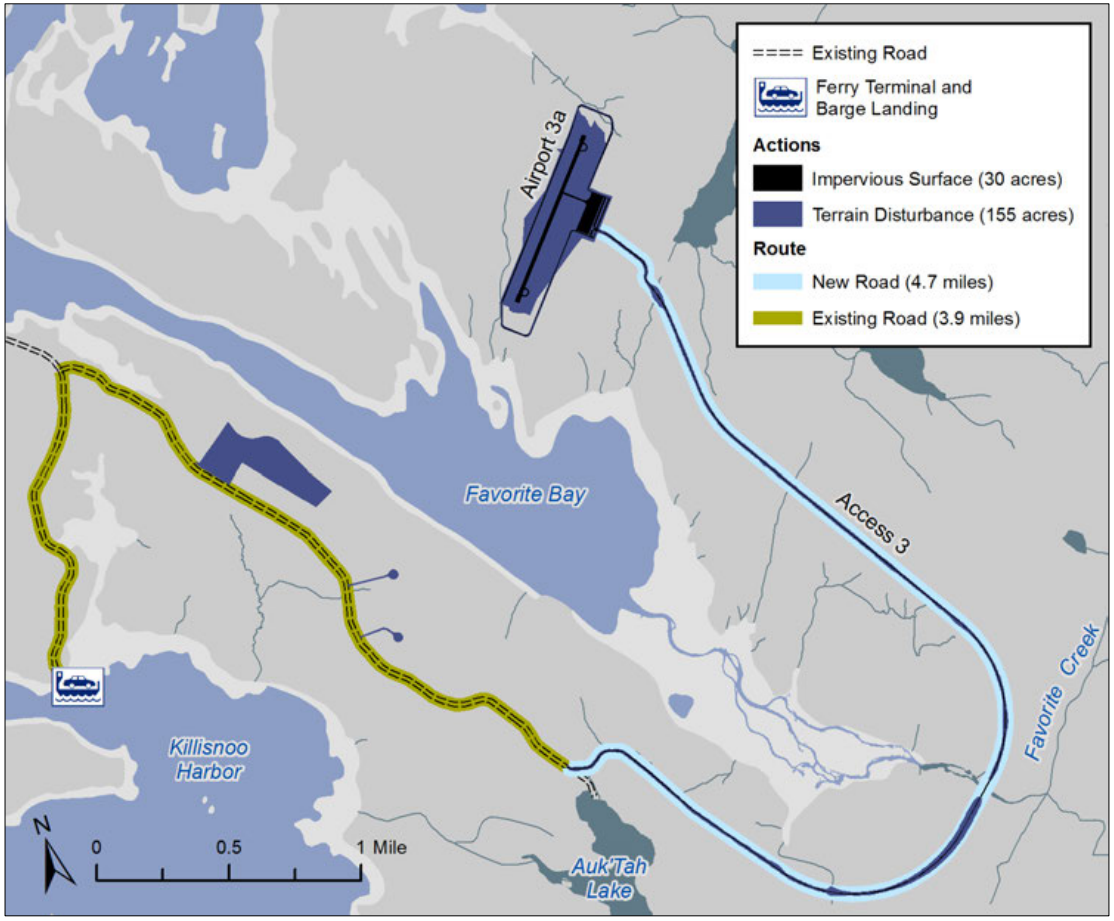


Figure HZ3. Proposed location of Airport 3a with Access 3.

The longer access road under Airport 3a with Access 3 would increase the acreage of impervious surfaces compared to other alternatives. As with all action alternatives, the introduction of impervious surfaces would, when compared to existing conditions, increase stormwater runoff that could carry minor amounts of pollutants leaked from poorly maintained vehicles and equipment into adjacent lands or waters. See section 4.6.3.3 in Floodplains, Stream Geomorphology, and Hydrology for estimates of increased stormwater runoff under each action alternative.

Given the small quantity of hazardous materials that would be present at the airport or access road sites during operation and maintenance under Airport 3a with Access 3 (and all other action alternatives), the greatest risk of potential environmental contamination during operation and maintenance would come from accidental spills. Given the small volume of hazardous materials to be used in operations and maintenance combined with the pollution prevention and spill response measures required for all FAA-approved and DOT&PF-operated facilities, the actual risk of significant exposures of hazardous materials from spills would be low.

Significance determination

As with Airport 3a with Access 2, this alternative would not have significant effects associated with hazardous materials.

Irreversible and irretrievable effects

As with Airport 3a with Access 2, Airport 3a with Access 3 would not have irreversible or irretrievable effects related to hazardous materials, pollution prevention, or solid waste.

4.7.3.3.4. Airport 4 with Access 2

Construction of Airport 4 with Access 2 would not disturb or alter any known hazardous material or solid waste sites (see Table HZ1) nor would it disturb any properties on the Environmental Protection Agency's National Priority List. As with Airport 3a, solid and hazardous wastes generated during construction of this alternative would be barged out of the Angoon area to off-site certified landfills of appropriate type and capacity. The barges would use existing landing and transfer facilities at Angoon and at their final destination.

Table HZ4 summarizes the actions related to Airport 4 with Access 2 that could cause potential effects. Figure HZ4 shows the proposed location of the alternative and its related actions. See Table HZ7 for a comparison of the sources of effects from all action alternatives.

Table HZ4. Sources of potential effects from Airport 4 with Access 2

Source	Measure
Terrain disturbance	134 acres
New impervious surface	26 acres
Construction duration*	up to 3 seasons
Length of road from airport site to barge terminal	6.8 miles

* Construction seasons presented here are conservative estimates. Actual construction seasons would be determined after a build alternative is selected in the record of decision, the airport is designed, and a construction bid is accepted. A construction season typically occurs from May to October, but due to the mild climate in Angoon, construction could occur year-round depending on weather conditions.

Airport 4 with Access 2 would have the second-smallest area of terrain disturbance among all action alternatives, and therefore the likelihood of discovering hazardous materials would be somewhat lower for this alternative than for most other alternatives. As with the Airport 3a alternatives, the actual risk of encountering hazardous materials during construction of Airport 4 with Access 2 would remain low due to the nature and extent of past land uses in the terrain disturbance areas.

Of the five action alternatives, Airport 4 with Access 2 would have the second-shortest access road. In comparison to all other action alternatives except Airport 12a with Access 12a, this alternative would pose a slightly lower risk for encountering buried hazardous materials during construction and exposing vehicles transporting hazardous materials to accidents that could result in spills during both construction and operation. It also means that, in comparison to all other action alternatives except Airport 12a with Access 12a, this alternative would require the least use of hazardous materials in the form of road-marking paint as well as fuel and other petroleum-based products to operate and maintain equipment and vehicles. It would also be expected to generate the second-lowest amount of solid waste associated with the size of the construction zone and volume of materials needed. Construction crews would be required for a slightly shorter period of time compared to all other action alternatives except Airport 12a with Access 12a, and they would therefore generate slightly less human waste to be disposed of and treated at the Angoon sewage treatment facility.

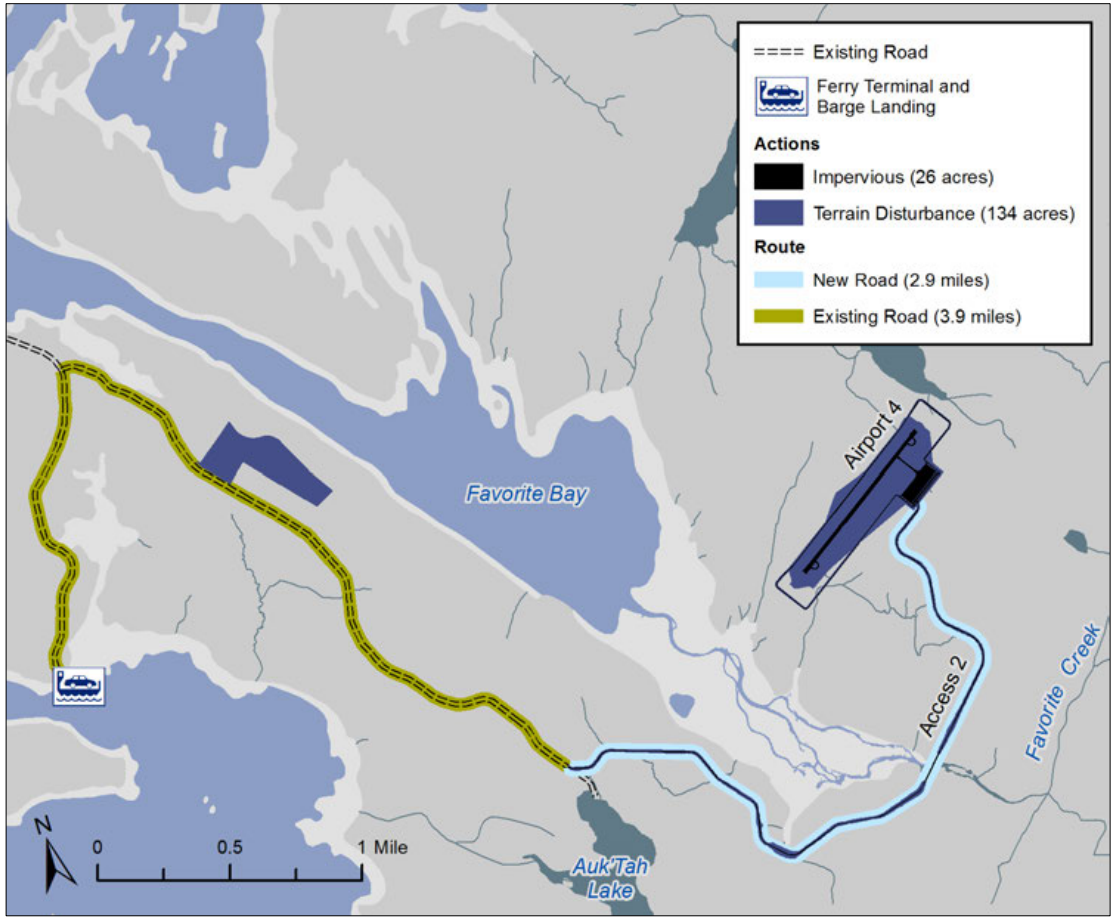


Figure HZ4. Proposed location of Airport 4 with Access 2.

Airport 4 with Access 2 would increase the amount of impervious surface acreage compared to existing conditions but not to the degree of all other action alternatives except Airport 12a with Access 12a. As with all action alternatives, the introduction of impervious surfaces would, when compared to existing conditions, increase stormwater runoff that could carry minor amounts of pollutants leaked from poorly maintained vehicles and equipment into adjacent lands or waters. See section 4.6.3.3 in Floodplains, Stream Geomorphology, and Hydrology for estimates of increased stormwater runoff under each action alternative.

Given the small quantity of hazardous materials that would be present at the airport or access road sites during operation and maintenance under Airport 4 with Access 2, the greatest risk of potential environmental contamination during operation and maintenance would come from accidental spills. Given the small volume of hazardous materials to be used in operations and maintenance combined with the pollution prevention and spill response measures required for all FAA-approved and DOT&PF-operated facilities, the actual risk of significant exposures of hazardous materials from spills would be low.

Significance determination

As with Airport 3a with Access 2, this alternative would not have significant effects associated with hazardous materials.

Irreversible and irretrievable effects

As with Airport 3a with Access 2, Airport 4 with Access 2 would not have irreversible or irretrievable effects related to hazardous materials, pollution prevention, or solid waste.

4.7.3.3.5. Airport 4 with Access 3

Construction of Airport 4 with Access 3 would not disturb or alter any known hazardous material or solid waste sites (see Table HZ1), nor would it disturb any properties on the Environmental Protection Agency's National Priority List. As with the Airport 3a alternatives and Airport 4 with Access 2, solid and hazardous wastes generated during construction of this alternative would be barged out of the Angoon area to off-site certified landfills of appropriate type and capacity, and the barges would use existing landing and transfer facilities in Angoon and their final destination.

Table HZ5 summarizes the actions related to Airport 4 with Access 3 that could cause potential effects. Figure HZ5 shows the proposed location of the alternative and its related actions. See Table HZ7 for a comparison of the sources of effects from all action alternatives.

Table HZ5. Sources of potential effects from Airport 4 with Access 3

Source	Measure
Terrain disturbance	140 acres
New impervious surface	27 acres
Construction duration*	up to 3 seasons
Length of road from airport site to barge terminal	7.1 miles

* Construction seasons presented here are conservative estimates. Actual construction seasons would be determined after a build alternative is selected in the record of decision, the airport is designed, and a construction bid is accepted. A construction season typically occurs from May to October, but due to the mild climate in Angoon, construction could occur year-round depending on weather conditions.

Terrain disturbance increases the likelihood of discovering hazardous materials, and this alternative would be in the middle range for likelihood of discovering hazardous materials. Overall, however, the actual risk of encountering hazardous materials during construction of Airport 4 with Access 3 would be low due to the nature and extent of past land uses in the terrain disturbance areas.

Of the five action alternatives, Airport 4 with Access 3 would have third-longest access road. This means that in comparison to all other action alternatives, this alternative would pose a moderate risk for encountering buried hazardous materials during construction and exposing vehicles transporting hazardous materials to accidents that could result in spills during both construction and operation of the airport. It also means that, by comparison to all other action alternatives, this alternative would require use of a moderate amount of hazardous materials in the form of road-marking paint and fuel as well as other petroleum-based products to operate and maintain equipment and vehicles over both the short term and long term. It would also be expected to generate the third-most solid waste associated with the size of the construction zone and volume of materials needed. Construction crews would be required for a slightly shorter period of time compared to the Airport 3a alternatives but longer than for Airport 4 with Access 2 and Airport 12a with Access 12a. These crews would therefore generate slightly more human waste to be disposed of and treated at the Angoon sewage treatment facility than would Airport 4 with Access 2 and Airport 12a with Access 12a, but less than would the Airport 3a alternatives.

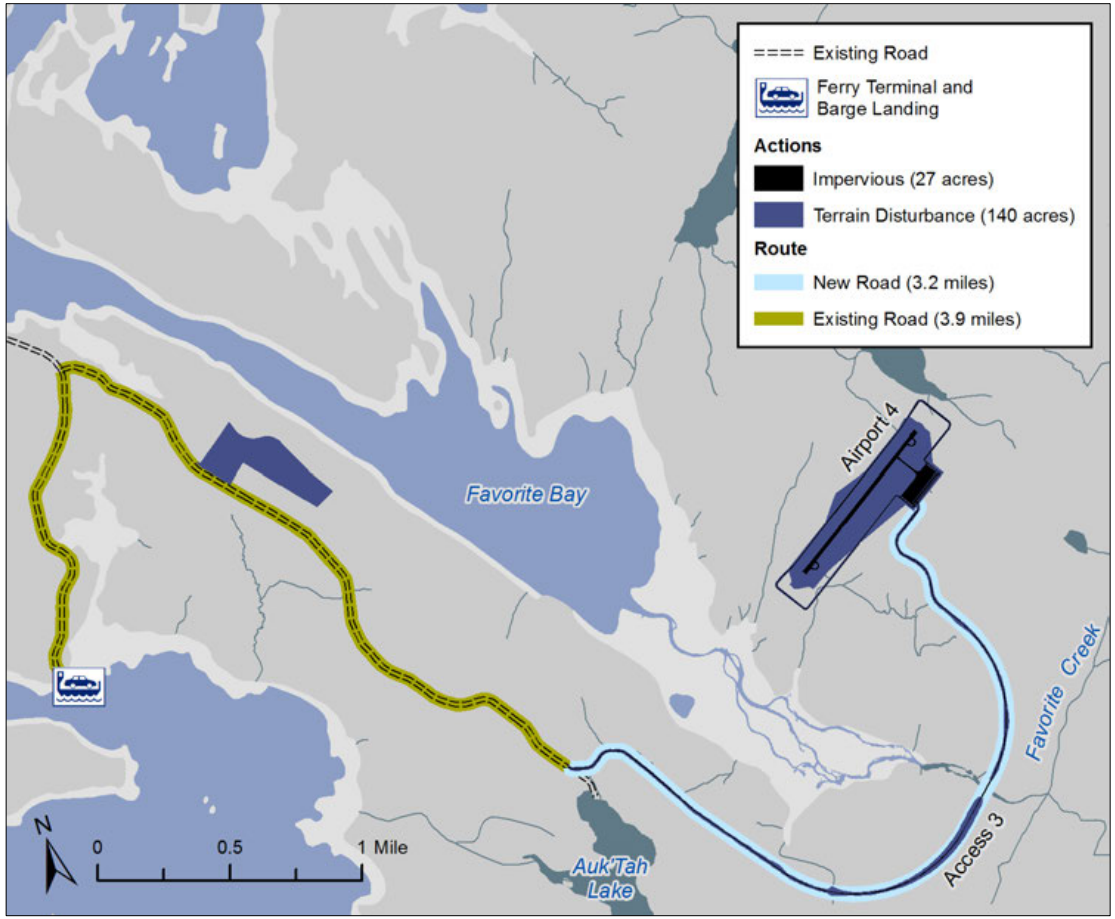


Figure HZ5. Proposed location of Airport 4 with Access 3.

Airport 4 with Access 3 would increase the amount of impervious surface acreage compared to existing conditions but not to the degree of the Airport 3a alternatives. It would have a greater increase in the amount of impervious surfaces than would Airport 12a with Access 12a and Airport 4 with Access 2. As with all action alternatives, the introduction of impervious surfaces would, when compared to existing conditions, increase stormwater runoff that could carry minor

amounts of pollutants leaked from poorly maintained vehicles and equipment into adjacent lands or waters. See section 4.6.3.3 in Floodplains, Stream Geomorphology, and Hydrology for estimates of increased stormwater runoff under each action alternative.

Given the small quantity of hazardous materials that would be present at the airport or access road sites during operation and maintenance under Airport 4 with Access 3, the greatest risk of potential environmental contamination during operation and maintenance would come from accidental spills. Given the small volume of hazardous materials that would be used in operations and maintenance, combined with the pollution prevention and spill response measures required for all FAA-approved and DOT&PF-operated facilities, the actual risk of significant exposures of hazardous materials from spills would be low.

Significance determination

As with Airport 3a with Access 2, this alternative would not have significant effects associated with hazardous materials.

Irreversible and irretrievable effects

As with Airport 3a with Access 2, this alternative would not have irreversible or irretrievable effects related to hazardous materials, pollution prevention, or solid waste.

4.7.3.3.6. Airport 12a with Access 12a (preferred alternative)

Construction of Airport 12a with Access 12a would not disturb or alter any known hazardous material or solid waste sites (see Table HZ1), nor would it disturb or alter any properties on the Environmental Protection Agency's National Priority List. As with all other action alternatives, solid and hazardous wastes generated during construction would be barged out of the Angoon area to off-site certified landfills of appropriate type and capacity, and the barges would use existing landing and transfer facilities in both Angoon and their final destination.

Table HZ6 summarizes the actions related to Airport 12a with Access 12a that could cause potential effects. Figure HZ6 shows the proposed location of the alternative and its related actions. See Table HZ7 for a comparison of the sources of effects from all action alternatives.

Table HZ6. Sources of potential effects from Airport 12a with Access 12a

Source	Measure
Terrain disturbance	119 acres
New impervious surface	20 acres
Construction duration*	up to 2 seasons
Length of road from airport site to barge terminal	2.4 miles

* Construction seasons presented here are conservative estimates. Actual construction seasons would be determined after a build alternative is selected in the record of decision, the airport is designed, and a construction bid is accepted. A construction season typically occurs from May to October, but due to the mild climate in Angoon, construction could occur year-round depending on weather conditions.

Airport 12a with Access 12a would have the smallest area of terrain disturbance of all action alternatives. For this reason, the risk of discovering and disturbing hazardous materials during construction would be lower under this alternative than for all other action alternatives. However, the proposed location of this alternative has seen greater historical and modern use by comparison to the proposed locations of the other action alternatives. This raises the risk of actually encountering and disturbing hazardous materials or solid wastes during construction in comparison to the other action alternatives, which are all located in areas that have been used less intensively during the historical and modern era for purposes that could generate such materials.

Of the five action alternatives, Airport 12a with Access 12a would have the shortest access road. By comparison to all other action alternatives, this alternative would pose the lowest risk for encountering buried hazardous materials during construction and exposing vehicles transporting hazardous materials to accidents that could result in spills during both construction and operation. It also means that in comparison to all other action alternatives, this alternative would require the least use of hazardous materials in the form of road-marking paint as well as fuel and other petroleum-based products to operate and maintain equipment and vehicles. It would also be expected to generate the lowest amount of solid waste associated with the size of the construction zone and volume of materials needed. Construction crews would be required for a shorter period of time compared to all other action alternatives, therefore less human waste would be generated to be disposed of and treated at the Angoon sewage treatment facility over the short term.

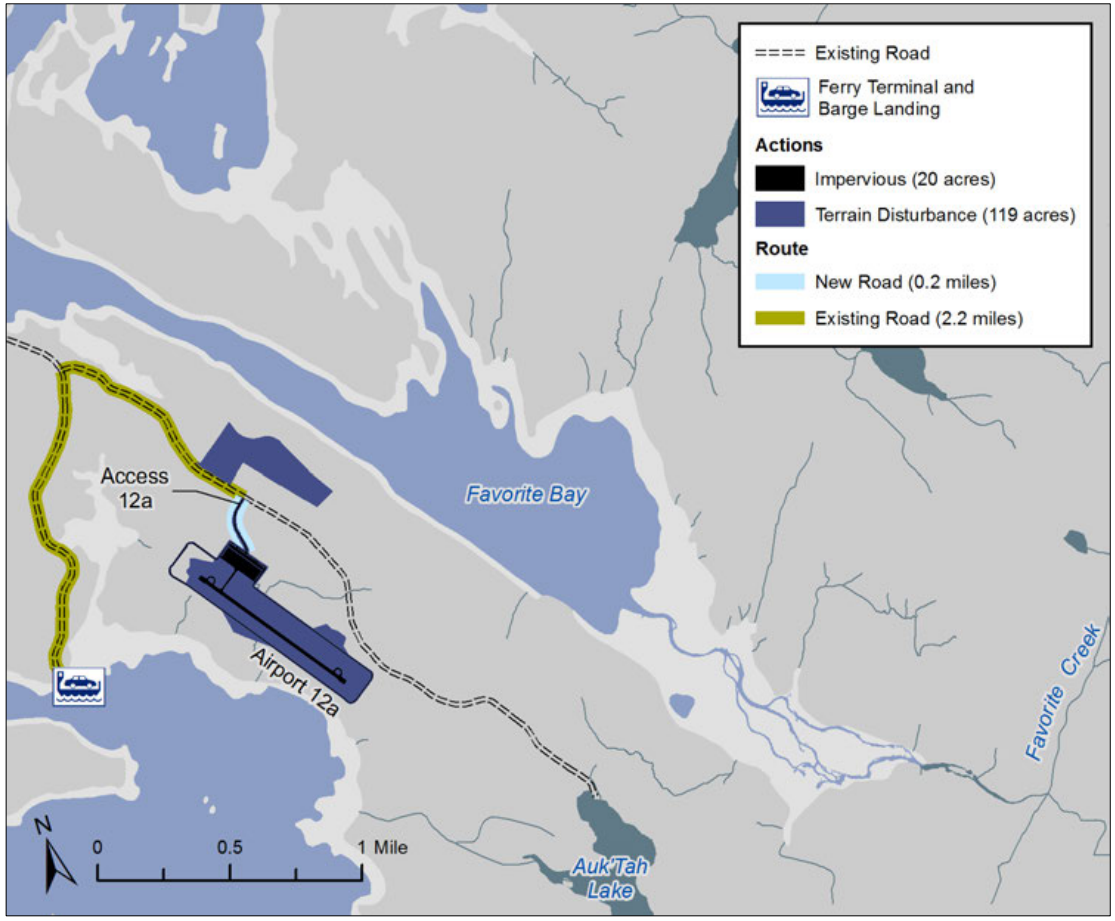


Figure HZ6. Proposed location of Airport 12a with Access 12a.

Airport 12a with Access 12a would increase the amount of impervious surface acreage compared to existing conditions but less so than all other action alternatives. As with all action alternatives, the introduction of impervious surfaces would, when compared to existing conditions, increase stormwater runoff that could carry minor amounts of pollutants leaked from poorly maintained vehicles and equipment into adjacent lands or waters. See section 4.6.3.3 in Floodplains, Stream Geomorphology, and Hydrology for estimates of increased stormwater runoff under each action alternative.

Given the small quantity of hazardous materials that would be present at the airport or access road sites during operation and maintenance under Airport 12a with Access 12a, the greatest risk of potential environmental contamination during operation and maintenance would come from accidental spills. Given the small volume of hazardous materials to be used in operations and maintenance combined with the pollution prevention and spill response measures required for all FAA-approved and DOT&PF-operated facilities, the actual risk of significant exposures of hazardous materials from spills would be low.

Long-term direct effects from hazardous materials and solid waste spills during the operation of Airport 12a with Access 12a would mostly be associated with vehicle accidents, improper containment procedures during storage and/or transport, and discharges of untreated stormwater runoff. Direct effects to the environment would be the same as those associated with construction; however, construction activity, transport and disposal of hazardous materials and solid waste, and an overall increase in human waste due to the increased number of construction personnel would be substantially diminished or eliminated by the time Airport 12a with Access 12a was operational. The likelihood of long-term indirect effects associated with an accumulation of hazardous materials and solid waste in the environment near Airport 12a with Access 12a would be low, provided that appropriate containment and cleanup procedures were followed.

Airport 12a with Access 12a is closest to the community of Angoon and may have a greater potential than the other action alternatives for the presence of unknown hazardous materials or solid waste such as illegally dumped trash, buried or leaking hazardous materials containers, or contaminated soil that was improperly disposed of. If present, these materials could be disturbed during the construction process. However, as noted in section 4.7.2.1, field personnel did not observe evidence of dumping or stained soils during resource surveys conducted for this EIS. Some trails exist in the vicinity of this alternative, but the difficult terrain and dense vegetation prevents vehicle access.

Significance determination

As with Airport 3a with Access 2, this alternative would not have significant effects associated with hazardous materials.

Irreversible and irretrievable effects

As with Airport 3a with Access 2, Airport 12a with Access 12a would not have irreversible or irretrievable effects related to hazardous materials, pollution prevention, or solid waste.

4.7.3.4. How do the effects related to hazardous materials, solid waste, and pollution prevention compare?

Potential effects related to hazardous materials, solid waste, and pollution prevention would be similar under all action alternatives. Only the no action alternative, which would not introduce any new hazardous materials or solid wastes into the area nor require changes to existing pollution prevention measures, would be substantively different. Under all action alternatives, the same types of hazardous materials would be used during construction, operation, and maintenance of the airport and access road. Under all action alternatives, the same types and quantities of hazardous materials would be stored at the airport and the same types and quantities of solid wastes would be generated during airport operations.

The alternatives would differ in the following ways:

- The relative risk of uncovering previously unknown hazardous materials during construction due to differences in the acreage of terrain disturbance
- The volume of potentially contaminated stormwater runoff due to differences in the acreage of impervious surface
- The volume of hazardous, solid, and human waste generated as a result of differences in the duration of the construction period
- The relative risk of accidental spills due to differences in transit times (as a function of distance) from the facilities in Angoon to and from the airport sites

Comparing the anticipated use and generation of hazardous materials and solid waste during construction, the risk of encountering buried hazardous materials, and the risk of potential spills due to longer exposure of hazardous materials during transit times, Airport 3a with Access 3 and Airport 3a with Access 2 rank highest and second-highest, respectively, for greatest risk and greatest use and generation of waste materials. Airport 12a with Access 12a ranks lowest on all counts, although the likelihood of encountering buried hazardous materials during construction may ultimately be comparable to that of Airport 3a and Airport 4 with either access due to the more intensive modern and historical human use of the land that may have left behind waste materials at the proposed location for Airport 12a.

Table HZ7 summarizes the acres of terrain disturbance, acres of new impervious surfaces, seasons of construction duration, and miles from the airport site to the barge terminal for each of the action alternatives and ranks these sources of potential effect.

Table HZ7. Summary of sources of potential effects by action alternative

Alternative	Terrain disturbance		New impervious surface		Construction duration*		Length of road from airport site to barge terminal	
	Acres	Rank*	Acres	Rank*	Maximum number of seasons†	Rank*	Miles	Rank*
No action	0	1	0	1	0	1	0	1
Airport 3a with Access 2	150	5	29	5	3	6	8.3	5
Airport 3a with Access 3	155	6	30	6	3	6	8.6	6
Airport 4 with Access 2	134	3	26	3	3	6	6.8	3
Airport 4 with Access 3	140	4	27	4	3	6	7.1	4
Airport 12a with Access 12a	119	2	20	2	2	2	2.4	2

* 1 = least effects; 6 = most effects

† Construction seasons presented here are conservative estimates. Actual construction seasons would be determined after a build alternative is selected in the record of decision, the airport is designed, and a construction bid is accepted. A construction season typically occurs from May to October, but due to the mild climate in Angoon, construction could occur year-round depending on weather conditions.

4.7.3.5. How could the effects be avoided, minimized, or mitigated?

Because no significant effects are anticipated for these resources, no additional mitigation measures beyond those discussed in Chapter 7: Mitigation would be implemented under any action alternative. Chapter 7 describes best management practices that would be implemented during construction. Best management practices are relatively common activities in construction, and are intended to prevent pollution, minimize environmental harm, and assure that appropriate response action is taken if unacceptable environmental effects occur. Through the use of these best management practices, effects are reduced during construction. The best management practices described in Chapter 7 were considered during effects analysis for this resource.

4.8. Cultural Resources

This section addresses the existing conditions of cultural resources in the area of the airport and access road alternatives. It also addresses the potential changes to those conditions from construction and operation of the proposed land-based airport.

4.8.1. Background information

4.8.1.1. What does the term "cultural resources" mean?

The term "cultural resources" is broadly applied to places and objects of cultural value, and therefore comprises historic, archaeological, and heritage resources. These resources are typically thought of as the physical remnants of past human activity such as archaeological sites, historical buildings, and artifacts. But cultural resources can also include landscapes and locations that have cultural or historical significance for the public today. These might include places where important historic events occurred, locations that are the focus of traditional or spiritual uses, or areas where resources important to maintaining cultural identity are obtained. As an aspect of cultural resources, heritage resources are sites or locales that are important for their value to cultural identity, traditional belief, or oral tradition; an example of such a site is Beaver Tail Rock, which represents the Tlingit oral tradition of how the original Tlingit settlers of the area were led to Angoon.

What is discussed in this section?

A brief history of the Angoon area

The Angoon area has been home to Alaska Natives for thousands of years, and Alaska Natives, primarily Tlingits, make up most of the community's population today.

Archaeological evidence and traditional oral history indicate that human activity in the Angoon area dates back many thousands of years. Both archaeological evidence and oral history indicate that the Angoon village was relocated around the Favorite Bay area and the offshore islands of the general area many times.

Beginning in the late 1870s, Euro-Americans established the Northwest Trading Company just off the west coast of the Angoon Peninsula. A whaling station was opened there a few years later, employing many Alaska Natives. An infamous incident in which a local shaman was killed on one of the whaling boats led to the shelling of the Angoon village by the U.S. Navy in the late 1800s.

Today, the area remains home to many Alaska Natives and is a destination for visitors who want to fish, sightsee, and enjoy the Admiralty Island National Monument and Kootznoowoo Wilderness Area.

4.8.1.2. What laws, policies, or regulations apply to cultural resources in the Angoon area?

Many laws and regulations protect cultural resources. For the Angoon Airport Environmental Impact Statement (EIS), two regulations in particular direct the ways cultural resources are addressed.

Under **Section 4(f) of the Department of Transportation Act of 1966** (as amended by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, Public Law [PL] 109-59), agencies under the U.S. Department of Transportation are prevented from directly or indirectly ***using*** cultural resources that are listed on or eligible for the ***National Register of Historic Places*** (referred to hereafter as the National Register) in the process of implementing a transportation project, unless 1) there is "no feasible and prudent alternative," and 2) all possible planning has been done to minimize harm to the property.

Section 106 of the National Historic Preservation Act of 1966 (36 Code of Federal Regulations [CFR] 800, as amended) requires federal agencies like the Federal Aviation Administration (FAA) to, among other things, identify ***historic properties*** that could be affected by actions such as the construction and operation of a new airport. Under this act, the FAA must consider how and to what extent an action would affect these historic properties. Further, the FAA must consult and cooperate with others (such as the Alaska State Historic Preservation Officer [SHPO] and federally recognized Alaska Native Tribes) while carrying out this work. This is the primary law directing the process by which cultural resources are addressed during federal projects and actions. The steps in the Section 106 process as they relate to the Angoon Airport project are illustrated in Figure CR1.

Terms to know

Historic properties: Archaeological, cultural, or historical sites that are listed on or have been determined eligible for the National Register. Historic properties can be archaeological sites of any age, historic buildings, and other types of cultural sites, including those having traditional religious or cultural importance to Alaska Native tribes.

National Register of Historic Places: The country's official list of places deemed important to the nation's history. Cultural resources are assessed for National Register eligibility based on four criteria. States, tribes, and federal agencies may nominate a place for the National Register if it fits one or more of the criteria.

Using or *use:* The term "use" under Section 4(f) means physically taking land from a historic property or indirectly affecting a historic property in such a way that the important values of that property are substantially impaired.

- Determine whether the proposed project or action has the potential to affect historic properties.
- Consult with the Alaska State Historic Preservation Officer (SHPO), federally recognized tribes like the Angoon Community Association, and other consulting parties such as the U.S. Forest Service and Alaska Department of Transportation and Public Facilities (DOT&PF) regarding the project, and request their input on historic properties that could be affected and on what should constitute the APE.
- Determine, with the parties noted above, the level of effort appropriate to identifying historic properties in the APE.

Identify historic properties in the APE

- Consider sources of existing information, including that from previous cultural resource surveys conducted in the APE and adjacent areas available from the Office of History and Archaeology, the U.S. Forest Service, and others.
- Consult with the SHPO, tribal organizations (Angoon Community Association [ACA] and Central Council of Tlingit and Haida Indian Tribes of Alaska [CCTHITA]), the DOT&PF, and other consulting parties regarding the presence of known cultural resources in the APE.
- Seek information from knowledgeable parties such as elders, historians, and longtime Angoon residents.
- Conduct studies to locate and evaluate cultural resources, including field studies.

Determine eligibility of resources and assess effects

- Consult with the SHPO, ACA, CCTHITA, and other consulting parties as appropriate to determine if cultural resources found in the APE are eligible for the National Register.
- Consult with the SHPO, ACA, CCTHITA, and other consulting parties as appropriate regarding whether any of the cultural resources in the APE that are eligible for the National Register would be affected by the airport project, and whether that effect would be adverse (harmful) to the values that make the resource important.
- Consult with the SHPO, ACA, CCTHITA, and other consulting parties as appropriate to identify measures to reduce the severity of the effect on the resource, compensate for that effect, or both.

Terms to know

Area of potential effects (APE): A term used in the Section 106 process of the National Historic Preservation Act of 1966 to describe the area where effects of a project, including both direct and indirect disturbance, would occur. The APE is used to determine the area where efforts to identify historic properties should occur. Often, the nature of the APE also contributes to decisions about what types of studies should be used to identify historic properties. For example, in an area where the entire APE is paved with asphalt, no field studies may be necessary, but in areas of undisturbed land, field studies may be appropriate to search for artifacts or similar cultural resources.

Figure CR1. The steps in the Section 106 process as they relate to the Angoon Airport project.

4.8.2. Existing conditions

The information in this section is summarized from the *Cultural Resources Existing Conditions Technical Report for the Angoon Airport Environmental Impact Statement, Angoon, Alaska* (SWCA 2014d), included as Appendix K.

What is discussed in this section?

4.8.2.1. What areas did the FAA examine for cultural resources?

As introduced in section 4.8.1.2, to determine the APE that should be considered for cultural resources, the FAA consulted with the SHPO, the U.S. Forest Service, tribal organizations, and other consulting parties. The FAA asked two questions:

1. What areas would be directly affected by construction of an airport and access road through such actions as removing vegetation, digging up soils, building structures, extracting construction materials, and placing fill material (dirt and gravel) to level out an area? (See section 4.8.3.1.1 for descriptions of these kinds of effects.)

2. What areas could be indirectly affected by airport and access road construction and operation through things like visual or noise intrusion; vibration; or increased erosion, vandalism, looting, or accidental damage from new or improved access to areas previously not easily accessible? (See section 4.8.3.1.2 for descriptions of these kinds of effects.)

For the Angoon Airport EIS, a direct effects APE and four indirect effects APEs were established for each alternative by the FAA in consultation with the other parties. The APEs are shown on Figure CR2, and their related effects are described in section 4.8.3.1.

The U.S. Forest Service has developed a model to use when conducting cultural resource studies on lands they manage. This model identifies specific types of environmental criteria often associated with cultural resource sites, and guides researchers in where they look to find sites. For more information about this model, see the blue sidebar on this page. The FAA employed this model to help guide the methods used during field studies.

The U.S. Forest Service cultural resource probability model

The U.S. Forest Service developed a model to help guide management of cultural resources on Admiralty Island and the rest of the Tongass National Forest (USFS 2008a). Referred to as a probability model or sensitivity model, it uses information from known cultural resource sites to predict where other sites might be located. The model is based on the fact that, much like modern populations, past humans used the landscape based on the locations of the resources they depended on. For example, people who obtain a lot of their food from the ocean or other water bodies tend to live near the water; people whose diet includes the many resources available in wetlands and marshes either live near or set up temporary camps near such wetlands. Using this information, the model provides guidance to researchers as to which portions of a study area have high probability to contain cultural resources, and which areas have low probability. See Figure CR2 for the areas of high and low probability in the Angoon area.

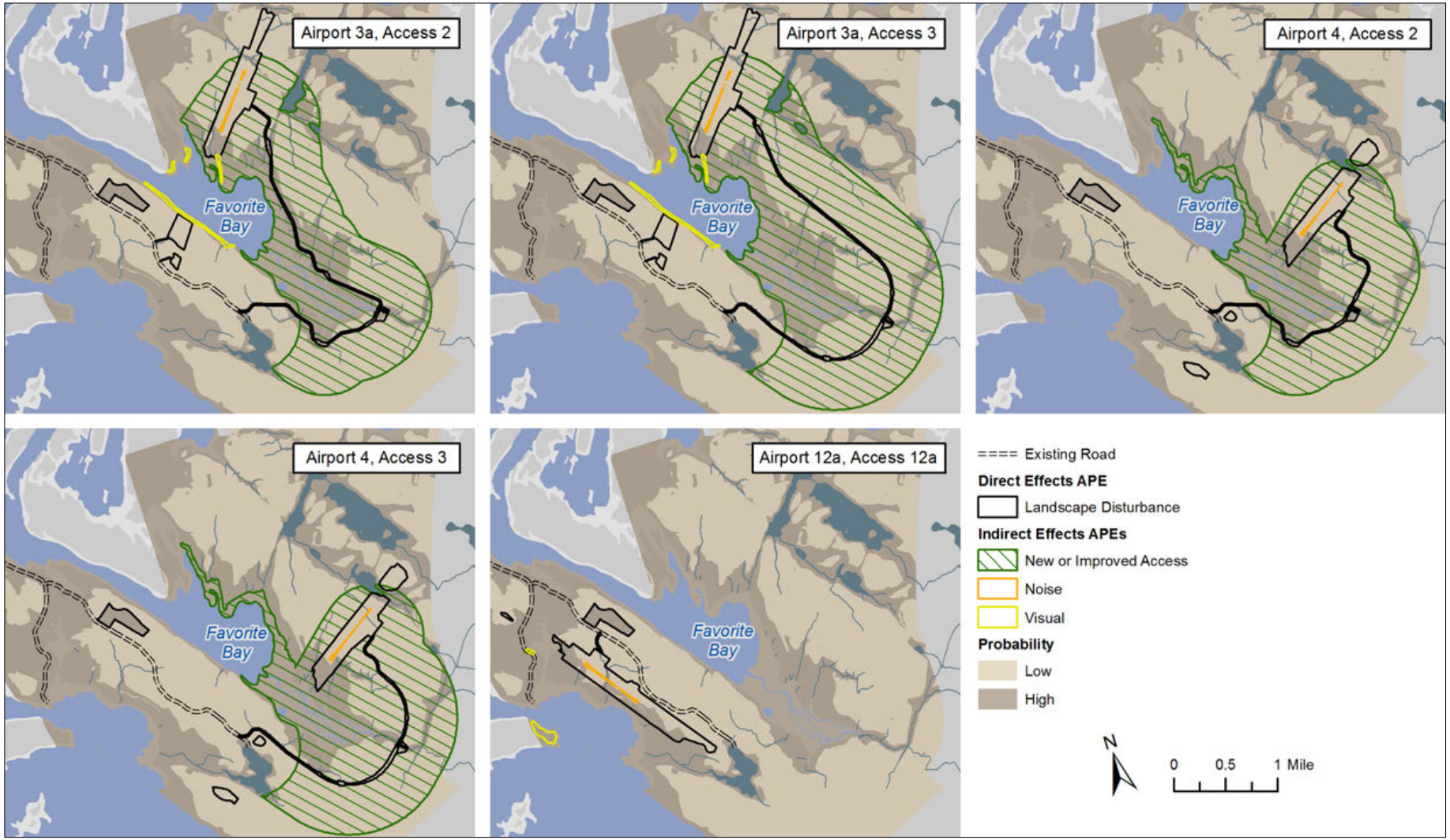


Figure CR2. The APEs for all alternatives and the high- and low-probability areas as estimated from the U.S. Forest Service cultural resource probability model.

4.8.2.2. How did the FAA identify cultural resources?

Cultural resources that could be affected by the action alternatives were identified using these approaches:

- Reviewing previous studies in the general project area to identify cultural resources there (although most of these studies were not related to the proposed airport project). These studies were reviewed to determine what cultural resources are already known to be present and where other sites might be located. Of particular use were the studies by de Laguna (1960), Moss (1989), and Moss and Erlandson (1985).
- Conducting field surveys by archaeologists hired by the FAA for this EIS. Archaeologists searched for artifacts, features, and other cultural resources in areas where direct and indirect effects from construction and operation would be expected to occur. In areas identified through the U.S. Forest Service model as having a high probability to contain cultural resources, the archaeologists also dug small shovel holes and used soil probes to search for buried cultural resources.
- Conducting formal and informal interviews with elders and ***culture bearers*** in the Angoon community. Using maps, aerial photographs, and field visits, the FAA's cultural resources specialists asked these individuals about known cultural resources in or near the action alternative locations. Because the information provided by these individuals is sensitive, site location information is being kept confidential but was used in the assessment of potential project effects and the refinement of alternatives (see the blue sidebar on this page). Interviews and discussions with elders and community members will continue throughout the EIS process.
- Assessment of National Register eligibility criteria to determine if eligible properties are in or near airport and access alternative locations. Nine places in the APEs fit the criteria for eligibility: SIT-00014 (Killisnoo Island Village), SIT-00033 (the Favorite Bay Fish Weir), SIT-00034 (a prehistoric midden and historic garden site), SIT-00056 (St. Andrew's Church), SIT-00169 (Killisnoo Harbor Village), SIT-00302 (the Favorite Bay Garden Site), SIT-00502 (a historic garden site), SIT-00749 (the Killisnoo Cemetery site), and SIT-00781 (Beaver Tail Rock). Of these, sites SIT-00014, SIT-00056, SIT-00169, and SIT-0749 have been formally determined eligible for the National Register. The FAA has received concurrence on this determination from the Alaska SHPO. For SIT-00302, the FAA has also received concurrence from the U.S. Forest Service, which manages the land on which the site is located. To learn more about the nine sites, see Table CR1.

Terms to know

Culture bearer: A person of any age whose identified role in the community is to preserve aspects of its cultural identity. Culture bearers may be familiar with oral traditions, rituals, or objects, and have knowledge of important sites or resources, among other things.

Restrictions on information about cultural resources

The locations of known cultural resources are not shown on maps in this section because information that could result in damage to cultural resources is restricted from public disclosure by federal law. Such restricted information includes showing or precisely describing the locations of cultural resource sites such that people can use the information to find the site and cause damage through looting or vandalism. It also includes information that could result in people being able to locate sites or places that are sacred to federally recognized tribes or important in Alaska Native traditional religious practice.

- Consultation with agency representatives. As part of the Section 106 process, the FAA has consulted with the SHPO, the U.S. Forest Service, and the DOT&PF to define the APEs, establish the level of effort to identify potential historic properties, evaluate cultural resources to determine which are historic properties, and assess project effects on those historic properties. Consultation has occurred through in-person meetings and written correspondence.
- Consultation with tribal representatives and other organizations. To date, the FAA has consulted with the Angoon Community Association (the federally recognized tribal government in Angoon), the Central Council of the Tlingit and Haida Indian Tribes of Alaska, Sealaska Corporation (the regional Alaska Native corporation), and Kootznoowoo, Inc. (the village Alaska Native corporation). The FAA invited all these organizations in writing to be consulting parties in the Section 106 process. The FAA has also actively engaged these parties through meetings, project updates, and written correspondence in defining the APEs, identifying historic properties (which includes evaluating resources under the criteria of the National Register), and assessing project effects. Informal discussions were held with groups having general knowledge of the area. At the time of the final EIS, only Kootznoowoo, Inc. had identified any specific sites or potential effects of concern. Kootznoowoo, Inc. identified SIT-00781 (Beaver Tail Rock), SIT-00302 (the Favorite Bay Garden Site), SIT-00033 (the Favorite Bay Fish Weir), and any site associated with Tlingit history and prehistory as being of general concern to them relative to the alternatives under consideration. All three named sites and six additional sites, some of which are also associated with Tlingit history, are inside the APEs for one or more action alternatives. Consultation with Kootznoowoo, Inc. and the other tribal parties and organizations noted here continued throughout the EIS process.

4.8.2.3. What are cultural resources in the Angoon area like?

Favorite Bay and the surrounding lands of Admiralty Island have been the site of human activity for thousands of years. As a protected bay with abundant marine and freshwater resources, Favorite Bay has always served as the breadbasket for those who live there, particularly the Alaska Native community. Archaeological evidence of past human activity is plentiful around Favorite Bay and other nearby bays, and modern-day Alaska Natives continue to use these areas for their cultural practices, including subsistence hunting and gathering, gathering of traditional materials for art and ritual objects, and other cultural practices. Figure CR3 shows examples of archaeological evidence in the Angoon area.

Terms to know

Culturally modified trees: Trees that have been purposely altered by humans. Alterations may include cutting notches in the trees to hold springboards, stripping bark off of trees to mark trails or use for crafts or other purposes, removing sections of trees to extract sap or pitch, and carving words or symbols into trees.

Isolated artifact: A single artifact or very few artifacts located in a small area.

Prehistoric and historic people living in and using the Angoon and Favorite Bay areas did not use all of the land equally when it came to choosing places to live or to build structures—activities that leave behind some of the most substantial archaeological evidence. Lake and ocean shorelines, wetlands, and other nearby areas were the most popular locations for humans to live and gather in large numbers. This is for three reasons: 1) the terrain is rugged, 2) the vegetation is dense, and 3) people dependent on travel by foot or boat rely on sheltered locations with easy access to fresh water and the water-based resources such as fish that are very important as a food source.

Figure CR3. Artifacts and features from SIT-00302 (the Favorite Bay Garden Site): (from left) a hearth (fire ring), an obsidian microblade, and a culturally modified tree.

The U.S. Forest Service cultural resource probability model considers such land use patterns when it predicts which areas on Admiralty Island are more likely to contain archaeological resources than others. Due to the long shoreline of Favorite Bay, the use of Favorite Creek by spawning salmon, the protected nature of the Favorite Bay, the bay's abundant marine resources, and the numerous wetlands and other land-based food sources in the surrounding area, a high percentage of the land around Favorite Bay and Angoon (and therefore a large percentage of land in each alternative's APEs) is considered as having a high probability to contain historic and prehistoric cultural resources.

Several types of cultural resources are known to be present in the APEs for the airport and access locations. These include ***isolated artifacts***, ***culturally modified trees***, and archaeological sites that are historic properties. Other archaeological sites and structures are present nearby, but they are outside the APEs for the different alternatives; these sites are not discussed further.

Buried or hidden cultural resources may be located throughout the Angoon area, but none were found during field studies for this EIS or during previous studies. For this reason, there is always a chance that additional sites could be discovered as the airport project progresses or during construction if an action alternative is selected. In general, lands around shorelines and creeks have a higher potential for containing buried or hidden cultural resources than do upland areas because both prehistoric and historic peoples in Southeast Alaska depended heavily on the availability of fresh drinking water and water-based resources such as fish and other marine life.

4.8.2.3.1. Isolated artifacts and culturally modified trees

During surveys, an isolated artifact that was probably a historic boring bit or jackhammer bit was found in the vicinity of Favorite Creek near the proposed Access 2 location. Culturally modified trees, which are very common in Southeast Alaska, were found throughout all APEs but primarily along the east side of Favorite Bay near the proposed Airport 4 with Access 2 location, and on the west side of Favorite Bay near the proposed location for Airport 12a. Neither the isolated artifact nor the culturally modified trees were determined to be historic properties. Under the requirements of the Section 106 process—as described in 36 CFR 800.5(a)—only historic properties must be considered when assessing project effects. For this reason, the isolated artifact and culturally modified trees are not discussed further in this EIS.

4.8.2.3.2. Archaeological sites located in the areas of potential effects

The nine archaeological sites located in the APEs and determined or preliminarily determined to be historic properties are described in Table CR1.

Table CR1. Archaeological sites located in the APEs

Site number	Site name or type	Description
SIT-00014	Killisnoo Island Village	The site includes the remains of the historic Killisnoo Village from the late 1800s to late 1920s. The village was almost entirely destroyed by fire in 1928.
SIT-00033	Favorite Bay Fish Weir	The site, which consists of a series of wooden stakes in the ground that prehistoric peoples used to harvest fish in Favorite Bay, has been determined to be more than 3,000 years old.
SIT-00034	Prehistoric midden and historic garden site	The midden consists largely of shells from marine resources processed by prehistoric peoples for food and other uses. The historic garden site includes garden furrows and other features related to farming small plots of food resources for individual families or clans.
SIT-00056	St. Andrew's Church	The church was destroyed by fire in 1928, and no structural remains are present.
SIT-00169	Killisnoo Harbor Village	The site includes remains of collapsed cabins, artifacts, depressions in the ground, and garden plots.
SIT-00302	Favorite Bay Garden Site	The site contains evidence of both prehistoric and historic use, and includes hearths, garden rows or furrows, a culturally modified tree, and depressions in the ground that could represent the locations of buried cultural materials. A microblade—a prehistoric stone artifact type that has been found elsewhere in Alaska to date as far back as 11,000 years ago—was also found at the site (see Figure CR3).
SIT-00502	Historic garden site	The site is similar to the historic garden at SIT-00034 but lacks an associated prehistoric midden.
SIT-00749	Killisnoo Cemetery	The site contains historical graves from Aleut, Russian, Japanese, and other individuals associated with the varied history of the Killisnoo Village and Killisnoo Island.
SIT-00781	Beaver Tail Rock	The site is a large boulder that the local Alaska Native community has identified as being associated with the oral tradition of the migration of their ancestors into the Angoon area, and is considered an important cultural landmark.

4.8.3. Project effects

Based on what is known through field studies, interviews, and research, none of the action alternatives would directly affect known historic properties. However, all action alternatives have the potential to directly affect buried or hidden cultural resources. All would directly affect known culturally modified trees.

The action alternatives may also indirectly affect historic properties and buried or hidden cultural resources by introducing vibration, noise intrusions, or visual intrusions, or by creating new or improved human access to areas previously difficult to access, thereby introducing the potential for intentional or inadvertent harm to cultural resources.

The sections below describe the actions that could affect these resources, the nature of the effects, the methods for analyzing effects, any assumptions used in the analysis, and the magnitude and extent of effects for each alternative.

4.8.3.1. How did the FAA determine the effects of the alternatives on cultural resources?

For the purpose of this analysis, all effects—direct and indirect—on cultural resources are considered long-term effects. Unlike biological resources such as vegetation, once a cultural resource site is affected, it can never be restored to its pre-disturbance condition.

4.8.3.1.1. Direct effects

Direct effects to cultural resources would be caused by direct disturbance of the landscape from the construction actions of any action alternative. As described in section 4.1 Introduction, these actions would consist of the following:

- Vegetation removal related to the airport, road, and certain ***avigation easements*** (clearing of all vegetation for construction, line of sight, and open areas for flight approach and takeoff)
- Terrain disturbance related to the airport, airport access road, and access roads to avigation easements (cutting and filling of soil or blasting of bedrock to level the ground)

What is discussed in this section?

Terms to know

Avigation easement: A right-of-way tool used in airport planning to grant certain rights to the holder of the easement. For this EIS, avigation easements outside of airport property would provide DOT&PF the right to access areas to clear them of obstructions and maintain that clearance.

- Tree felling in certain avigation easements (cutting down the trees but not other vegetation). For the effects analysis, where tree felling is identified in certain avigation easements, it is assumed that all trees within these easements would be felled (cut down).
- Terrain disturbance from potential extraction of construction materials such as gravel, soil, and rock from an on-island materials source
- Pavement related to the airport and road
- Bridge construction (temporary staging areas for construction and permanent footers placed in or alongside Favorite Creek)
- ***Culverting*** or re-routing of streams

These actions were grouped together into a single type of action—landscape disturbance—because any modification of the landscape, whether cutting and filling of soil, removing vegetation, or even trimming of trees, has the potential to damage any cultural resource. The areas of landscape disturbance for each alternative are depicted in Figures CR3 through CR7, below.

Direct effects to cultural resources from landscape disturbance were assessed in two ways:

1. Comparing the areas of landscape disturbance for each action alternative to the locations of known historic properties.
2. Overlaying the high-probability areas, as determined in the U.S. Forest Service cultural resources probability model (described in the sidebar titled "The U.S. Forest Service cultural resource probability model"), on the areas of landscape disturbance for each action alternative to determine the relative potential for each action alternative to affect buried or hidden cultural resources.

For the purpose of this analysis, action alternatives with greater acreages of landscape disturbance in high-probability areas are considered to pose a higher risk to buried or hidden cultural resources than action alternatives with smaller acreages.

4.8.3.1.2. Indirect effects

Indirect effects to historic properties or to buried or hidden cultural resources could occur as a result of new or improved access and increased human activity, noise intrusions, vibration during construction, and visual intrusions.

Vibration can indirectly affect cultural resources by causing damage to standing structures or, in very rare cases, causing artifacts in loose soil to move. Typical sources of vibration from airport projects are explosives used to loosen rock during construction. Given the nature of the geology in the Angoon area, vibration from explosives is not expected to extend very far beyond the source of the blast (for example, the specific location of the explosive charge). This means that the vast majority of areas where vibration could be strong enough to damage a cultural resource are located in the direct effects APE; the remaining areas that could be affected are those areas located immediately adjacent to the border of the direct effects APE. Additionally, cultural resources susceptible to damage from vibration are generally limited to standing structures where structural elements could crack or collapse. Because any cultural resources located in the direct effects APE would be more greatly affected by physical disturbance than by vibration effects, the FAA focused the assessment of potential vibration effects on cultural resources immediately surrounding the direct effects APE that are known to have structural resources. This analysis is presented in section 4.8.3.2 and its subsections.

For the remaining sources of indirect effects, the FAA used the methods described below to define and assess these potential indirect effects.

New or improved access

New or improved access and the resulting potential for increased human activity increases the chances of artifact looting and inadvertent or intentional trampling of or damage to cultural resources. This increased activity would exist during construction with workers in the area, and would continue after construction ceases. The presence of a new access road and vehicle parking area would create new or improved access to areas that are currently reached only by foot trails used by Angoon residents for subsistence harvest. This would be a notable change at the proposed locations of Airport 3a and Airport 4 with either access road. At the proposed location of Airport 12a, the existing road already provides access into nearby areas, and Access 12a would be so short as to not make a noticeable difference in access.

The new or improved access APE was established assuming that the density of vegetation and the management of the surrounding Kootznoowoo Wilderness Area (which prohibits off-road motorized travel) would limit use of the area to cross-country foot travel. Further, due to dense vegetation, fallen trees, and terrain characterized by many steep-sided drainages, it is reasonable to assume that most travel would be limited to within 0.5 mile of the entry point of access for any alternative. The exception is where access to the Favorite Bay shoreline would be improved. Here, users of the area would be expected to travel more than 0.5 mile because walking along the lightly vegetated shoreline would be easier. Because the airport would have a perimeter fence, the 0.5-mile buffer was based on only the airport parking area and the access road.

Acreages of high-probability areas within this APE provide a relative measure of the potential for indirect effects on hidden or buried cultural resources from new or improved access and increased human activity.

Noise intrusions

Noise can adversely affect historic properties by disrupting human use of the sites for the purposes that make them eligible for the National Register. For each alternative, the FAA identified a noise APE based on the FAA's noise significance guidelines and a metric called the day-night average sound level (DNL), which describes the average sound level that would be experienced during an entire 24-hour day.

For the purposes of this analysis, the noise APEs for the alternatives consist of the area within the DNL 65 A-weighted decibel (dBA) contour because FAA criteria establishes that outside of this contour, there are no significant effects. (See section 4.11 Noise for explanations of noise modeling, noise contours, significance, and DNL.)

In all cases, the noise APE for each alternative is located entirely within that alternative's direct effects APE.

Visual intrusions

Based on an analysis of anticipated changes to the visual character of the landscape from each airport and access alternative (see section 4.9.3.3 Light Emissions and Visual Resources), the FAA identified an APE for visual effects to cultural resources. Although dense tree cover throughout the Angoon area would obscure most visual changes, some changes would be noticeable from certain viewpoints, and these viewpoints compose the visual APE for a given alternative.

The FAA analyzed visual effects in two ways:

- Comparing the locations of known historic properties to the boundaries of the visual APE. Any historic property found to be in the visual APE would then be evaluated for the degree to which its historical importance would be affected by the anticipated visual intrusion. Historic properties that are sensitive to visual intrusions are generally those where the viewshed is or was important to the historical use of the site or its intended design and setting. More specifically, sensitive historic properties are those with viewsheds that are important to the resource's eligibility for the National Register.
- Calculating the acreages of high-probability areas in the visual APE to provide a relative measure of the potential for visual effects on hidden or buried cultural resources.

4.8.3.2. How would each alternative affect cultural resources?

4.8.3.2.1. No action alternative

Under the no action alternative, no new airport or access road construction would occur. Cultural resources would remain undisturbed by airport actions but would remain vulnerable to future disturbance from the same type of land use activities that exist at the present time. No direct or indirect effects to cultural resources would occur.

4.8.3.2.2. Airport 3a with Access 2 (proposed action)

No historic properties are located in the direct effects APE. Five historic properties are located in one of the indirect effects APEs—the new or improved access APE.

Figure CR4 shows the APEs for Airport 3a with Access 2. Table CR2 compares this alternative with the other alternatives.

Direct effects

Airport 3a with Access 2 would result in no direct effects to historic properties because all such sites are located outside the areas of landscape disturbance.

Airport 3a with Access 2 could result in direct effects to buried or hidden cultural resources because landscape disturbance would occur on approximately 119 acres of high-probability areas.

Direct disturbance, even if inadvertent, has the potential to adversely affect historic properties, and the greater the number of acres of disturbance in high-probability areas, the higher the risk such effects could occur. Airport 3a with Access 2, having the second-highest number of acres of landscape disturbance in high-probability areas, would pose the second-greatest risk for such adverse effects.

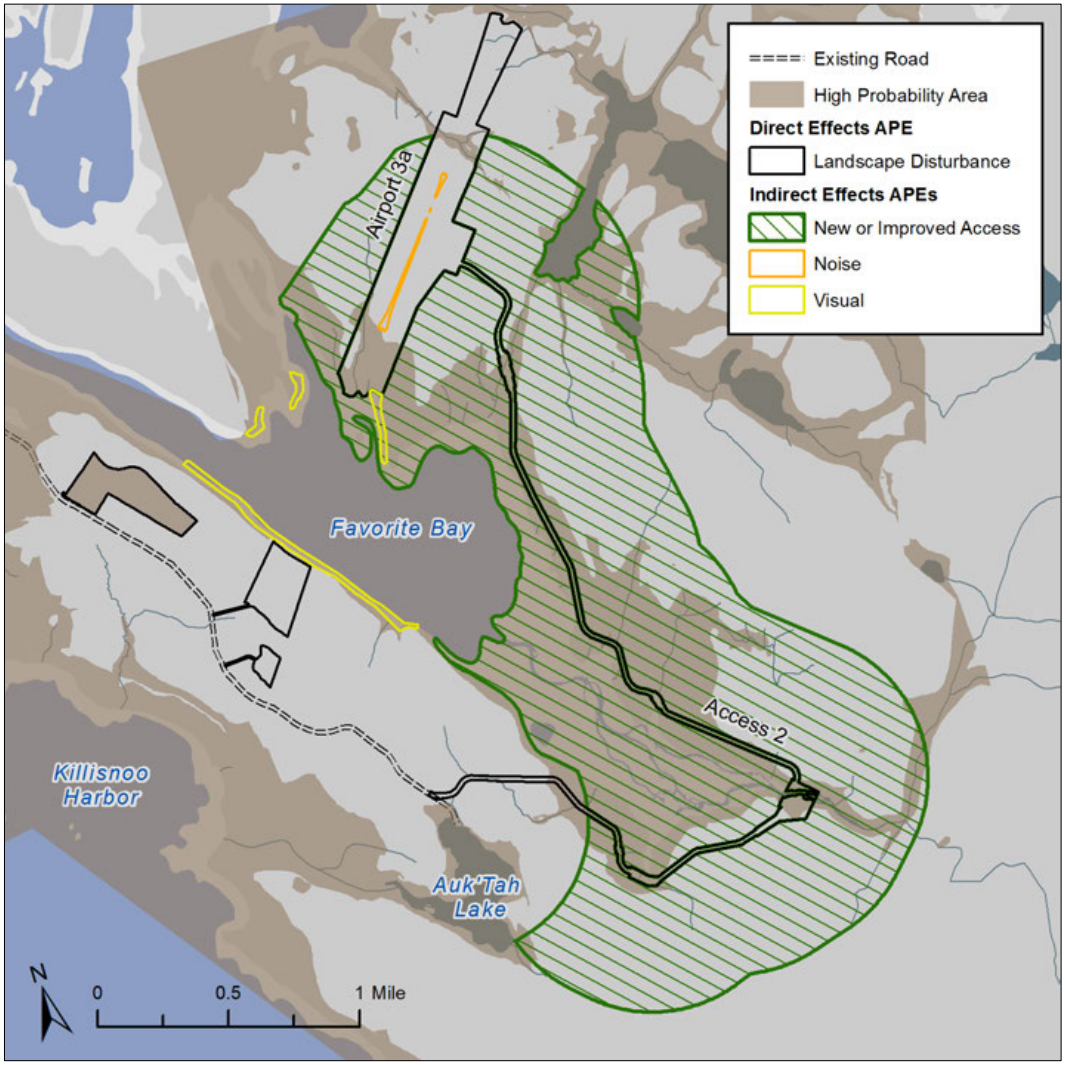


Figure CR4. APEs for Airport 3a with Access 2.

Indirect effects

Five of the nine historic properties are located in the portion of the APE where new or improved access would occur as a result of this alternative:

- SIT-00033, the Favorite Bay Fish Weir
- SIT-00034, prehistoric midden and historic garden site
- SIT-00302, the Favorite Bay Garden Site
- SIT-00502, a historic garden site
- SIT-00781, Beaver Tail Rock

Additionally, this alternative would provide new or improved human access to approximately 854 acres of high-probability areas for buried or hidden cultural resources.

As detailed in section 4.8.3.1.2, indirect effects to historic properties or to buried or hidden cultural resources from new or increased access and human activity could include looting of artifacts and inadvertent or intentional trampling of or damage to cultural resources during and after construction. Access 2 has a higher potential for these indirect effects than do other access alternatives because the alignment of the road would closely follow the shoreline of Favorite Bay, which is a high-probability area as well as an attractive area for recreation and subsistence. Construction of a road that would provide easy access to the southern and eastern shoreline of Favorite Bay as well as the Favorite Bay tidelands is likely to increase human activity in these areas. All five of the historic properties in the APE for this alternative are located in areas where improved access would result from the new access road. Although the FAA cannot definitively state that cultural resources would experience indirect effects from new or improved access, it is reasonable to assume that they would be more vulnerable to such effects. The FAA also cannot predict with accuracy the severity of any indirect effects from improved access. Periodic monitoring of historic properties could be implemented to evaluate the occurrence (or lack thereof) of any effects related to improved access, and measures could be taken to avoid adverse effects prior to their occurrence. Under these conditions, the FAA finds that the improved access to the lands containing these five sites would result in no adverse effects to the sites.

None of the five historic properties are located in the noise or visual APEs or areas that could be affected by vibration. The noise APE is entirely encompassed by the direct effects APE, and therefore any buried or hidden cultural resources in the noise APE would have already been directly affected by landscape disturbance.

4.8.3.2.3. Airport 3a with Access 3

No historic properties are located in the direct effects APE. Five historic properties are located in one of the indirect effects APEs—the new or improved access APE.

Figure CR5 shows the APEs for Airport 3a with Access 2. Table CR2 compares this alternative with the other alternatives.

Direct effects

Airport 3a with Access 3 would result in no direct effects to historic properties because all such sites are located outside the areas of landscape disturbance.

Airport 3a with Access 3 could result in direct effects to buried or hidden cultural resources because landscape disturbance would occur on approximately 84 acres of high-probability areas. Most of this disturbance would come from construction of the airport and use of the proposed on-island materials source; almost none of the access road would be located in high-probability terrain.

Direct disturbance, even if inadvertent, has the potential to adversely affect historic properties, and the greater the number of acres of disturbance in high-probability areas, the higher the risk such effects could occur. Airport 3a with Access 3, having the fewest acres of landscape disturbance in high-probability areas, would pose the lowest risk for such adverse effects.

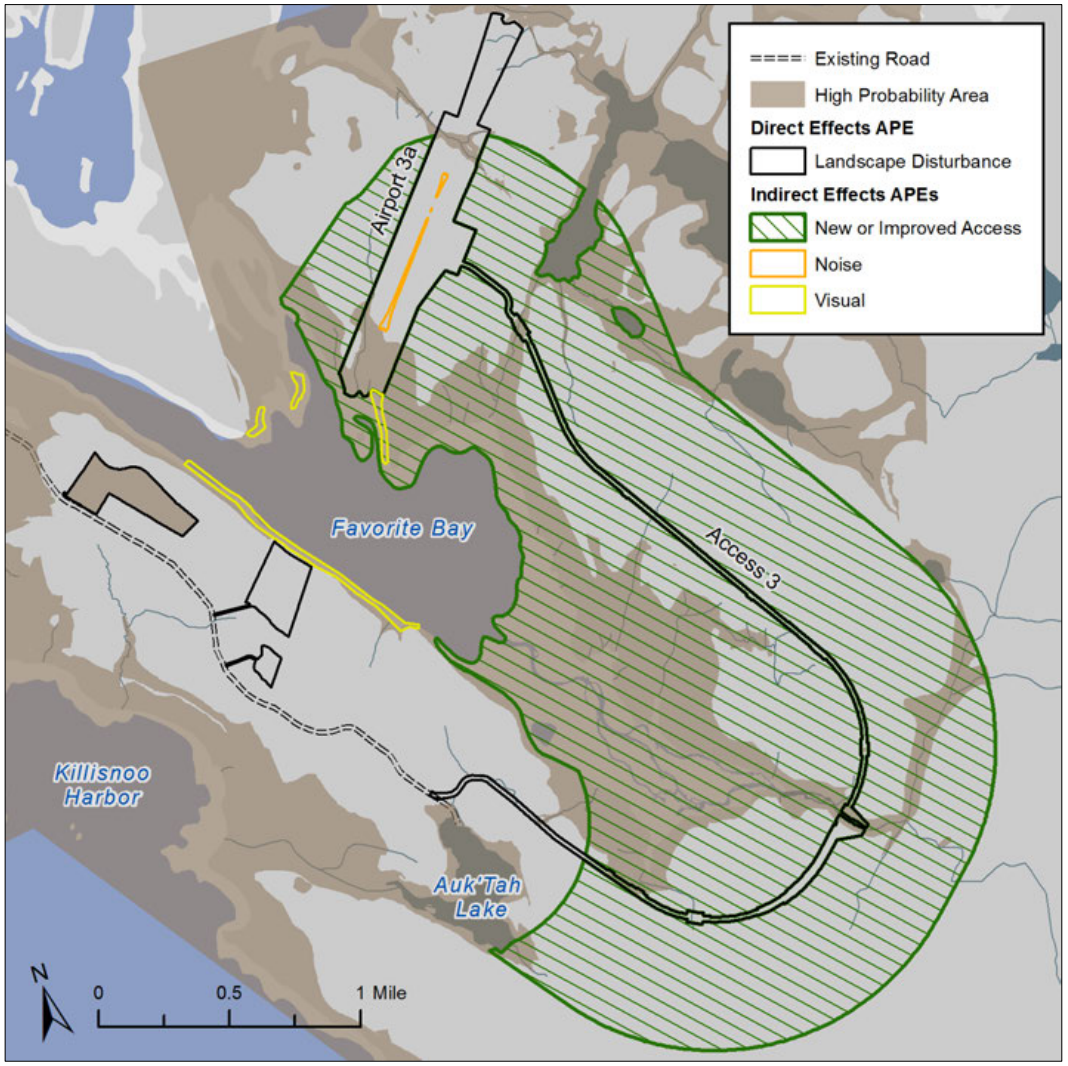


Figure CR5. APEs for Airport 3a with Access 3.

Indirect effects

Five of the nine historic properties are located in the new or improved access APE for this alternative:

- SIT-00033, the Favorite Bay Fish Weir
- SIT-00034, prehistoric midden and historic garden site
- SIT-00302, the Favorite Bay Garden Site
- SIT-00502, a historic garden site
- SIT-00781, Beaver Tail Rock

Additionally, this alternative would provide new or improved access to 949 acres of high-probability areas for buried or hidden cultural resources, more than any other alternative.

As detailed in section 4.8.3.1.2, indirect effects to historic properties or to buried or hidden cultural resources from new or improved access and human activity could include looting of artifacts and inadvertent or intentional trampling of or damage to cultural resources during and after construction. Access 3 has a lower potential for these indirect effects than does Access 2 because it would be farther inland, away from desirable areas of cross-country travel such as the Favorite Bay shoreline. However, Access 3 would still increase the risk of intentional or unintentional indirect effects on cultural resources as compared to the no action alternative because it would provide new or improved access to the lands south and east of Favorite Bay.

All five historic properties in the APE for this alternative are located in areas where improved access would result from the new access road. Although the FAA cannot definitively state that cultural resources would experience indirect effects from new or improved access, it is reasonable to assume that they would be more vulnerable to such effects. The FAA also cannot predict with accuracy the severity of any indirect effects from improved access. For the reasons outlined above for Airport 3a with Access 2, the FAA finds that the improved access to the lands containing these five sites would result in no adverse effects to the sites; that is, adverse effects can be avoided.

None of the five historic properties are located in the noise or visual APEs or areas that could be affected by construction-related vibration. The noise APE is entirely encompassed by the direct effects APE, and therefore any buried or hidden cultural resources in the noise APE would have already been directly affected by landscape disturbance.

4.8.3.2.4. Airport 4 with Access 2

No historic properties are located in the direct effects APE. Five historic properties are located in one of the indirect effects APEs—the new or improved access APE.

Figure CR6 shows the APEs for Airport 4 with Access 2. Table CR2 compares this alternative with the other alternatives.

Direct effects

Airport 4 with Access 2 would result in no direct effects to historic properties because all such sites are located outside the areas of landscape disturbance.

Airport 4 with Access 2 could result in direct effects to buried or hidden cultural resources because landscape disturbance would occur on approximately 96 acres of high-probability areas. Most of this disturbance would come from construction of the airport and use of the proposed on-island material source; only a few sections of the access road would be located in high-probability areas.

Direct disturbance, even if inadvertent, has the potential to adversely affect historic properties, and the greater the number of acres of disturbance in high-probability areas, the higher the risk such effects could occur. Airport 4 with Access 2, having the third-highest number of acres of landscape disturbance in high-probability areas, would pose the third-greatest risk for such adverse effects.

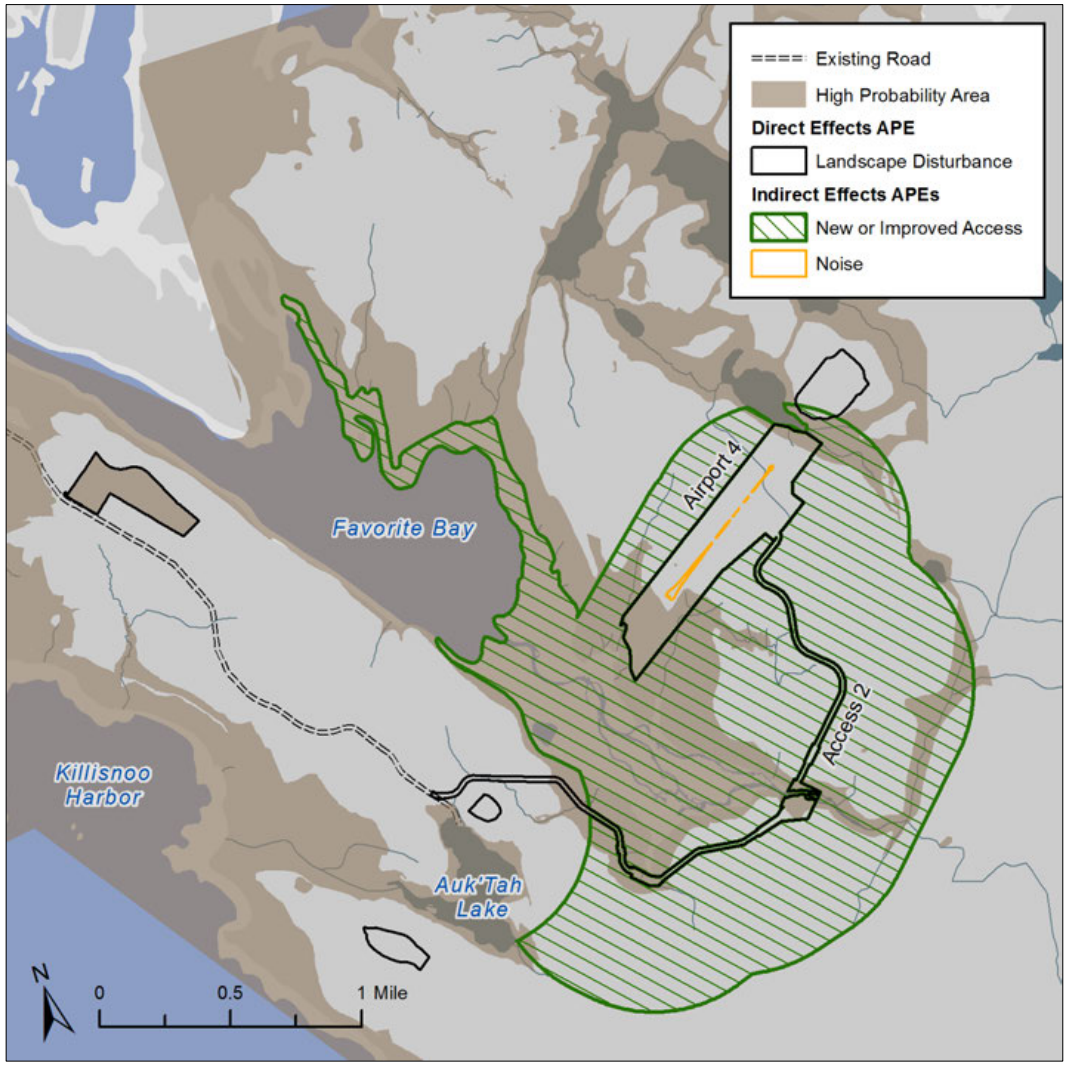


Figure CR6. APEs for Airport 4 with Access 2.

Indirect effects

Five of the nine historic properties are located in new or improved access APE for this alternative:

- SIT-00033, the Favorite Bay Fish Weir
- SIT-00034, prehistoric midden and historic garden site
- SIT-00302, the Favorite Bay Garden Site
- SIT-00502, a historic garden site
- SIT-00781, Beaver Tail Rock

Additionally, this alternative would provide new or improved access to approximately 678 acres of high-probability areas for buried or hidden cultural resources.

As detailed in section 4.8.3.1.2, indirect effects to either historic properties or to buried or hidden cultural resources from new or improved access and human activity could include looting of artifacts and inadvertent or intentional trampling of or damage to cultural resources during and after construction. Access 2 for Airport 4 has a similar but lower potential for these effects than does Access 2 for Airport 3a. Figures CR3 and CR5 illustrate the following differences:

- Access 2 for Airport 4 would be shorter, and a large section of it would be located farther inland than Access 2 with Airport 3a.
- Access 2 for Airport 4 would not extend very far around Favorite Bay, and would not provide direct access to most of the eastern shoreline of the bay.

Therefore, Access 2 for Airport 4 would pose a lower risk to cultural resources because access to the Favorite Bay shoreline would still be difficult on foot. All five historic properties in the APE for this alternative are located in areas where improved access would result from the new access road. Although the FAA cannot definitively state that cultural resources would experience indirect effects from new or improved access, it is reasonable to assume that they would be more vulnerable to such effects. The FAA also cannot predict with accuracy the severity of any indirect effects from improved access. For the reasons outlined above for Airport 3a with Access 2, the FAA finds that the improved access to the lands containing these five sites would result in no adverse effects to the sites; that is, adverse effects can be avoided.

None of the five historic properties are located in the noise APE or areas that could be affected by construction-related vibration. There is no visual APE for this alternative because the altered landscape would not be visible from outside the immediate disturbance area; the existing forest would screen the disturbance from remote view. The noise APE is entirely encompassed by the direct effects APE, and therefore any cultural resources in the noise APE would have already been directly affected by landscape disturbance.

4.8.3.2.5. Airport 4 with Access 3

No historic properties are located in the direct effects APE. Five historic properties are located in one of the indirect effects APEs—the new or improved access APE.

Figure CR7 shows the APEs for Airport 4 with Access 3. Table CR2 compares this alternative with the other alternatives.

Direct effects

Airport 4 with Access 3 would result in no direct effects to historic properties because all such sites are located outside the areas of landscape disturbance.

Airport 4 with Access 3 could result in direct effects to buried or hidden cultural resources because landscape disturbance would occur on approximately 85 acres of high-probability areas. Most disturbance in the high-probability areas would come from construction of the airport and use of the proposed on-island materials source; almost none of the access alternative would be located in high-probability terrain.

Direct disturbance, even if inadvertent, has the potential to adversely affect historic properties, and the greater the number of acres of disturbance in high-probability areas, the higher the risk such effects could occur. Airport 4 with Access 3, having the second-lowest number of acres of landscape disturbance in high-probability areas, would pose the second-lowest risk for such adverse effects.

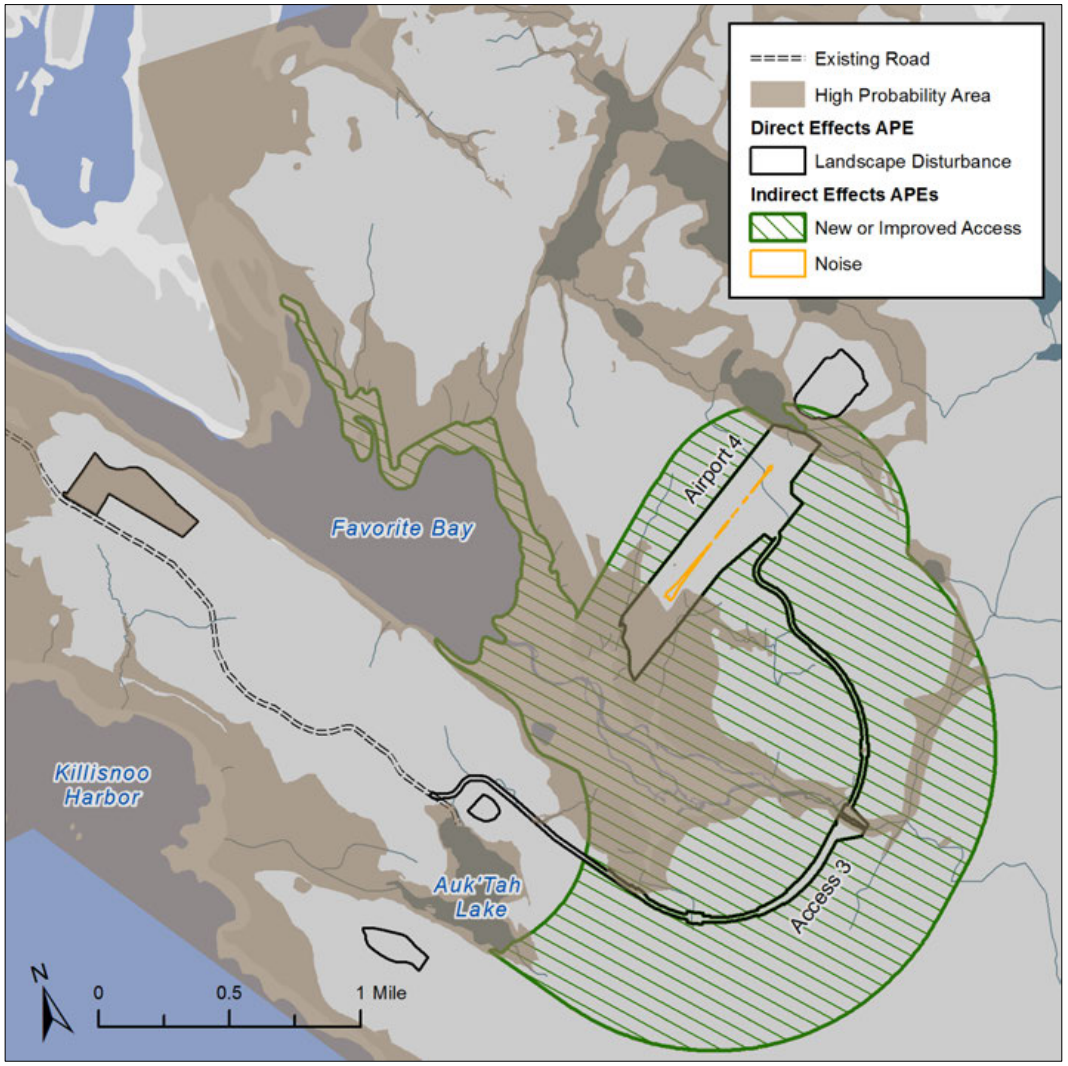


Figure CR7. APEs for Airport 4 with Access 3.

Indirect effects

Five of the nine historic properties are located in the indirect effects APE for this alternative:

- SIT-00033, the Favorite Bay Fish Weir
- SIT-00034, prehistoric midden and historic garden site
- SIT-00302, the Favorite Bay Garden Site
- SIT-00502, a historic garden site
- SIT-00781, Beaver Tail Rock

Additionally, this alternative would provide new or improved human access to approximately 697 acres of high-probability areas for buried or hidden cultural resources, including the Favorite Bay shoreline and tidelands.

As detailed in section 4.8.3.1.2, indirect effects to either historic properties or to buried or hidden cultural resources from new or improved access and human activity could include looting of artifacts and inadvertent or intentional trampling of or damage to cultural resources during and after construction. Indirect effects from this alternative would be similar to those for Airport 4 with Access 2, but with a slightly lower risk of intentional or unintentional damage from human activity because nearly the entire access road would be located farther inland, and cross-country travel from it to the shoreline would be more difficult than from Access 2.

All five historic properties in the APE for this alternative are located in areas where improved access would result from the new access road. Although the FAA cannot definitively state that cultural resources would experience indirect effects from new or improved access, it is reasonable to assume that they would be more vulnerable to such effects. The FAA also cannot predict with accuracy the severity of any indirect effects from improved access. For the reasons outlined above for Airport 3a with Access 2, the FAA finds that the improved access to the lands containing these five sites would result in no adverse effects to the sites; that is, adverse effects can be avoided.

None of the historic properties are located in the noise APE or areas that could be affected by construction-related vibration. There is no visual APE for this alternative because the altered landscape would not be visible from outside the immediate disturbance area; the existing forest would screen the disturbance from remote view. The noise APE is entirely encompassed by the direct effects APE, and therefore any cultural resources in the noise APE would have already been directly affected by landscape disturbance.

4.8.3.2.6. Airport 12a with Access 12a (preferred alternative)

No historic properties are located in the direct effects APE.

As discussed in section 4.8.3.1.2, Access 12a would not create new or improved access beyond what the existing road provides, therefore this alternative does not have a new or improved access APE. Three known historic properties are located in the visual APE, and a fourth is located immediately adjacent to the direct effects APE, in an area that could experience construction-related vibration.

Figure CR8 shows the APEs for Airport 12a with Access 12a. Table CR2 compares this alternative with the other alternatives.

Direct effects

Airport 12a with Access 12a would result in no direct effects to historic properties because all such sites are located outside the areas of landscape disturbance.

Airport 12a with Access 12a could result in direct effects to buried or hidden cultural resources because landscape disturbance would occur on approximately 128 acres of high-probability areas. This disturbance would come from construction of the airport where the runway would parallel the shoreline of Killisnoo Harbor, as well as from use of the proposed on-island materials source.

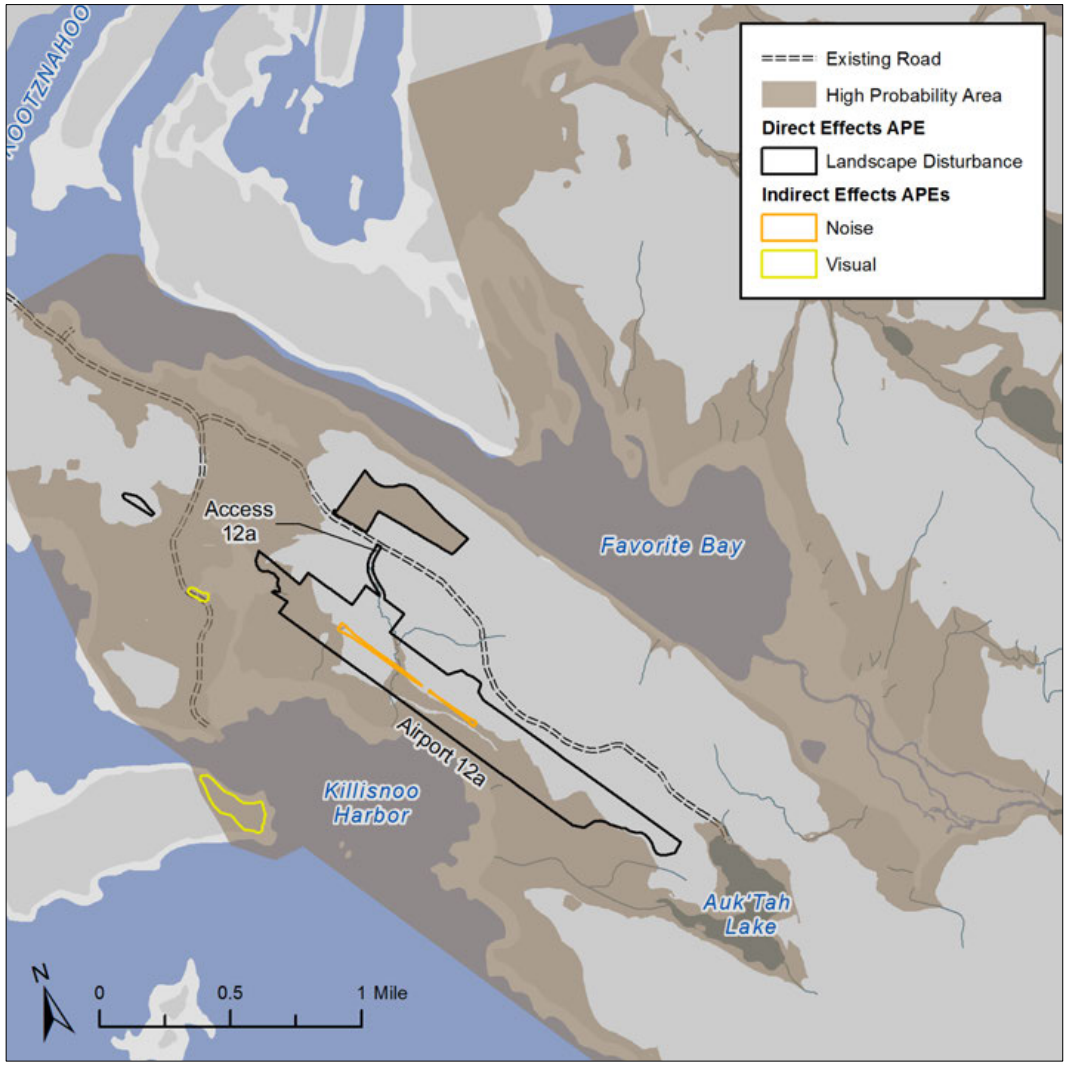


Figure CR8. APEs for Airport 12a with Access 12a.

Direct disturbance, even if inadvertent, has the potential to adversely affect historic properties, and the greater the number of acres of disturbance in high-probability areas, the higher the risk such effects could occur. Airport 12a with Access 12a, having the highest number of acres of landscape disturbance in high-probability areas, would pose the greatest risk for such adverse effects.

Indirect effects

Three known historic properties are located in the visual APE:

- SIT-00014, the Killisnoo Island Village site
- SIT-00056, the St. Andrew's Church site
- SIT-00749, the Killisnoo Cemetery site

Landscape changes caused by the airport project would be visible from these three sites. That is, small areas of vegetation clearing would be visible in the viewsheds from these sites. The FAA, in consultation with the Alaska SHPO and other consulting parties, has determined that none of these three sites would be adversely affected by the changes to the viewshed.

One known historic property is located near the direct effects APE, in an area that may experience construction-related vibration:

- SIT-00169, the Killisnoo Harbor Village site

This site contains structural remains, which may be more sensitive to vibration damage than sites without structural remains. However, the structures have already collapsed and would not be further damaged by the level of vibration that would be expected to occur in the vicinity of the site. As such, the FAA has made a finding of no adverse effects for this site relative to Airport 12a with Access 12a.

None of the four historic properties is located in the noise APE. The noise APE is encompassed entirely by the direct effects APE, and therefore any cultural resources in the noise APE would have already been directly affected by landscape disturbance. The visual APE encompasses approximately 15 acres of high-probability land, all located on the eastern shore of Killisnoo Island.

Although there would be no new or improved access APE, this alternative could still involve indirect effects, including looting of artifacts and inadvertent or intentional trampling of or damage to cultural resources from increased human activity in the area during and after construction. This alternative poses a lower risk for these indirect effects than the other action alternatives, however, because it would not improve access into areas currently not accessible. Airport property would not be available for use as new or improved access to the Killisnoo Harbor shoreline or any other areas adjacent to the airport.

4.8.3.3. How do the effects to cultural resources compare?

4.8.3.3.1. Historic properties

There would be no direct effects to any historic properties from any alternative (see Table CR2).

Airports 3a and 4 with their respective access alternatives pose increased risk to five known historic properties from indirect effects from new or improved access (see Table CR2). For Airport 12a with Access 12a, four known historic properties would be located in the visual APE or in areas that could experience construction-related vibration.

In all cases, the FAA has concluded that anticipated new or improved access, changes to the viewshed, or construction related vibration from the alternatives would result in no adverse effects to the site characteristics that make the sites eligible for the National Register.

4.8.3.3.2. Buried or hidden cultural resources

Table CR2 provides the acreages of landscape disturbance in high-probability areas. As shown in the table, the largest total acreage of landscape disturbance in high-probability areas would occur under Airport 12a with Access 12a (128 acres). The smallest total acreage of landscape disturbance in high-probability areas would occur under Airport 3a with Access 3 (84 acres).

For indirect effects to buried or hidden cultural resources, Table CR2 provides the acres of new or improved access, and visual intrusion in high-probability areas. These acreages provide a relative measure of the potential for indirect effects on buried or hidden cultural resources. Indirect effects from noise are not reportable because the noise APE is entirely encompassed by the direct effects APE, and any cultural resources in the noise APE would have already been directly affected by landscape disturbance.

Table CR2. Summary of effects to all cultural resources

Alternative	Direct effects		Indirect effects		
	Historic properties in the area of landscape disturbance	High-probability lands in areas of landscape disturbance	Historic properties in one or more of the indirect effects APEs	High-probability lands in new or improved access APE and increased potential for disturbance from human activity	High-probability areas in visual APE and increased potential for visual intrusion
No action alternative	N/A	0 acre	N/A	0 acre	0 acre
Airport 3a with Access 2	0	119 acres	5 (new or improved access APE)	854 acres	25 acres
Airport 3a with Access 3	0	84 acres	5 (new or improved access APE)	949 acres	25 acres
Airport 4 with Access 2	0	96 acres	5 (new or improved access APE)	678 acres	N/A**
Airport 4 with Access 3	0	85 acres	5 (new or improved access APE)	697 acres	N/A**
Airport 12a with Access 12a	0	128 acres	3 (visual APE) 1 (potential vibration area)	N/A*	15 acres

* Airport 12a with Access 12a would not improve access to any new areas.

** There is no visual APE for this alternative, because the altered landscape would not be visible from outside the immediate disturbance area.

N/A = not applicable.

4.8.3.4. Would any effects be irreversible or irretrievable?

No irreversible or irretrievable effects to cultural resources were identified.

4.8.3.5. How did the FAA determine the significance of the anticipated effects from the alternatives?

FAA *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) and *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b) do not identify specific thresholds for significant effects on cultural resources. However, the implementing regulations of the National Historic Preservation Act at 36 CFR 800.5(a) establish criteria by which a finding of adverse effect is made. (This finding means a historic property will be substantially affected in a negative way during either construction or operation of the airport.) The FAA adopts these criteria for findings of adverse effect, but such a finding does not automatically equal a finding of significant effects within the context of the National Environmental Policy Act (NEPA) of 1969 (PL 91-190). That determination is left up to the FAA, who consults with a number of agencies and other parties about the decision.

According to 36 CFR 800.5(a)(1), an adverse effect is found when the action

> would alter, directly or indirectly, any of the characteristics of a historic property [a site determined eligible for listing on the National Register] that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

According to FAA *Order 1050.1E*,

> [r]egulations at 36 CFR 800.8(a) state that an adverse effect finding does not automatically trigger preparation of an EIS (i.e., a significant impact). The section 106 consultation process includes consideration of alternatives to avoid adverse effects on National Register listed or eligible properties; of mitigation measures; and of accepting adverse effects. But in all cases, the FAA makes the final determination of the level of effect….

4.8.3.6. Would any of the alternatives have a significant effect on cultural resources?

No significant effects to cultural resources were identified for any action alternative. Significant effects could occur if currently buried or hidden cultural resources are uncovered during construction. As detailed in section 7.4.2 of Chapter 7: Mitigation, cultural resource monitors would be used during construction to watch for the exposure of buried cultural resources hidden by dense vegetation. Standard protocols for reporting the discovery to the proper agencies, and consulting with agencies and other consulting parties about the best way to address the discovery would be followed.

In applying the criteria of adverse effect under the implementing regulations of Section 106 (see 36 CFR 800.5(a)(1)), the FAA finds that none of the action alternatives would have an adverse effect on any known historic properties.

Airport 3a and Airport 4 with either Access 2 or Access 3 would result in a finding of no adverse effects for five historic properties located in areas of new or improved access, where they may experience limited effects from increased human activity. No known historic properties are located in the direct effects portions of the APEs for these alternatives.

Airport 12a with Access 12a would also result in finding of no adverse effects for historic properties in its APE. No known historic properties are located in the direct effects APE for this alternative. Three known historic properties are located in the visual APE, and one is located in an area where construction-related vibration may occur.

In making the findings of no adverse effects, the FAA consulted with the U.S. Forest Service for sites on lands it administers and with the Alaska SHPO. The FAA received concurrence from the U.S. Forest Service on the findings described above. The FAA submitted determinations of eligibility and findings of no adverse effects for Airport 12a with Access 12a, and received concurrence from the Alaska SHPO on those determinations.

4.8.3.7. How could the effects be avoided, minimized, or mitigated?

Cultural resource monitors would be used during construction to watch for the exposure of buried cultural resources hidden by dense vegetation. Standard protocol for reporting the discovery to the proper agencies, and consulting with agencies and other consulting parties about the best way to address the discovery would be followed.

Because no significant effects are anticipated for these resources, no additional mitigation measures beyond the cultural resource monitor and those discussed in Chapter 7: Mitigation would be implemented under any action alternative. Chapter 7 describes best management practices that would be implemented during construction. Best management practices are relatively common activities in construction, and are intended to prevent pollution, minimize environmental harm, and assure that appropriate response action is taken if unacceptable environmental effects occur. Through the use of these best management practices, effects are reduced during construction. The best management practices described in Chapter 7 were considered during effects analysis for this resource.

4.9. Light Emissions and Visual Resources

What is discussed in this section?

This section addresses the existing conditions of light emissions and visual resources in the area of the proposed airport and access alternatives. It also addresses the potential changes to those conditions from construction and operation of the proposed land-based airport.

The information contained in this section is summarized from the *Visual Resources Existing Conditions Technical Report for the Angoon Airport Environmental Impact Statement, Angoon, Alaska* (SWCA 2011c), included as Appendix L.

4.9.1. Background information

4.9.1.1. What do the terms "light emissions" and "visual resources" mean?

The term "light emissions" refers to the combined light that shines from artificial types of outdoor lighting. Light emissions commonly come from sources such as streetlights, house lights, car headlights, dock and harbor lights, and store lights, or from glare, which occurs when light is redirected off a reflective surface such as window glass, solar panels, or reflective building surfaces. Light emissions also come from the lighting used at airports, especially the lights along runways that ensure pilots can safely taxi, takeoff, and land.

Figure VS1. Example of light shining from a city and obscuring parts of the night sky, creating skyglow.

Light emissions can affect human actions such as sleep and the enjoyment of recreational areas. They can create skyglow (Figure VS1), which is a background illumination of the night sky that often occurs when light is scattered by water droplets in the form of rain, snow, fog, clouds, or high humidity. Skyglow can affect sleep patterns and enjoyment of the night sky for people living nearby.

The term "visual resources" is used to describe the landscapes and scenery in a given area. Visual resources encompass all visible natural features in the landscape, such as mountains, forests, rocks, open water, estuaries, and streams (Figure VS2). Visual resources also include the existing human-made structures on the landscape, such as cabins, houses, commercial buildings, docks, roads, and water towers.

The combination of features on a landscape is what gives that landscape its visual character. As with light emissions, visual character affects the quality of life for residents and the recreational enjoyment of visitors in a given area. The blue sidebar at right explains why scenery is considered a resource that needs to be managed. It is considered a key value of the Admiralty Island National Monument and Kootznoowoo Wilderness Area (referred to in this environmental impact statement [EIS] as the Monument–Wilderness Area), which is the location of four of the airport and access alternatives. (See section 4.16 Wilderness Character for more on wilderness areas and their management.)

Why is scenery a resource that needs to be managed?

Research has shown that people need to occasionally experience the beauty of nature to maintain psychological and physical health. Therefore, natural-appearing scenery enhances the quality of human life and benefits society (U.S. Forest Service 1995). High-quality scenery is a tourist and recreational attraction.

The U.S. Forest Service, which manages the Monument–Wilderness Area near Angoon, recognizes and acknowledges the social and economic benefits of scenery, and it also recognizes that people are concerned about the quality of their environment. To ensure that visual character is preserved for environmental, social, economic, and aesthetic reasons, the U.S. Forest Service applies a system of scenery management as part of its overall management of the land.

Figure VS2. A view of the Angoon area, facing northeast across Favorite Bay.

4.9.1.2. What laws, policies, or regulations apply to light emissions and visual resources in the Angoon area?

The Federal Aviation Administration (FAA) and the U.S. Forest Service have specific guidance requiring that light emissions and visual resources—and any possible changes to them by a project—be assessed and considered.

The FAA's guidance, which can be found in *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) and *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b), does not provide specific direction on the methods to be used, but it does require the FAA to consider the following:

- Whether light emissions associated with airport construction or operation would annoy people nearby or interfere with their normal activities
- Whether changes to the visual character of an area because of airport construction or operation would be objectionable

The U.S. Forest Service, on the other hand, has issued specific guidance on how to evaluate visual resources, including light emissions, on lands it manages. Although only four of the five alternatives (Airport 3a and Airport 4 with either access) are on U.S. Forest Service lands, the FAA applied the U.S. Forest Service guidance to all five alternatives for the sake of consistent analysis and disclosure of possible effects. An exception to this consistency in evaluating visual resources is the choice of threshold levels used to decide if the possible effects from construction and operation are significant. This exception is discussed below in section 4.9.3.2.2.

Scenic management objectives of the *Tongass Land and Resource Management Plan*

The land management plan (U.S. Forest Service 2008a) specifies that scenery and visual character should be considered in the management of Tongass National Forest lands. The following objectives are part of that plan:

- Minimize the visibility of developments as seen from certain vantage points.
- Design roads and trails to be compatible with the surrounding landscape.
- Manage forest wilderness areas and national monument areas so that activities are not evident to the casual observer.
- Analyze effects to the landscape as projects are developed to ensure scenic and attractive views are preserved or created.

Under the U.S. Forest Service guidelines, changes to visual character are measured against the agency's goals and objectives for the management of visual resources in a given area. The objectives applicable to the Angoon Airport EIS can be found in the U.S. Forest Service's land management plan for the Kootznoowoo Wilderness Area, hereafter called the land management plan; U.S. Forest Service 2008a). See the blue sidebar box above titled "*Scenic management objectives of the Tongass Land and Resource Management Plan*" for a summary of these scenic management objectives. That plan identifies the Monument–Wilderness Area as having "High" ***scenic integrity***, and it establishes goals and guidelines for maintaining that integrity. Additionally, the plan requires that the Scenery Management System—used throughout the U.S. Forest Service, not just in Alaska—be applied to lands managed under the plan.

Terms to know

Scenic integrity: According to the U.S. Forest Service, scenic integrity is the degree to which the landscape character is, or appears to be, intact, unaltered, and natural-appearing.

4.9.2. Existing conditions

For the Angoon Airport project, the area assessed for light emissions and visual resources included the community of Angoon and its roads, the land and shoreline around Favorite Bay, the Alaska Marine Highway ferry route into and out of Angoon, Chatham Strait, and nearby portions of the Monument–Wilderness Area.

4.9.2.1. How did the FAA determine the existing conditions of light emissions?

The FAA determined the existing conditions of light emissions by qualitatively observing and noting lighting conditions during the day and at night at different locations in and around the community of Angoon and at locations near the action alternatives. Areas of light concentration and light scattering, unlit areas, and sources of light were noted. Light sources currently include Angoon community residential and commercial lights, exterior building lights, dock and harbor lights, and streetlights.

4.9.2.2. How did the FAA determine the existing visual character of the area?

Existing conditions of visual resources in the Monument–Wilderness Area were determined through field visits by a wilderness resource specialist. This specialist hiked cross-country to identify areas where the qualities that contribute to wilderness character had been affected through human action. These qualities of wilderness are closely related to the area's overall scenic quality. (See section 4.16.1.2 in Wilderness Character for more information on the qualities of wilderness.)

Existing conditions outside the Monument–Wilderness Area were determined using the U.S. Forest Service's Scenery Management System. Following this system and its associated guidance, the FAA took the following steps:

- Identified where disturbances might take place on the landscape in association with the airport and access alternatives.
- Identified ***priority travel routes*** and ***use areas*** in the general Angoon area. The land management plan specifies the following as priority travel routes and use areas: ship routes, small- and mid-sized boat routes, roads, hiking trails, saltwater use areas, communities, dispersed recreational areas, and boat anchorages. The U.S. Forest

What is discussed in this section?

Terms to know

Priority travel routes: Routes from which many people can see an area's scenery and landscapes. These include highways, railroads, rivers, canals, waterways, and commercial flight paths.

Use areas: Locations from which many people can view an area's scenery and landscapes. These include national forest visitor centers, trailheads, campgrounds, picnic grounds, marinas, beaches, resorts, and scenic overlooks.

Service considers these areas important for assessing visual character (and assessing possible changes to visual character caused by construction projects), because in these areas, projects are most likely to be visible to large numbers of people traveling through and recreating, working, or living nearby. Such areas have the largest number of people who might be affected by changes to the landscape.

- Determined which of the priority travel routes and use areas would have a full or partial view of each airport and access road location. For Angoon, the priority travel routes and use areas that could be affected by the action alternatives comprise the following:
    - The Alaska Marine Highway ferry routes arriving and departing from the Angoon ferry dock
    - Chatham Strait (*Note*: Chatham Strait was considered in the initial visual survey conducted for this EIS but was later eliminated from further analysis. The Angoon area lies at some distance from Chatham Strait and the coastal topography obscures any proposed airport and access road location from view.)
    - The Angoon town site
    - Existing public roads and trails near the alternatives
    - The Favorite Bay shoreline
- Selected specific viewpoints along or in each potentially affected visual priority route or use area (referred to as Viewpoints 1–2a and Viewpoints 4–7 in this section).
- Photographed the existing landscape from each viewpoint toward the potentially visible airport or access road location, recording the precise location of the viewpoint using the global positioning system and field notes. Photographs were taken in June in light overcast conditions.

- Evaluated the existing visual character of those views using the U.S. Forest Service method, which involves the four components of ***line***, ***form***, ***color***, and ***texture,*** as well as viewing distance, which consists of ***foreground***, ***middleground***, and ***background*** (depicted in Figure VS3). Because views of the landscape can change with distance—closer views show more detail and distant views show less detail but more of the landscape—***viewer sensitivity*** to the landscape can change with distance.

Terms to know

Background: The visible area more than 4 miles from a viewpoint to the horizon.

Color: The colors of vegetation, soil, water, rock, and sky, and the colors of structures within the landscape.

Foreground: The visible area up to 0.5 mile from the viewpoint.

Form: The masses or shapes of the landscape, such as existing structures, topography, and natural objects (for example, cone-shaped peaks, rolling hills, or flat water).

Line: The real or imagined paths that the eye follows when perceiving abrupt changes in form, color, or texture. These are often noticeable as the edge effect created at the boundary of two different landscape features (for example, a line of trees along a bare rocky slope or ledge or a dark mountain ridgeline silhouetted against a bright sky).

Middleground: The visible area between 0.5 mile and 4.0 miles from a viewpoint.

Texture: The variation, pattern, density, and graininess of the landscape surface (for example, sparse and seemingly randomly ordered shrubs in an arid landscape or dense crowding of trees in a forest), and the dimensions of those surface variations (for example, tall conifers or short grasses).

Viewer sensitivity: The importance or concern people place on scenery or a scenic landscape.

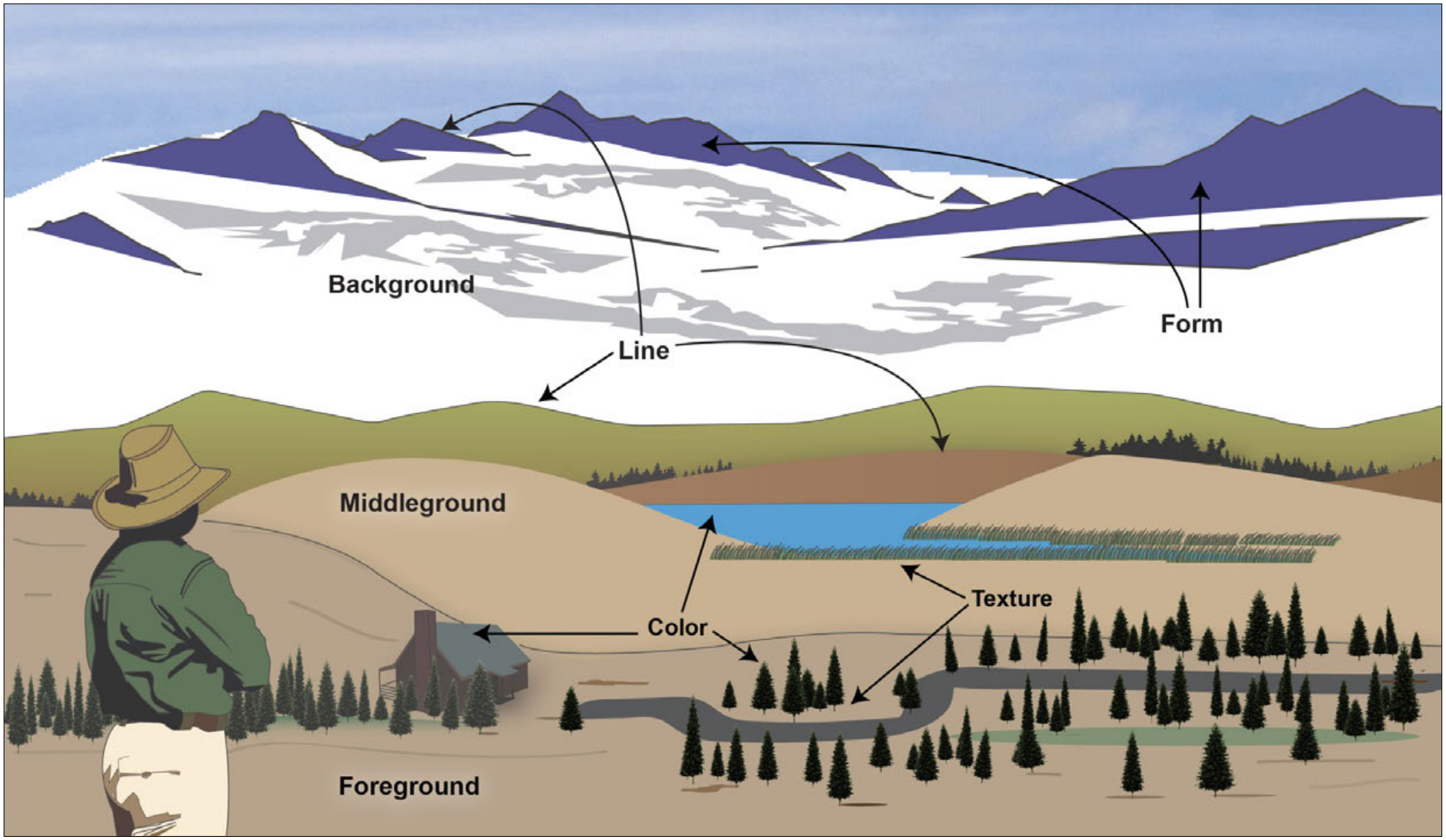


Figure VS3. The components (line, form, color, and texture) and viewing distances (foreground, middleground, and background) used in the U.S. Forest Service's method for assessing and describing visual character.

4.9.2.3. What are light emissions in the Angoon area like?

Based on the qualitative observations described in section 4.9.2.1, existing light emissions and skyglow conditions in the Angoon area are of very low intensity. Lighting that could contribute to nighttime light emissions is concentrated in developed areas on the Angoon peninsula (including docks in Favorite Bay and shoreline residences along the bay), in the community of Angoon (where interior and exterior residential and commercial lighting is most concentrated), around the ferry terminal, and on Killisnoo Island near the ferry terminal. Beyond these developed areas, visible lighting is limited. There are few sources of light emissions, and there is very little skyglow as a result. Angoon is a small community, with very few bright light sources either in or beyond the city limits. The roads are not lit, and there are no commercial or industrial centers with intensely concentrated sources of light. No lights from other towns or cities are visible. Outdoor lights in Angoon are generally limited to residential and commercial porch lights or isolated light posts associated with public facilities. Lighting in and around the community varies with the season. During spring and summer, the long period of daylight reduces the time that light emissions are visible; in fall and winter, light emissions are visible for a longer time. The existing light sources do not produce enough upward-shining light to create skyglow during either the short-daylight or the long-daylight seasons.

Current lighting conditions and light emissions in and near the alternatives are similar. There are no visible light sources in or adjacent to the proposed locations of Airport 3a and Airport 4 with either access. From the Favorite Bay shoreline near the proposed locations of Airport 3a and Airport 4, lights from the community of Angoon along the opposite shoreline of Favorite Bay are visible, but they are distant, dispersed, and weak. These lights are not visible from within the forest at the proposed locations of Airport 3a and Airport 4 because the very dense forest growth obscures all lights. Potential light sources near Airport 12a with Access 12a include Whaler's Cove Lodge, the ferry terminal, and vehicles traveling along the ferry access road. However, these are not visible from the proposed location of Airport 12a because the forest growth is dense and shields the lights from view.

4.9.2.4. What is visual character in the Angoon area like?

The visual character of the Angoon area is that of a very lightly developed landscape in some areas and an unaltered landscape in others. Developed areas are concentrated on the Angoon peninsula, in the town site, around the ferry terminal, and on Killisnoo Island a short distance from the ferry terminal. Few roads are present in the area, and none currently exist in the Monument–Wilderness Area. Dense spruce-hemlock forest covers much of the area and, in combination with the rolling terrain, shields developed areas from view, quite often at short distances.

For the Monument–Wilderness Area near Airport 3a and Airport 4 and their access alternatives, one of the four wilderness qualities most related to visual resources—opportunities for solitude—has been degraded (meaning it has been changed in a way that detracts from its ability to contribute to wilderness character). This degradation effect is caused by the visibility of aircraft flying over the area, including seaplanes using the Angoon Seaplane Base. (See section 4.16.2.3 in Wilderness Character for a description of existing effects to opportunities for solitude.) Despite this existing effect to the visual character of the Monument–Wilderness Area, it has been designated by the U.S. Forest Service as having "High" scenic integrity, meaning the landscape appears to be intact and unchanged. The corresponding planning objectives for that level of scenic integrity allow only those deviations that repeat the lines, forms, colors, and textures common to the landscape so completely and at such a scale that they are not evident.

For the non-wilderness areas around Angoon, the following graphics, titled Viewpoints 1, 2, 2a, 4, 5, 6, and 7, describe and show the area's existing visual character as viewed from each viewpoint and relative to the footprint of the potential effect of each alternative. (*Note*: Eight viewpoints were originally evaluated, but one, Viewpoint 3, is not discussed in this EIS because the alternative to which it related, Access 5, which included a proposed bridge across Favorite Bay, was eliminated from consideration.)

Viewpoint 1

Foreground

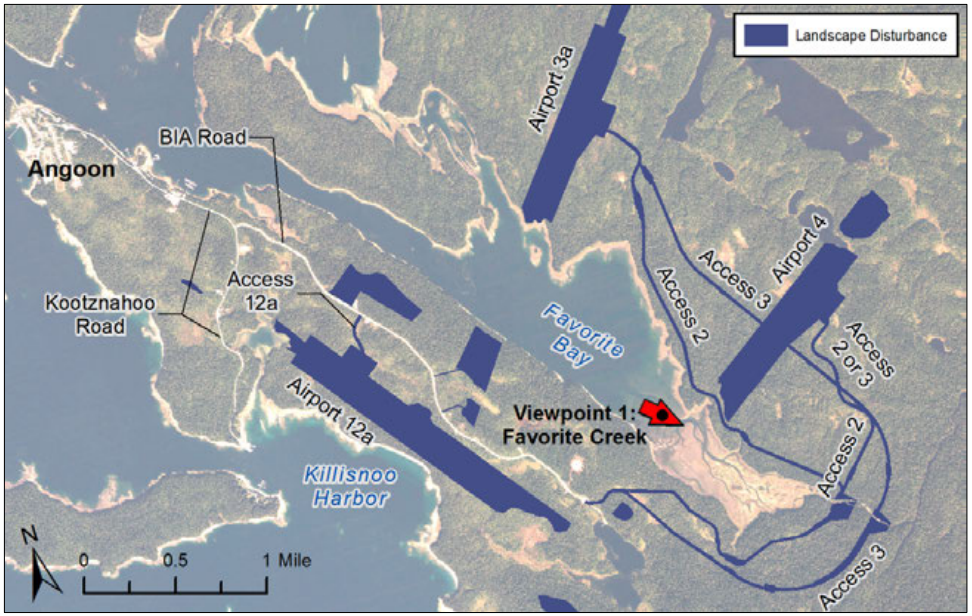
- General view: Flat estuary where the brackish water flowing through Favorite Creek is bordered by low-growing vegetation. Dense, uniform, and solid-appearing spruce-hemlock forest lies just beyond the shoreline.
- Line: Strong and simple. The horizontal, straight, narrow band of shoreline appears to be distinct between water and forest, and the sharp, horizontal edge of the forest along the shoreline is clear and regular.
- Form: Definite and distinct. The forest-shoreline boundary is abrupt and obvious with a clear transition from the low-growing vegetation to tall trees.
- Color: Distinct and scenic. Dark water intermixes with bright orange-yellow intertidal vegetation near the shoreline. Vivid intertidal vegetation colors rapidly change to soft light green, light green, and dark green within the forest.
- Texture: Distinct. Ranges from smooth water and uneven or stippled gradations of shoreline textures to dense, coarse-textured trees.

Middleground

- General view: Middleground views are hidden by the height of the dense forest cover near the shoreline.

Background

- General view: Dominated by high, rugged mountain ranges to the east.
- Line: Strong. Mountain skyline creates a silhouette with the background sky. Diffuse and scenic edge effects created by intermixing of snowfields with the dark rocky or dark green forested slopes.
- Form: Diverse and complex mountain forms. Vertical and angular slopes composed of rocky outcrops and peaks, forested lower slopes, and snowfields at middle and upper elevations.
- Texture: Rough and coarse on jagged upper slopes; less coarse on the lower slopes.



Viewpoint 1, Favorite Creek: View facing east-southeast toward the proposed location of the runway area for Airport 4.

Viewpoint 2

Foreground

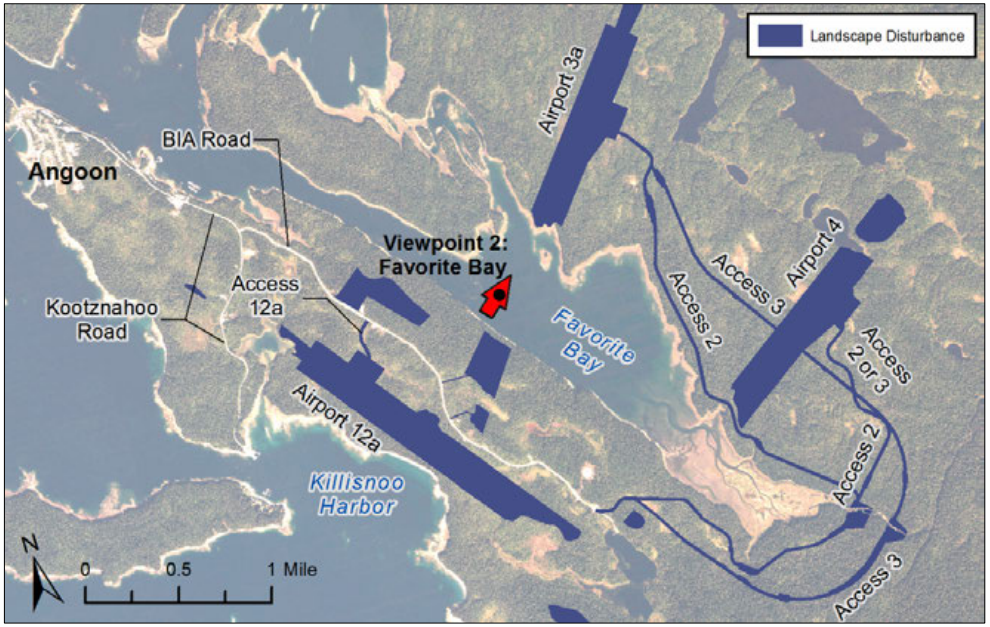
- General view: Similar to Viewpoint 1 but without the estuary line and color features.
- Line: Predominantly and distinctly horizontal. Composed of edges between water and shoreline and between shoreline and forest. The forest creates a continuous but undulating and irregular silhouette at the treetops.
- Form: Flat landscape with a distinct and definite shoreline-to-forest boundary. View is dominated by a dense, unbroken wall of mature spruce-hemlock forest, which is characteristic of the shoreline and foreground around Favorite Bay.
- Colors: Vivid. Consist of the dark green of spruce-hemlock forest, the bright blue-gray of the sky, and the bright blue-gray of the water. It should be noted that these colors change depending on lighting conditions, haze, smoke, fog, and rain. A moderate color difference exists among the light green shoreline vegetation, the water in the foreground, and the forest in the background.
- Texture: Similar to those described for Viewpoint 1 with coarse-textured forest trees contrasting strongly with fine-textured water and shoreline.

Middleground

- General view: Middleground features are entirely obscured by the dense growth of forest in the foreground and the low angle of the view.

Background

- General view: Background features are entirely obscured by the dense growth of forest in the foreground and the low angle of the view.



Viewpoint 2, Favorite Bay: View from near center of bay, facing northeast toward the proposed location of Airport 3a.

Viewpoint 2a

Foreground

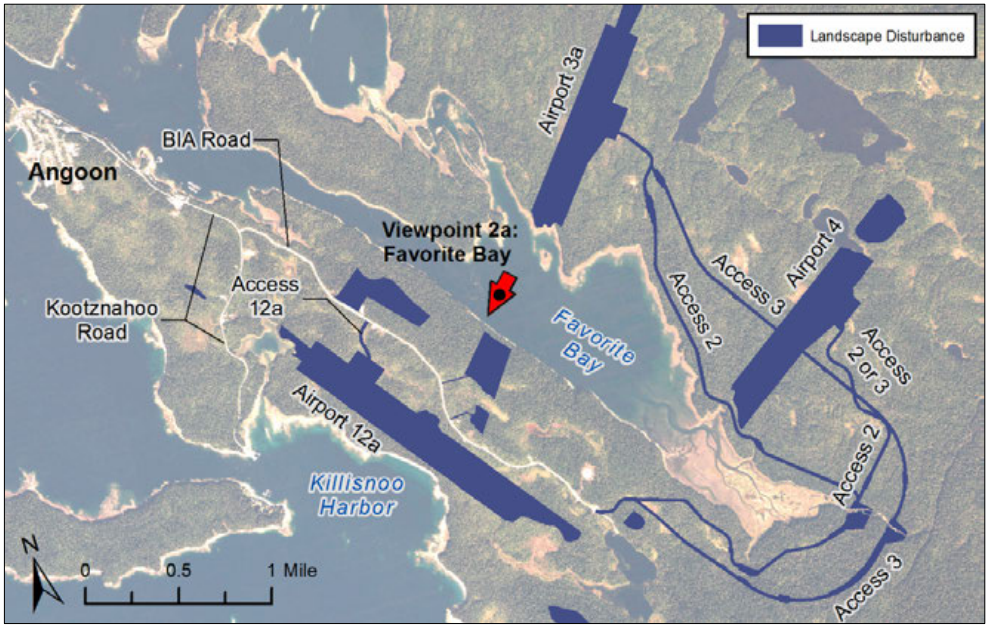
- General view: Similar to Viewpoint 1 but without the estuary line and color features.
- Line: Strong and simple. The horizontal, straight, narrow band of shoreline appears to be distinct between water and forest, and the sharp, horizontal edge of the forest along the shoreline is clear and regular.
- Form: Definite and distinct. The forest-shoreline boundary is abrupt and obvious with a clear transition from the low-growing vegetation to tall trees.
- Colors: Distinct and scenic. Thin pale white horizontal stripe of shoreline delineates the dark water and the dark green spruce-hemlock forest.
- Texture: Distinct. Ranges from smooth water and uneven or stippled gradations of shoreline textures to dense, coarse-textured trees.

Middleground

- General view: Middleground features are entirely obscured by the dense growth of forest in the foreground and the low angle of the view.

Background

- General view: Background features are entirely obscured by the dense growth of forest in the foreground and the low angle of the view.



Viewpoint 2a, Favorite Bay: View from near center of bay, facing southwest toward the proposed location of Airport 12a.

Viewpoint 4

Foreground

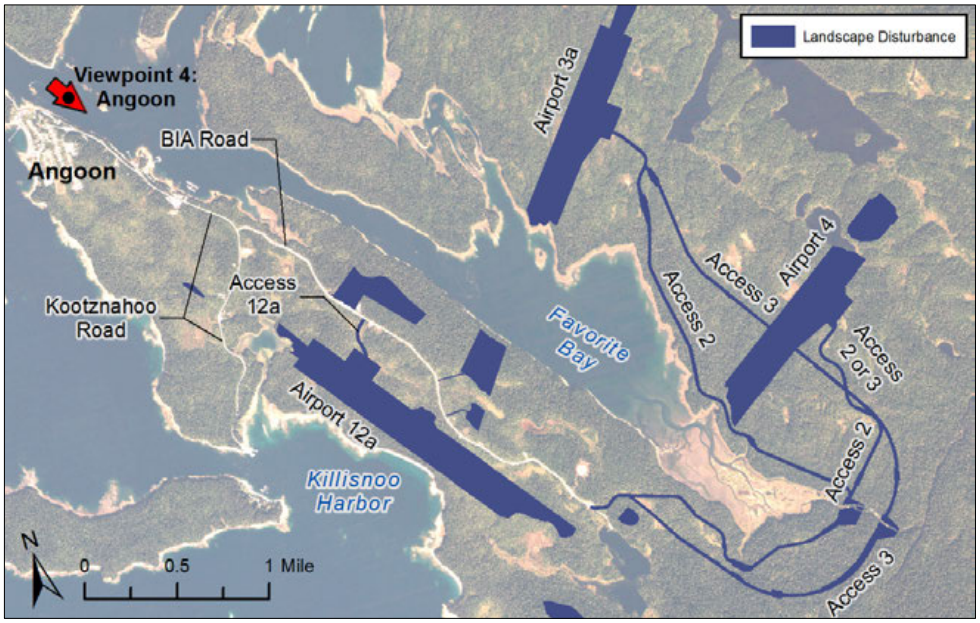
- General view: Dwellings, docks, and other structures lie along the partially developed, rocky shoreline. Tree-covered, gently rising slopes frame the shoreline and lead up toward the east side of Angoon.
- Line: Strong lines are caused by distinct structural edges against a softened and diffuse forest background. Strong landscape line created by edge effect of forest treetops against background sky.
- Form: Typical of the shoreline surrounding Favorite Bay (as described for Viewpoint 2), except where the shoreline has been widened (near and adjacent to buildings and structures). Development has made the form of the landscape more complex. Numerous vertical and horizontal, rectangular and regular shapes and angles are intermixed with the relatively uniform, regular shapes of trees and shoreline.
- Color: Gray, white, tan, and brown structures. Natural colors include the muted dark green of the trees and the dark gray of the water.
- Texture: Ranges from fine in the offshore water and along the shoreline to moderate due to shoreline buildings and structures to coarse where tall spruce-hemlock trees are visible along the shoreline.

Middleground

- General view: Middleground views are hidden by shoreline trees, where the view is toward Alternative 12a.

Background

- General view: View is of the mountain range described in Viewpoint 1. Visual characteristics would be similar to those described for Viewpoint 1.



Viewpoint 4, Angoon: View facing southeast from offshore at the northern end of Favorite Bay toward the proposed location of Airport 12a.

Viewpoint 5

Foreground

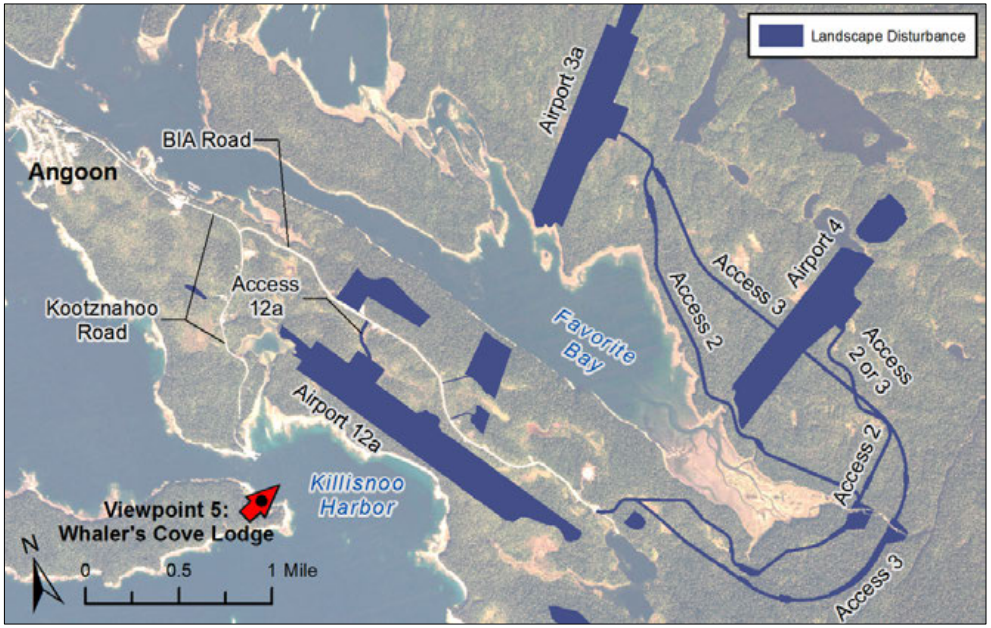
- General view: Dominated by the lodge dock, the ferry terminal, Killisnoo Harbor, and the dense stand of spruce-hemlock trees that covers the low ridge and slopes beyond the harbor.
- Line: Similar to that described for Viewpoint 2.
- Form: Highly variable. The near shoreline is dominated by regular, horizontal, long, low metal and wooden ramps, docks, piers, and moorings. Tall vertical pilings, sheds, buildings, and dock support structures are visible. The far shoreline and landscape appear undeveloped with the exception of minor structures along the shoreline. The undeveloped slope and low ridge are typical of the undeveloped landscape described for Viewpoint 2 with a low, narrow shoreline bounded by flat water, behind which lies a dense, tall, vertical, unbroken spruce-hemlock forest.
- Colors: Similar to those described for Viewpoint 2.
- Texture: Fine at water level and along the far shoreline; fine to medium and uneven in areas of shoreline development; and coarse, dense, and uniform in the forest.

Middleground

- General view: The middleground is hidden by trees and topography.

Background

- General view: The background is hidden by trees and topography.



Viewpoint 5, Whaler's Cove Lodge: View facing northeast toward the proposed location of Airport 12a.

Viewpoint 6

Foreground

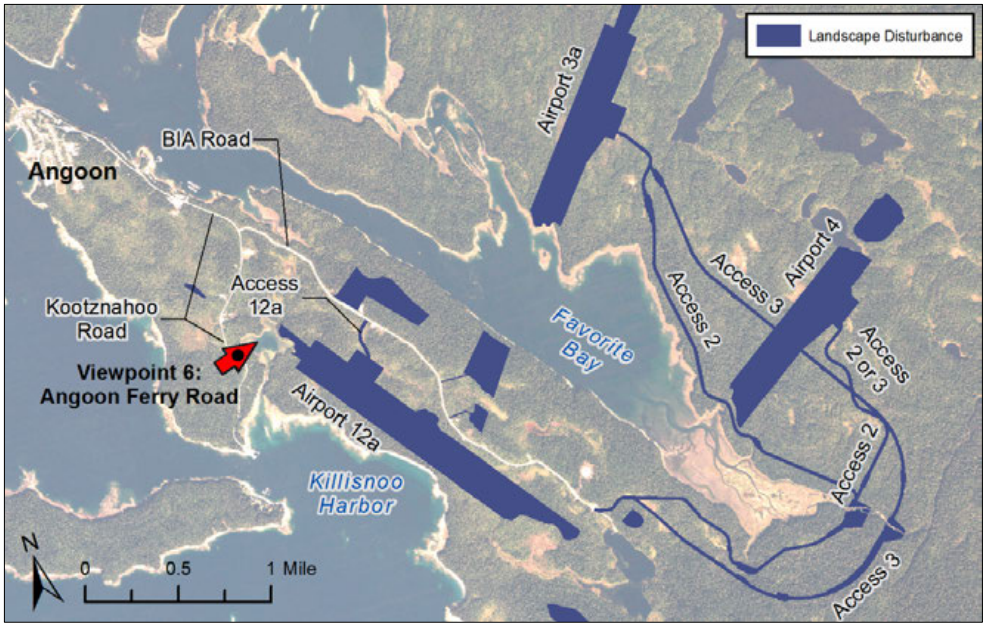
- General view: A flat landscape with a clearly visible curving lagoon shoreline bounded by low-growing vegetation along the road and by tall conifers on the far shore and on most of the near shore.
- Line: Prominent lines create edge effects between the forest boundary and the shoreline, and between the shoreline and lagoon. Silhouette lines and edges are created between the treetops and background sky.
- Form: The narrow, curving shoreline creates a minor transitional change between tall vertical trees and flat lagoon water. The prominent wall-like edge of the forest and flat, open water are the dominant forms.
- Colors: Range from green-brown lake water to light green shoreline vegetation to mottled dark green along the forest edge.
- Texture: Ranges from simple textures within the lagoon and along the shoreline to more complex, dense, and coarse textures along and within the surrounding forest. Internal textures are created among the trees visible along the edge of the forest.

Middleground

- General view: The middleground is obscured by the foreground trees and by the low angle of view from this location.

Background

- General view: The background is obscured by the foreground trees and by the low angle of view from this location.



Viewpoint 6, Kootznahoo Road: View facing east toward the northern end of the proposed location of Airport 12a.

Viewpoint 7

Foreground

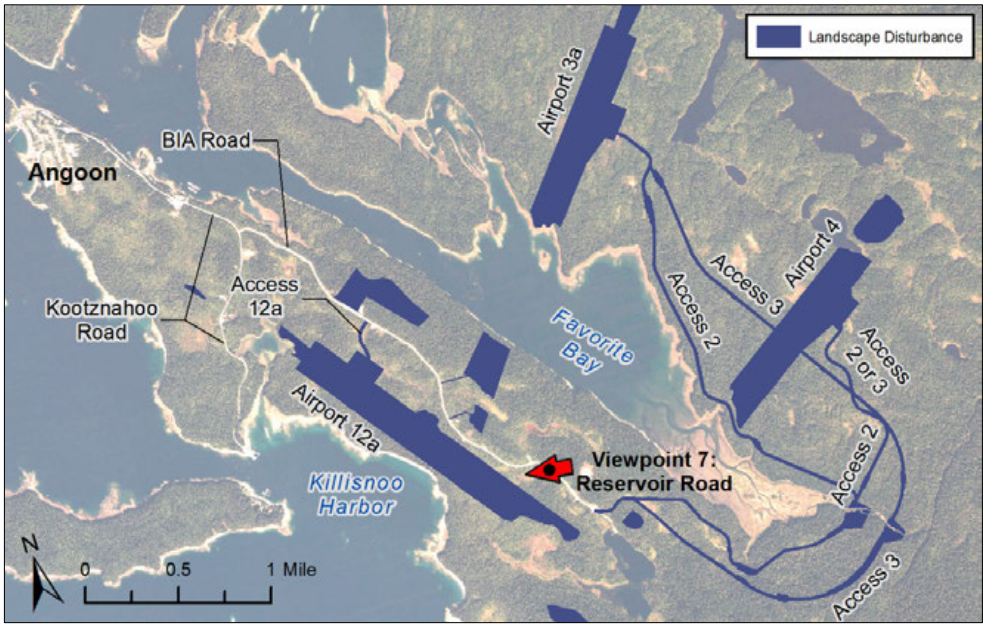
- General view: Flat wetland meadow; tall trees lie along the meadow boundary.
- Line: Linear edge effect is created along the boundary between short meadow vegetation and the forest boundary.
- Form: Slightly undulating ridgeline and slope; short vegetation within the flat meadow; vertical trees along the edge of a spruce-hemlock forest; and a single downed tree that partially (and temporarily) obscures the foreground view.
- Colors: Range from the light green of meadow vegetation to the dark green of conifers along meadow edge.
- Texture: Fine within the meadow and coarse within the forest.

Middleground

- General view: Views are obscured by tall trees and topography.

Background

- General view: Partially hidden by foreground trees.
- Line: Strong edge effect is visible along the background ridgeline and sky.
- Form: Smooth to rough and jagged mountain ridgeline and steep upper-elevation slopes are visible.
- Colors: Muted green and brown on the mountain slopes; indistinct because of distance.
- Texture: Medium to coarse.



Viewpoint 7, Bureau of Indian Affairs (BIA) Road: View facing west through a clearing from the road edge toward the southern end of the proposed location of Airport 12a.

4.9.3. Project effects

For all action alternatives, construction and operation of an airport and access road would cause effects related to light emissions and visual resources. Although the nature of the effects would be the same for all action alternatives, the extent of effects would differ. The sections below describe the actions causing the effects and the effects themselves; the methods for evaluating effects; and the similarities and differences in magnitude and extent of effects between the alternatives.

4.9.3.1. How did the FAA determine the effects related to light emissions and visual resources?

The specific actions related to construction and operation that could cause effects to light emissions and/or visual resources were determined by the FAA as listed and described here.

The following construction actions would cause long-term visual effects because the results of these actions would persist. For effects analysis, these actions were grouped together into a single action—landscape disturbance—because all would create visually apparent changes to the landscape, affecting its appearance and changing its baseline scenic quality.

- Vegetation removal related to the airport, road, and certain ***avigation easements*** (clearing of all vegetation for construction, line of sight, and open areas for flight approach and takeoff)
- Tree felling in certain avigation easements (cutting down the trees but not other vegetation). For the effects analysis, where tree felling is identified in certain avigation easements, it is assumed that all trees within these easements would be felled (cut down). These particular avigation easements would be surrounded by dense forest and would therefore not be visible from any of the viewpoints.
- Terrain disturbance related to the airport, airport access road, and avigation easement access roads (cutting and filling of soil or blasting of bedrock to level the ground)
- Terrain disturbance from potential extraction of construction materials, such as gravel, soil, and rock from an on-island materials source

What is discussed in this section?

Terms to know

Avigation easements: A right-of-way tool used in airport planning to grant certain rights to the holder of the easement. For this EIS, avigation easements outside of airport property would provide the Alaska Department of Transportation and Public Facilities the right to access areas to clear them of obstructions and maintain that clearance.

- Pavement related to the airport and road (creating ***impervious*** surfaces)
- Bridge construction (temporary use area for construction)
- ***Culverting*** or re-routing of streams
- Construction of an airport perimeter fence

Terms to know

Culverting: The creation of a drain or pipe that allows water to flow under a road, runway, or similar structure.

Impervious: The quality of not allowing water to pass through a surface. Instead, water collects and can create runoff.

Other construction actions would cause temporary light emissions (skyglow and direct visibility of lighting) and effects to visual resources, because the effects would cease as soon as construction ended. (This EIS assumes construction would last for up to three construction seasons.) These actions are as follows:

- Daytime and nighttime movement of heavy equipment and construction vehicles along haul roads
- Construction activity and equipment in work areas, including bridge construction equipment that may be taller than the surrounding trees
- Illumination of construction areas and of some equipment for nighttime construction
- Barging of construction materials to the island
- Unloading of barged materials at the ferry terminal

The following operations actions would cause long-term light emissions or visual resource effects:

- Operation of radio-controlled lights during flight arrival and departure. Intermittent and short-duration use of medium-intensity runway edge and runway end lights would occur during the day and at night (Barnard Dunkelberg and Company 2008a). These navigation lights would be upward-directed, unshielded, and by necessity intense enough to shine through rain, snow, fog, or low cloud cover. They would be turned on by the pilots as needed during runway approach and takeoff. The runway edge and approach lights would be used during the day, especially during low-light conditions, such as heavy clouds, rain, or fog.
- Passenger vehicles traveling on access roads. Light emissions and visual effects could be caused by vehicles traveling to and from the airport during the day and at night, but the proposed access roads would be screened from casual view by dense inland and shoreline forest growth. Vehicle light penetration beyond the access road would be screened or obscured within a short distance.

To analyze effects from light emissions, the FAA describes the degree to which airport operation and construction lighting would change the current lighting conditions, based on the type of lighting and the way the lighting would be used in both construction and operation.

To analyze effects to visual resources, the FAA modified the process specified in the U.S. Forest Service's scenery management handbook (U.S. Forest Service 1995) by adding ***visual simulations*** (step 1, below) and by augmenting the way contrast analysis results are rated, as described in step 3 below. The FAA's process for analyzing effects is as follows:

1. Create visual simulations to portray how the landscape disturbance would affect the landscape's appearance. The simulations are included below, starting with Figure VS5. (*Note*: Visual simulations were prepared for all viewpoints, but only those simulations that show effects from an alternative are provided.)
2. Using the visual simulations, determine changes to the baseline scenic quality through contrast analysis. In contrast analysis, the degree or amount of potential change in scenic quality in the existing landscape is determined through a comparison of the line, form, color, and texture of the landscape as it presently exists (the baseline) with the line, form, color, and texture that would exist after implementation of each action alternative.
3. Rate the results of the contrast analysis. In contrast analysis, elements of construction or operation that repeat or duplicate the natural features of the landscape or that look similar to existing landscape features are considered to be in harmony with their surroundings. These changes produce low levels of contrast and are considered ***minor***. Elements that do not harmonize with the surrounding landscape are considered to have ***moderate*** or ***major*** levels of contrast; that is, the contrast appears obvious, stands out, and can be visually displeasing to viewers because the given element is not in harmony with the existing natural landscape. The ratings of "minor," "moderate," and "major" were derived from visual effects methodologies currently used by the U.S. Forest Service and other federal land management agencies (Bureau of Land Management 1984; National Park Service 2003; U.S. Forest Service 1974, 2008a).

Terms to know

Major: Project-related effects that would create a high degree of change in the existing landscape, would dominate the view, and would be a focus of viewer attention.

Minor: Project-related effects to scenic quality that would retain the existing character of the landscape, would create a low level of change, and, although visible, would not attract the attention of the casual viewer.

Moderate: Effects to scenic quality that would partially retain the existing character of the landscape, and, although attracting the attention of the casual viewer, would not dominate the view.

Visual simulations: Computer-generated images of a project's structures, surface disturbances, and visibility as seen from selected viewpoints. Used to assist in visualizing the degree of landscape contrasts and effects to the existing landscape.

4. To assess the severity or degree of visual changes, the contrast analysis results are compared with the scenic management objectives established for the location. These objectives apply only to Airports 3a and 4 and their associated access roads because those alternatives would be in lands managed by the U.S. Forest Service. If an action alternative's effects would be minor (in harmony with the existing landscape's lines, forms, colors, and textures, or are not visible), it would be considered compatible with the applicable scenic management objectives. If an action alternative's effects would be moderate or major (not harmonious with existing landscape's lines, forms, colors, and textures), it would be considered incompatible with the applicable scenic management objectives.

This type of analysis is qualitative because the size of the affected area does not matter as much as the visibility of the affected area. The area of disturbance could be measurably large in acreage, but what matters for visual resources and scenic quality are the disturbances people actually see. For example, a large clear-cut area in a dense forest on a flat landscape might be screened from view by surrounding trees and therefore would have no obvious effect on scenery. In contrast, a smaller clear-cut area on a steep slope might not be shielded by trees and be more highly visible; it could have an obvious and strong effect on the surrounding scenery because people would likely see it more clearly.

4.9.3.1.1. Effects to wilderness character

The scenic integrity of the landscape is an important part of the human experience of wilderness. Changes in light emissions and visual resources affect the wilderness quality called "opportunities for solitude" because this quality is also primarily related to the human experience of wilderness. As described in Table WC3 in Wilderness Character, the specific actions that affect opportunities for solitude are light emissions from construction, light emissions during construction, and the presence of developments and motorized equipment from within the wilderness. For each alternative, the effects of these actions are summarized.

4.9.3.2. How did the FAA determine the significance of the anticipated effects from the alternatives?

4.9.3.2.1. Significance for light emissions

FAA Order 1050.1E, A12.2a states that light emissions have environmental impacts "when an action's light emissions create annoyance to interfere with normal activities." Normal activities include sleeping, driving, boating, or other light-sensitive activities. FAA Order 1050.1E, A12.2a further states that "because of the relatively low levels of light intensity

compared to background levels associated with most air navigation facilities and other airport development actions, light emissions impacts are unlikely to have an adverse impact on human activity." When determining if light emissions would have significant effects, the FAA considers the context of those effects (such as the potential annoyances described in this EIS), the duration of effects, and mitigation that could reduce the effects (FAA Order 1050.1E, A12.3a). The context of effects for light emissions significance as applied to this EIS for operation of the airport is that, over the long term, the lights would only be on for 10–15 minutes at a time—during approach and takeoff—and no airport lighting concerns have been raised to date during the public involvement process.

Airport light emissions significance is not defined in the U.S. Forest Service's Scenery Management System, so FAA standards and guidelines are used in this EIS.

4.9.3.2.2. Significance for visual resources

Two thresholds of significance are applied to analyses for this EIS: the U.S. Forest Service threshold and that of the FAA. The U.S. Forest Service is a cooperating agency and is assisting the FAA with visual resources guidance and methodology. The U.S. Forest Service also has land management jurisdiction over federally administered lands in the Tongass National Forest, where Airports 3a and 4 are proposed. In locations where no other local, state, or federal criteria apply, the FAA establishes the significance threshold for visual effects because it has jurisdiction over the construction and operation of airports. FAA jurisdiction applies to Airport 12a because it is not located on land that the U.S. Forest Service has jurisdiction over.

A significant effect by U.S. Forest Service standards is one that is incompatible with the applicable scenic management objectives. For Airports 3a and 4 and their access roads—the action alternatives located within the boundaries of the Monument–Wilderness Area—the scenery management objectives are based on the area's "High" scenic integrity rating. Therefore, any visual change that would introduce moderate or major contrast with the surrounding landscape would be incompatible with the objectives and considered a significant effect.

A significant effect by FAA standards is not clearly defined. Visual effects, under FAA standards and guidelines, are subjective because they include personal preferences and perceptions. A significance determination includes factors such as increasing visual contrasts between an area and its existing environment, and the surrounding community's perceptions of that contrast. FAA Order 1050.1E, A12.2b states that there are significant effects if the jurisdictional agency (the FAA, in this EIS) determines that visual effects are objectionable. Typically, public involvement (such as conducting public

scoping meetings or sending mail-outs requesting public opinion about a project) and consultation with appropriate federal, state, or local agencies as well as tribes are included in the process to help assess whether the visual effects are objectionable. As mentioned above, this would apply to Airport 12a.

4.9.3.2.3. Significance for wilderness character

The significance threshold for effects related to visual resources and light emissions in the Monument–Wilderness Area is discussed in detail in section 4.16 Wilderness Character. Briefly, that section states that for scenically related wilderness qualities, effects would be significant if changes to visual resources and light emissions were not compatible with the desired condition of the Monument–Wilderness Area as described in the land management plan (U.S. Forest Service 2008a).

4.9.3.3. How would each alternative change light emissions and visual resources?

All changes in light emissions and effects to visual resources from each action alternative would be direct effects. This is because effects related to visual resources and light emissions are based on the human experience of scenery and light. For an airport and access road project such as this, humans would experience these scenery and light changes directly.

4.9.3.3.1. No action alternative

Under the no action alternative, an airport and access road would not be constructed. The existing landscape, visual resources, and light emissions would not be changed, and they would continue to be affected only by existing conditions and trends. The existing seaplane dock and ferry terminal are water-level docks along the shoreline, and they are compatible with existing development because 1) there are many docks that boats currently tie up to and 2) the seaplane dock and ferry terminal dock are not obvious nor visually distinctive enough to attract the attention of casual viewers. Under this alternative, seaplanes and ferries would continue to approach, dock, and depart periodically during the day or week.

4.9.3.3.2. Airport 3a with Access 2 (proposed action)

Temporary and long-term effects related to light emissions and visual resources for Airport 3a with Access 2 are discussed here. The locations of viewpoints relative to landscape disturbance are shown in Figure VS4. A summary of the effects and a comparison with the other alternatives are provided in Table VS1.

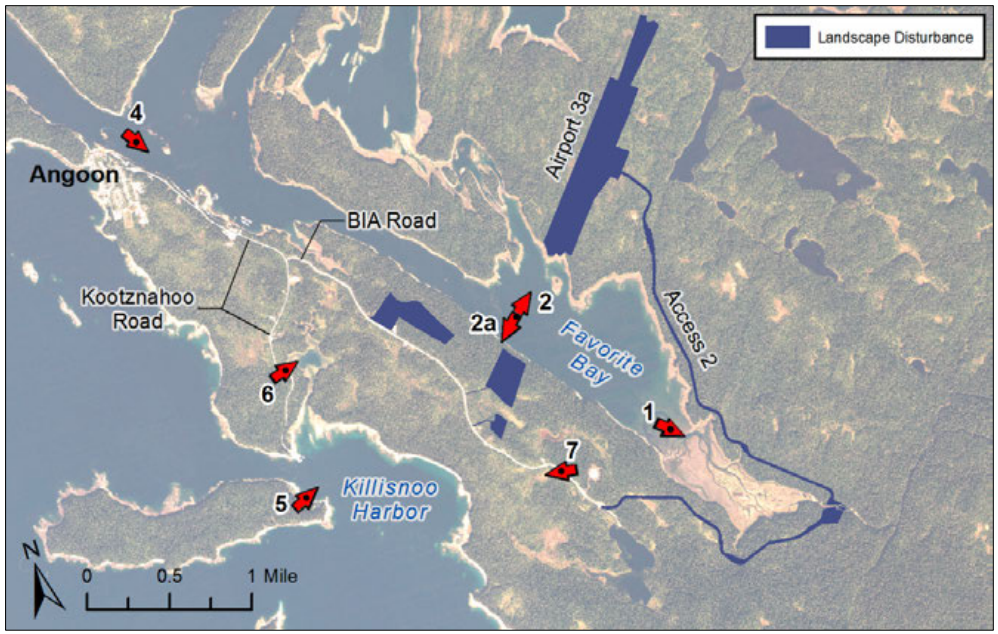


Figure VS4. Locations of the viewpoints relative to the proposed location of Airport 3a with Access 2.

Light emissions effects

Temporary light emissions effects

During the day under bright-light conditions, there would be no effects from light emissions related to construction actions because lighting, if used, would not be visible. Barge lights and construction vehicle lights at the ferry terminal would be visible during nighttime or low-light daytime conditions when viewed from Whaler's Cove Lodge, the approaching or departing ferry, fishing vessels, and pleasure craft in Killisnoo Harbor. Construction vehicle lights would also be visible along the Kootznahoo Road and along the BIA Road to the proposed location of the new access road. These light sources would increase the existing light in these areas, contributing to skyglow. Construction work areas for Airport 3a and Access 2, including the Favorite Creek bridge, would be well illuminated with high-intensity lighting during nighttime or low-light daytime conditions. It is assumed that the bridge construction equipment would also be illuminated at night. Skyglow from these actions could be visible from all viewpoints. These construction effects would be temporary and would end as soon as construction ceases.

Long-term light emissions effects

During the day under bright-light conditions, there would be no light emission effects from airport navigation lights. The runway would be elevated above the water level of Favorite Bay, and any lighting, if necessary, would not be visible to observers on the bay during the day. No vehicle lights would be visible during the day under bright-light conditions. At night and during low-light daytime conditions, intermittent, brief, and low-intensity skyglow caused by the airport's

upward-directed navigation lights would be visible during approaches and takeoffs. Skyglow effects would likely be visible in the middleground and background from all viewpoints but would be most visible to shoreline residents on the opposite side of Favorite Bay because of their proximity to the runway.

Visual resources effects

Temporary visual effects

From Viewpoints 5, 6, and 7, construction traffic at the ferry terminal and along the Kootznahoo and BIA Roads would be highly visible in the foreground, with visually intrusive line, form, and color contrasts created by off-loading barges and construction vehicles. Barge traffic would be highly visible from Viewpoint 5 (Whaler's Cove Lodge), but this visual intrusion would be consistent with other activities in the area, including boating traffic from fishing boats, pleasure craft, and the ferry. Potential on-island material extraction at the quarry site would be visible at the entrance of the quarry along the BIA Road, and haul trucks and other construction traffic would be visible entering and leaving the site and moving along the road. Construction work sites and vehicles temporarily parked along the road right-of-way would also be highly visible along the BIA Road. From Viewpoint 1, the Access 2 bridge construction equipment would be partially visible in the foreground and middleground. From the above-mentioned points of view and areas where construction would be visible, the level of visually intrusive contrast would produce a moderate effect. These construction effects would be temporary, however, and would end as soon as construction ceases. Construction activities at Airport 3a and Access 2 would not be visible from Viewpoint 4 because they would be screened from this viewpoint by topography or dense forest, or both.

Long-term visual effects

At the proposed location of Airport 3a, areas of vegetation clearing would be maintained as cleared areas to the Favorite Bay shoreline, exposing portions of the runway safety area to view from Viewpoint 2 and resulting in major contrasts (Figure VS5). Distinct form contrasts would be created by the abrupt transition from the uniformly dense forest to the underlying and exposed undulating topography. Distinct line contrasts would be visible as edge effects (abrupt changes in texture or form that create a line) at the tree boundary. The form, line, color, and texture contrasts would be obvious and distinctive enough to attract attention and dominate the view during the day. These contrasts would produce a major effect.

Along the proposed location of Access 2, there would be no long-term visual effects because the route would be screened from casual view for all viewpoints by the dense forest growth along the estuary and Favorite Bay shoreline. There would be no visual effects at the connection of the access road with the BIA Road because the new route would be consistent in design and material type with the existing road and would not likely attract the attention of the casual viewer.

An avigation easement located on the ridge slopes on the opposite (southwest) side of Favorite Bay would require vegetation clearing. As viewed from Viewpoint 2a, this would cause only minor contrasts with the surrounding landscape because the cleared area would be screened from view by a strip of forest along the shoreline (Figure VS6). There would be no effects to visual resources from this vegetation clearing because it would not be obvious to the casual viewer and the changes would blend with the surrounding densely forested slopes.

Effects in the Monument–Wilderness Area

As shown in Table WC5 in Wilderness Character, Airport 3a with Access 2 would affect opportunities for solitude in the Monument–Wilderness Area in three ways:

- Construction-related lights and construction-related skyglow would be temporarily visible during the construction period (up to three seasons) at night and during daytime low-light conditions.
- Skyglow would be intermittently visible over the long term when the airport navigation lights are briefly turned on during approaches and takeoffs.
- There would be 502 acres where developments and motorized equipment would be visible from within the wilderness area.

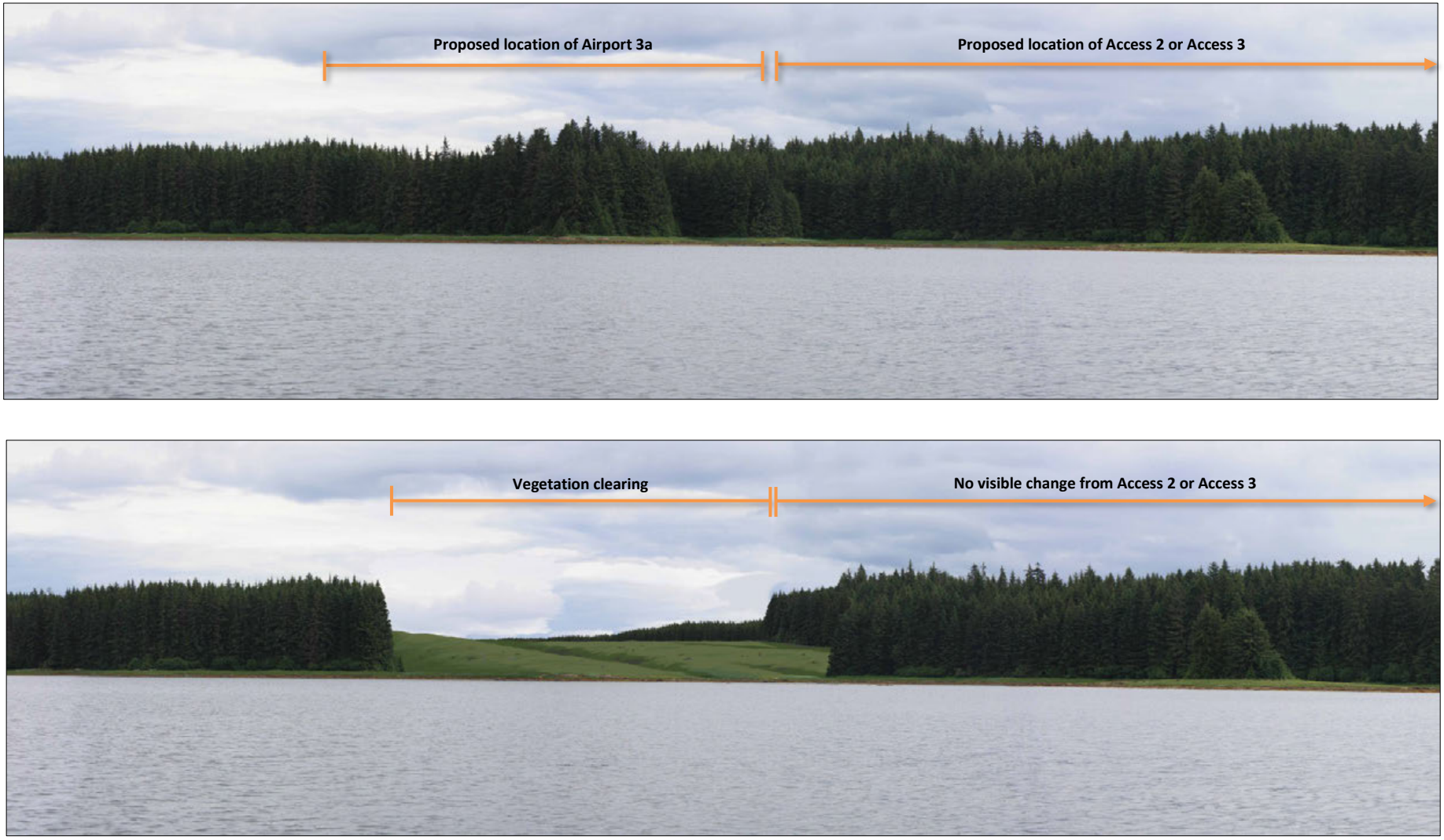


Figure VS5. View facing north-northeast from Viewpoint 2 toward the proposed location of Airport 3a. Existing conditions related to Airport 3a (top); visual simulation showing vegetation clearing at Airport 3a (bottom).

Figure VS6. View facing south-southwest from Viewpoint 2a toward the proposed location of the Airport 3a avigation easement. Existing conditions related to Airport 3a avigation easement (top); visual simulation showing vegetation clearing at the Airport 3a avigation easement (bottom).

Significance determinations for Airport 3a with Access 2

Light emissions effects from Airport 3a with Access 2 would not be considered significant because the use of the runway lights would be intermittent and of short duration.

Visual resources effects from Airport 3a, when observed from Viewpoint 2, would exceed the U.S. Forest Service scenic integrity planning objectives for the Monument–Wilderness Area. The project-related changes to the landscape would not repeat the existing landscape's form, line, color, and texture, and would be evident to the casual viewer. The effects to visual resources would be major and would not be compatible with scenery management objectives for this area and therefore would exceed the U.S. Forest Service significance threshold.

The significance determinations of the minor contrasts created by vegetation clearing in the avigation easement (see Figure VS6) lie within FAA jurisdiction because this area is outside of the U.S. Forest Service administrative boundary. No significance thresholds would be exceeded unless the FAA hears from the public, tribes, or appropriate government agencies that the long-term effect of airport and/or access road construction and operation is visually objectionable.

The significance of effects to visual resources from Airport 3a with Access 2 as they relate to the Monument–Wilderness Area and its qualities is discussed in section 4.16.3.5 and section 4.16.3.6 in Wilderness Character.

4.9.3.3.3. Airport 3a with Access 3

Temporary and long-term effects related to light emissions and visual resources for Airport 3a with Access 3 are discussed here. The locations of viewpoints relative to landscape disturbance are shown in Figure VS7. A summary of the effects and a comparison with the other alternatives are provided in Table VS1.

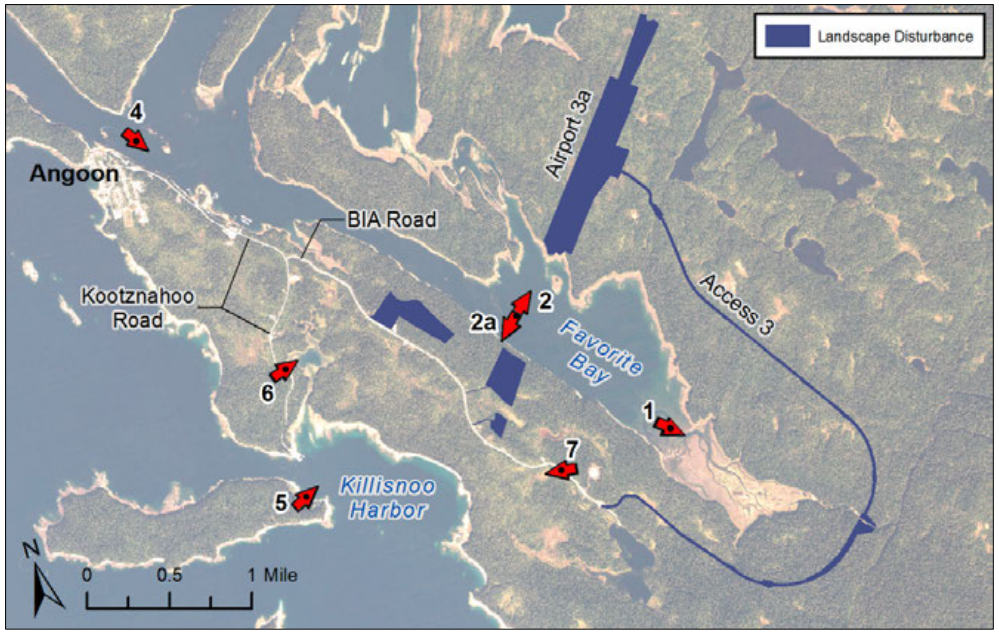


Figure VS7. Locations of the viewpoints relative to the proposed location of Airport 3a with Access 3.

Light emissions effects

The temporary and long-term effects related to light emissions would be the same as those discussed for Airport 3a with Access 2 (see section 4.9.3.3.2). The only difference between the two alternatives would be the location of the access road, but that difference would cause no change in either long-term or temporary effects. Barge lights and construction vehicle lights at the ferry terminal would be visible during nighttime or low-light daytime conditions when viewed from Whaler's Cove Lodge, the approaching or departing ferry, fishing vessels, and pleasure craft in Killisnoo Harbor. Construction vehicle lights would also be visible along the Kootznahoo Road and along the BIA Road to the proposed location of the new access road. These light sources would increase the existing light in these areas, contributing to skyglow.

Construction work areas for the airport and access road, including the Favorite Creek bridge, would be well illuminated with high-intensity lighting during nighttime or low-light daytime conditions. It is assumed that the bridge construction equipment would also be illuminated at night. Skyglow created from these actions could be visible from all viewpoints. These construction effects would be temporary and would end as soon as construction ceases.

Operation of the airport in nighttime and daytime low-light conditions would result in long-term visibility of intermittent, brief, and low-intensity skyglow from the airport's upward-directed navigation lights, as described for Airport 3a with Access 2.

Visual resources effects

Temporary visual effects

Under this alternative, the temporary effects on visual resources would be the same as those discussed for Airport 3a with Access 2, except for the visibility of the Access 3 bridge construction equipment, which would be less visible from Viewpoint 1 than the equipment at the Access 2 bridge location. Construction activities at Airport 3a and Access 2 would not be visible from Viewpoint 4 because they would be screened from this viewpoint by topography or dense forest, or both.

Long-term visual effects

Under this alternative, the long-term effects on visual resources would be the same as those discussed for Airport 3a with Access 2 because the airport location would be the same and the location of Access 3 would be even farther inland than Access 2, meaning it would also be screened from view by dense forest. At the proposed location of Airport 3a, areas of vegetation clearing would be maintained as cleared areas to the Favorite Bay shoreline, exposing portions of the runway safety area to view from Viewpoint 2 and resulting in major contrasts (see Figure VS5). The connection of the new road with the BIA Road would be consistent with existing road design and material type and would not likely attract the attention of the casual viewer. The visual effects related to the avigation easement (from Viewpoint 2a; see Figure VS6) would be identical with those of Airport 3a with Access 2. No long-term visual effects would occur for any other viewpoints.

Effects in the Monument–Wilderness Area

As shown in Table WC7 in Wilderness Character, Airport 3a with Access 3 would affect opportunities for solitude in the Monument–Wilderness Area in three ways:

- Construction-related lights and construction-related skyglow would be temporarily visible during the construction period (up to three seasons) at night and during daytime low-light conditions.
- Skyglow would be intermittently visible over the long term when the airport navigation lights are briefly turned on during approaches and takeoffs.
- There would be 735 acres where developments and motorized equipment would be visible from within the wilderness area.

Significance determinations for Airport 3a with Access 3

Light emissions effects from Airport 3a with Access 3 would not be considered significant because the use of the runway lights would be intermittent and of short duration and because no issues were raised regarding light emissions during public scoping.

Visual resources effects from Airport 3a, when observed from Viewpoint 2, would exceed the U.S. Forest Service scenic integrity planning objectives for the Monument–Wilderness Area. The project-related changes to the landscape would not repeat the existing landscape's form, line, color, and texture, and the landscape deviations would be evident to the casual viewer. The effects to visual resources would not be compatible with scenery management objectives for this area and therefore would exceed the U.S. Forest Service significance threshold.

The significance determinations of the minor contrasts created by vegetation clearing in the avigation easement (see Figure VS6) lie within FAA jurisdiction because this area is outside of the U.S. Forest Service administrative boundary. No significance thresholds would be exceeded unless the FAA hears from the public, tribes, or appropriate government agencies that the long-term effects of airport and/or access road construction and operation is visually objectionable.

The significance of effects to visual resources from Airport 3a with Access 3 as they relate to the Monument–Wilderness Area and its qualities is discussed in section 4.16.3.5 and section 4.16.3.6 in Wilderness Character.

4.9.3.3.4. Airport 4 with Access 2

Temporary and long-term effects related to light emissions and visual resources for Airport 4 with Access 2 are discussed here. The locations of viewpoints relative to landscape disturbance are shown in Figure VS8. A summary of the effects and a comparison with the other alternatives are provided in Table VS1.

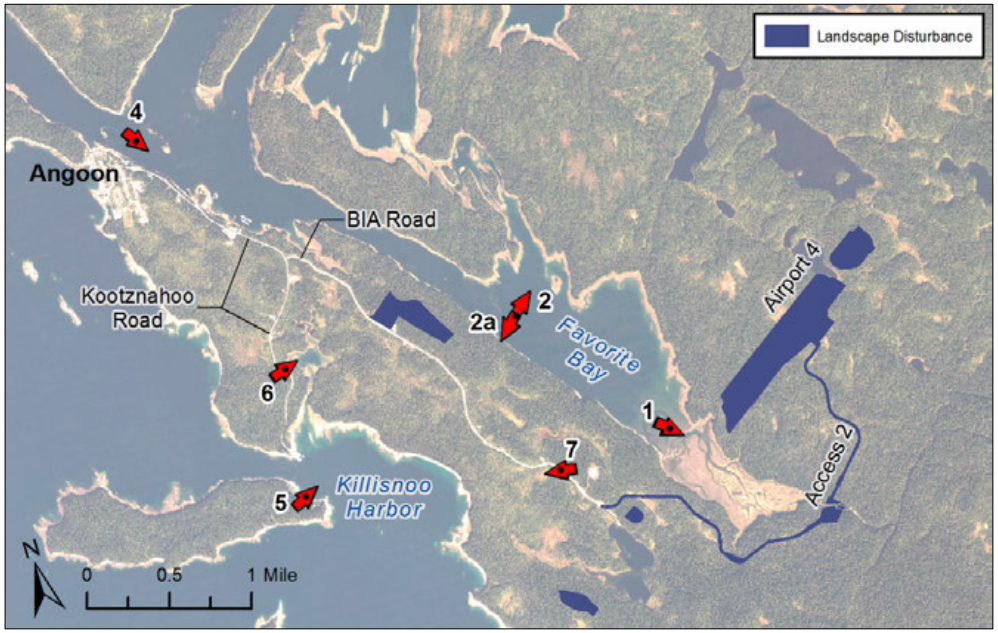


Figure VS8. Locations of the viewpoints relative to the proposed locations of Airport 4 with Access 2.

Light emissions effects

The temporary and long-term effects related to light emissions would be the same as those discussed for Airport 3a with Access 2 (see section 4.9.3.3.2). Barge lights and construction vehicle lights at the ferry terminal would be visible during nighttime or low-light daytime conditions when viewed from Whaler's Cove Lodge, the approaching or departing ferry, fishing vessels, and pleasure craft in Killisnoo Harbor. Construction vehicle lights would also be visible along the Kootznahoo Road and along the BIA Road to the proposed location of the new access road. These light sources would increase the existing light in these areas, contributing to skyglow.

Construction work areas for the airport and access road, including the Favorite Creek bridge, would be well illuminated with high-intensity lighting during nighttime or low-light daytime conditions. It is assumed that the bridge construction equipment would also be illuminated at night. Skyglow created from these actions could be visible from all viewpoints. These construction effects would be temporary and would end as soon as construction ceases.

Operation of the airport in nighttime and daytime low-light conditions would result in long-term visibility of intermittent, brief, and low-intensity skyglow from the airport's upward-directed navigation lights, as described for Airport 3a with Access 2.

Visual resources effects

Temporary visual effects

Effects from Airport 4 with Access 2 would be similar in most ways to those from Airport 3a with Access 2. From Viewpoints 5, 6, and 7, construction traffic at the ferry terminal and along the Kootznahoo and BIA Roads would be highly visible. Barge traffic would be highly visible from Viewpoint 5 (Whaler's Cove Lodge), but this visual intrusion would be consistent with other activities in the area, including boating traffic from fishing boats, pleasure craft, and the ferry. Potential on-island material extraction at the quarry site would be visible at the entrance of the quarry along the BIA Road, and haul trucks and other construction traffic would be visible entering and leaving the site and moving along the road. Construction work sites and vehicles temporarily parked along the road right-of-way would also be highly visible along the BIA Road.

Visual resource effects from construction at the airport location or along the access road would not be visible because these locations would be screened from view by dense forest growth. Unlike Airport 3a, the Airport 4 avigation easements that require tree felling would not be close to the Favorite Bay shoreline, and therefore the effects would not be visible to the casual viewer from any viewpoint (Figure VS9).

Long-term visual effects

There would be no long-term effects to visual resources from this alternative when viewed from any viewpoint. The locations of vegetation clearing would stop short of the shoreline, leaving forest intact between the shoreline and the airport or access road and screening the alternative from view from any viewpoint, including Viewpoint 1 in the Favorite Bay estuary (see Figure VS9).

Effects in the Monument–Wilderness Area

As shown in Table WC9 in Wilderness Character, Airport 4 with Access 2 would affect opportunities for solitude in the Monument–Wilderness Area in three ways:

- Construction-related lights and construction-related skyglow would be temporarily visible during the construction period (up to three seasons) at night and during daytime low-light conditions.
- Skyglow would be intermittently visible over the long term when the airport navigation lights are briefly turned on during approaches and takeoffs.
- There would be 528 acres where developments and motorized equipment would be visible from within the wilderness area.

Significance determinations for Airport 4 with Access 2

Light emissions effects from Airport 4 with Access 2 would not be considered significant because use of the runway lights would be intermittent and of short duration and because no issues were raised regarding light emissions during public scoping.

Visual resources effects from Airport 4 with Access 2 would not exceed the U.S. Forest Service scenic integrity planning objectives for the Monument–Wilderness Area. No long-term visual contrasts from the existing landscape would be evident to the casual viewer. The effects to visual resources would be compatible with scenery management objectives for this area and therefore would not exceed the U.S. Forest Service significance threshold.

The significance of effects to visual resources from Airport 4 with Access 2 as they relate to the Monument–Wilderness Area and its qualities is discussed in section 4.16.3.5 and section 4.16.3.6 in Wilderness Character.

Figure VS9. Existing conditions related to Airport 4. View facing east-southeast from Viewpoint 1. No simulation is included because there would be no visible change either temporarily or in the long term, except that bridge construction equipment could be visible temporarily during bridge construction.

4.9.3.3.5. Airport 4 with Access 3

Temporary and long-term effects related to light emissions and visual resources for Airport 4 with Access 3 are discussed here. The locations of the viewpoints relative to landscape disturbance are shown in Figure VS10. A summary of the effects and a comparison with the other alternatives is provided in Table VS1.

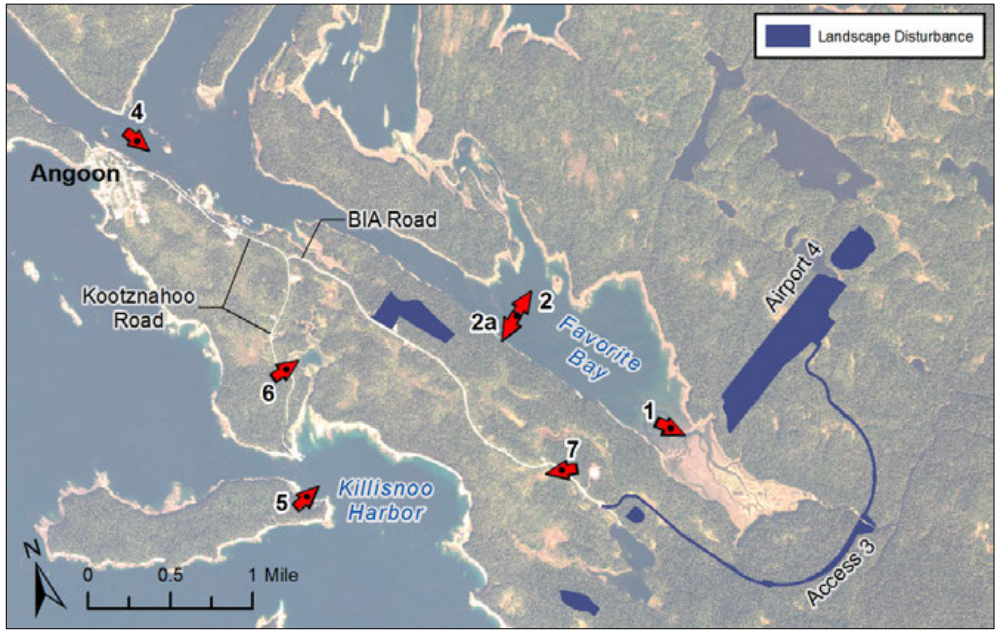


Figure VS10. Locations of the viewpoints relative to the proposed locations of Airport 4 with Access 3.

Light emissions effects

The temporary and long-term effects related to light emissions would be the same as those described for Airport 4 with Access 2. The only difference between the two alternatives would be the location of the access road, but that difference would cause no change in either long-term or temporary effects. Barge lights and construction vehicle lights at the ferry terminal would be visible during nighttime or low-light daytime conditions when viewed from Whaler's Cove Lodge, the approaching or departing ferry, fishing vessels, and pleasure craft in Killisnoo Harbor. Construction vehicle lights would also be visible along the Kootznahoo Road and along the BIA Road to the proposed location of the new access road. These light sources would increase the existing light in these areas, contributing to skyglow.

Construction work areas for the airport and access road, including the Favorite Creek bridge, would be well illuminated with high-intensity lighting during nighttime or low-light daytime conditions. It is assumed that the bridge construction equipment would also be illuminated at night. Skyglow created from these actions could be visible from all viewpoints. These construction effects would be temporary and would end as soon as construction ceases.

Operation of the airport in nighttime and daytime low-light conditions would result in long-term visibility of intermittent, brief, and low-intensity skyglow from the airport's upward-directed navigation lights.

Visual resources effects

Temporary visual effects

Under this alternative, the temporary effects on visual resources would be the same as those discussed for Airport 4 with Access 2 because the airport location would be the same and the construction activities would be the same.

Visual resources effects at the airport location or along the access road would not be visible because these locations would be screened from view by dense forest growth. Unlike Airport 3a, the Airport 4 avigation easements that require tree felling would not be close to the Favorite Bay shoreline, and therefore the effects would not be visible to the casual viewer from any viewpoint (see Figure VS9).

Long-term visual effects

As with Airport 4 with Access 2, there would be no long-term effects to visual resources from this alternative when viewed from any viewpoint. The locations of vegetation clearing would stop short of the shoreline, leaving forest intact between the shoreline and the airport or access road and screening the alternative from view from any viewpoint, including Viewpoint 1 in the Favorite Bay estuary (see Figure VS9).

Effects in the Monument–Wilderness Area

As shown in Table W11 in Wilderness Character, Airport 4 with Access 3 would affect opportunities for solitude in the Monument–Wilderness Area in three ways:

- Construction-related lights and construction-related skyglow would be temporarily visible during the three-season construction period at night and during daytime low-light conditions.
- Skyglow would be intermittently visible over the long term when the airport navigation lights are briefly turned on during approaches and takeoffs.
- There would be 630 acres where developments and motorized equipment would be visible from within the wilderness area.

Significance determinations for Airport 4 with Access 3

Light emissions effects from Airport 4 with Access 3 would not be considered significant because use of the runway lights would be intermittent and of short duration and because no issues were raised regarding light emissions during public scoping.

Visual resources effects from Airport 4 with Access 3 would not exceed the U.S. Forest Service scenic integrity planning objectives for the Monument–Wilderness Area. No long-term visual contrasts from the existing landscape would be evident to the casual viewer. The effects to visual resources would be compatible with scenery management objectives for this area and therefore would not exceed the U.S. Forest Service significance threshold.

The significance of effects to visual resources from Airport 4 with Access 3 as they relate to the Monument–Wilderness Area and its qualities is discussed in section 4.16.3.5 and section 4.16.3.6 in Wilderness Character.

4.9.3.3.6. Airport 12a with Access 12a (preferred alternative)

Temporary and long-term effects related to light emissions and visual resources for Airport 12a with Access 12a are discussed here. The locations of the viewpoints relative to landscape disturbance are shown in Figure VS11. A summary of the effects and a comparison with the other alternatives are provided in Table VS1.

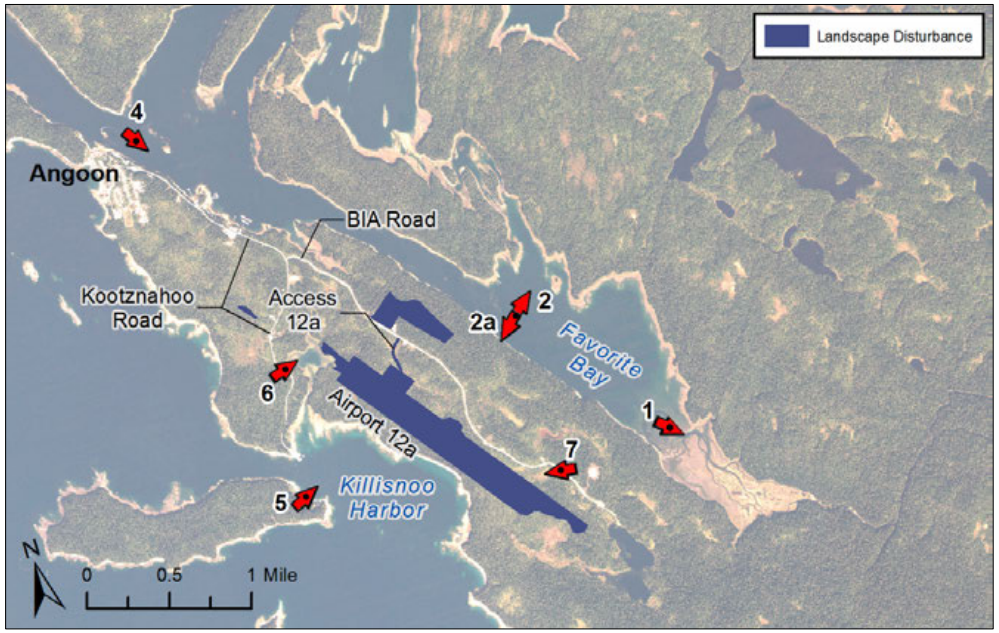


Figure VS11. Locations of the viewpoints relative to the proposed locations of Airport 12a with Access 12a.

Light emissions effects

Temporary light emissions effects

Temporary light emissions effects during construction of Airport 12a with Access 12a would be similar to those of the other alternatives, but would be less intensive because the construction period is assumed to be shorter (up to two construction seasons), and less construction material would needed. Barge lights and construction vehicle lights would be visible during nighttime or low-light daytime conditions when viewed from Whaler's Cove Lodge, the approaching or departing ferry, fishing vessels, and pleasure craft in Killisnoo Harbor. Construction vehicle lights would also be visible along the Kootznahoo Road and along the BIA Road to the proposed location of Access 12a. These light sources would increase the existing light in these areas, contributing to existing skyglow. However, the additional lighting effects would be consistent with existing light emissions from the Angoon ferry terminal, Angoon community roads, and the marina below the lodge. Construction work areas for Airport 12a and Access 12a would be well illuminated with high-intensity lighting during nighttime or low-light daytime conditions. Because of the existing skyglow in this area, new sources of light would intensify the skyglow, which would be visible from all viewpoints. These construction effects would be temporary and would end as soon as construction ceases.

Long-term light emissions effects

Because portions of the Airport 12a cleared area would be within view of Viewpoint 5 (Figure VS12), runway lights would be visible to casual viewers at Whaler's Cove Lodge and to ferry passengers and boaters traveling into and out of Killisnoo Harbor during daytime, low-light conditions and at night. The direct visibility of runway lights would attract the attention of the casual viewer and be a visual intrusion. At night and during low-light daytime conditions, intermittent, brief, and low-intensity skyglow caused by the airport's upward-directed navigation lights would be visible from all viewpoints during approaches and takeoffs.

Visual resources effects

Temporary visual effects

From Viewpoints 5 and 6, construction traffic at the ferry terminal or along the Kootznahoo and BIA Roads would be highly visible. Barge traffic would be highly visible from Viewpoint 5 (Whaler's Cove Lodge), but this visual intrusion would be consistent with other activities in the area, including boating traffic from fishing boats, pleasure craft, and the ferry. Potential on-island material extraction at the quarry site would be visible at the entrance of the quarry along the BIA Road, and haul trucks and other construction traffic would be visible entering and leaving the site and moving along the road. Construction work sites and vehicles temporarily parked along the road right-of-way would also be highly visible along the BIA Road. Construction activity would be visible at the southern end of the airport site (see Figure VS12 for a simulation of the cleared area) during the construction period, but these effects would cease when construction ends.

Long-term visual effects

This alternative would affect visual resources when viewed from Viewpoint 5. Visual simulations (Figure VS12) show that a cleared area would be visible along the southern end of the airport site, creating color, form, line, and texture contrasts between the densely forested landscape and the flat, smooth runway safety area. These contrasts and portions of the airport perimeter fence would be visible to casual viewers (lodge visitors, ferry passengers, casual boaters, and fishers). The effects would be moderate because they would likely attract attention, but they would not dominate the view. These effects would not be visible from the other viewpoints because of obscuring topography and dense forest, for example from Viewpoint 4, as shown in Figure VS13. Vegetation clearing in the avigation easement at the northern end of Airport 12a would produce a negligible effect because the cleared area would create no unnatural line contrasts

(unlike those for Airport 3a) and would be only briefly visible to vehicle passengers and to those walking along the ferry road (Figure VS14). Additionally, the area would be revegetated and in the long term would blend in with the surrounding landscape and appear natural, as grasses, low shrubs, small trees, and other vegetation regrow.

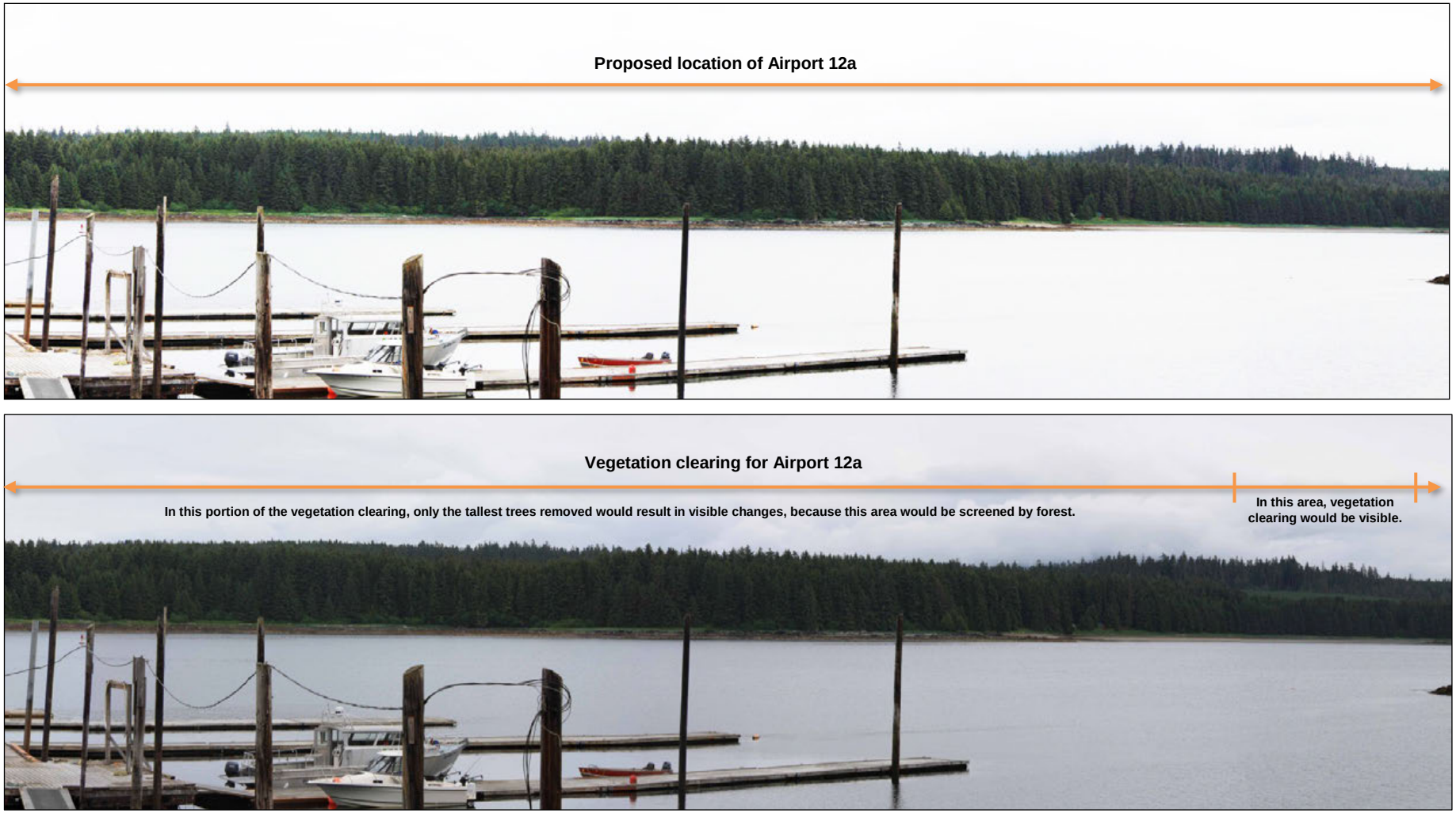


Figure VS12. View facing northeast from Viewpoint 5 toward the proposed location of Airport 12a. Existing conditions related to Airport 12a (top); visual simulation of avigation easement with vegetation clearing (bottom left) and airport location with vegetation clearing (bottom right).

Figure VS13. Existing conditions related to Airport 12a, view facing southeast from Viewpoint 4. No simulation is included because there would be no visible change either temporarily or in the long term.

Figure VS14. View facing east-northeast from Viewpoint 6 toward avigation easement for Airport 12a. Existing conditions (top); effects from vegetation clearing for Airport 12a avigation easement (bottom).

Effects in the Monument–Wilderness Area

As shown in Table WC13 in Wilderness Character, Airport 12a with Access 12a would affect opportunities for solitude in the Monument–Wilderness Area in two ways:

- Construction-related skyglow would be temporarily visible during the construction period (up to two seasons) at night and during daytime low-light conditions.
- Skyglow would be intermittently visible over the long term when the airport navigation lights are briefly turned on during approaches and takeoffs.

No developments and motorized equipment would be visible from within the wilderness area.

Significance determinations for Airport 12a with Access 12a

Effects from Airport 12a with Access 12a related to light emissions would not be considered significant because the use of the runway lights would be intermittent and of short duration and because no issues were raised regarding light emissions during public scoping.

Although Airport 12a has visual effects, these effects are not found to be significant. No comments were received during the public comment period from the public, tribes, or appropriate agencies that would demonstrate that the effects are visually significant.

The significance of effects to visual resources from Airport 12a with Access 12a as they relate to the Monument–Wilderness Area and its qualities is discussed in section 4.16.3.5 and section 4.16.3.6 in Wilderness Character.

4.9.3.4. How do the effects to light emissions and visual resources compare?

Table VS1 summarizes the effects of airport and road construction and operation on visual resources and light emissions.

Light emissions: Under all of the action alternatives, there would be long-term effects related to skyglow from navigation lights used during airport operations. This skyglow would be intermittent and brief, occurring only when the pilot-controlled lights are turned on for low-light daytime and nighttime approaches and landings. Construction of any alternative would involve lighting of the constructions areas and some equipment during nighttime or low-light daytime conditions; these temporary skyglow effects would also be visible from all viewpoints.

Visual resources: Vegetation clearing for Airport 3a would be visible from one of the viewpoints—Viewpoint 2, located in Favorite Bay—causing long-term effects to visual resources. Airport 4 would not be visible from any of the viewpoints and would therefore cause no long-term effects to visual resources. Vegetation clearing for Airport 12a would be visible from Viewpoint 5 (Whaler's Cove Lodge), causing long-term effects to visual resources. None of the access roads would cause long-term effects that would be visible from any of the viewpoints during construction or operation. Temporary effects would be similar across all alternatives, consisting of the visibility of barge traffic, construction vehicles, and equipment traffic along the Kootznahoo and BIA Roads, and activity in the construction work areas, at the quarry site, and at the bridge construction site.

Wilderness: Airport 3a with either access road and Airport 4 with either access road are the action alternatives located within the boundaries of the Monument–Wilderness Area, and they would cause effects to wilderness qualities, especially opportunities for solitude, through construction-related and operations-related skyglow and through visibility of developments and motorized equipment. Although not located in the wilderness area, Airport 12a would cause effects to opportunities for solitude in the Monument–Wilderness Area by creating temporary construction-related skyglow and long-term intermittent skyglow. (See section 4.16.3.2 in Wilderness Character for detail.)

Table VS1. Summary of light emissions and visual resource effects from action alternatives

	Airport 3a with Access 2 (proposed action)	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a (preferred alternative)
Light emissions	• Temporary visibility of lights and skyglow at night and during daytime low-light conditions from construction vehicles and illuminated construction areas and equipment • Long-term visibility of intermittent, brief, and low-intensity skyglow during airport operation at night and during daytime, low-light conditions	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Temporary visibility of lights and skyglow would be same as Airport 3a with Access 2 but would increase the existing light in these areas, contributing to existing skyglow • Long-term visibility of lights from Viewpoint 5 and long-term visibility of intermittent, brief, and low-intensity skyglow during airport operation at night and during daytime, low-light conditions
Visual resources					
Viewpoint 1	• Temporary visibility of bridge construction equipment • No visibility of airport, access road, or avigation easements in the long term	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• No visibility of construction actions • No visibility of airport, access road, or avigation easements in the long term
Viewpoint 2	• No visibility of construction actions • Major contrasts from vegetation clearing for the airport, producing a long-term effect	• Same as Airport 3a with Access 2	• No visibility of construction actions • No visibility of airport, access road, or avigation easements in the long term	• Same as Airport 4 with Access 2	• Same as Airport 4 with Access 2
Viewpoint 2a	• No visibility of construction actions • No visibility of airport, access road, or avigation easements in the long term	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2
Viewpoint 4	• No visibility of construction actions • No visibility of airport, access road, or avigation easement in the long term	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2

Table VS1. Summary of light emissions and visual resource effects from action alternatives

	Airport 3a with Access 2 (proposed action)	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a (preferred alternative)
Viewpoint 5	• Temporary visibility of construction traffic and barge traffic • No visibility of airport, access road, or avigation easements in the long term	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Temporary visibility of construction traffic and barge traffic • Major contrasts from vegetation clearing for the airport, producing a long-term effect
Viewpoint 6	• Temporary visibility of construction traffic • No visibility of airport, access road, or avigation easements in the long term	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Temporary visibility of construction traffic • Visibility of vegetation clearing at avigation easement along the Kootznahoo Road • No visibility of airport or access road
Viewpoint 7	• Temporary visibility of construction traffic • No visibility of airport, access road, or avigation easements in the long term	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• No visibility of construction traffic • No visibility of airport, access road, or avigation easements in the long term
Wilderness	• Temporary effects to opportunities for solitude from visibility of nighttime and low-light daytime light emissions from construction equipment and construction lights • Long-term effects to opportunities for solitude from visibility of airport developments and motorized equipment and from nighttime and low-light daytime skyglow during airport operation	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Temporary effects to opportunities for solitude from visibility of nighttime and low-light daytime light emissions from construction equipment and construction lights • Long-term effects to opportunities for solitude from nighttime and low-light daytime skyglow during airport operation

4.9.3.5. Would any effects be irreversible or irretrievable?

The effects from all action alternatives would be irreversible and irretrievable during construction and continued operation.

4.9.3.6. Would any of the alternatives have a significant effect related to light emissions and visual resources?

Vegetation clearing for Airport 3a would create clearly observable deviations from the designated "High" scenic integrity in the U.S. Forest Service–administered Monument–Wilderness Area. The contrasts created would not repeat the surrounding form, line, color, and texture, and would exceed the planning objectives for the area. Mitigation of visual contrasts within the airport site would not sufficiently reduce the contrasts to below the significance threshold. Therefore, Airport 3a would have a significant adverse effect to visual resources. Airport 4 with either access would not have a significant adverse effect to visual resources because the locations of the airport and access road under either alternative would be screened by forest and would not be visible. Although Airport 12a has visual effects as a result of major contrasts that are obvious, these effects are not found to be significant because a different threshold of significance—the FAA's threshold, as described in section 4.9.3.2.2—applies to Airport 12a.

Under that threshold, there are significant effects if the jurisdictional agency (the FAA, in this EIS) determines that visual effects are objectionable. For visual resources affected by Airport 12a with Access 12a, no significance thresholds would be exceeded unless the public, tribes, or appropriate agencies demonstrate that the effects are visually significant. No comments were received during the draft EIS comment period to indicate that the public, tribes, or agencies believe the effects would be significant.

4.9.3.7. How could the effects be avoided, minimized, or mitigated?

In addition to the best management practices and mitigation measures listed in Chapter 7: Mitigation, the following additional measures are proposed to further reduce the significant effects to visual resources from Airport 3a. The most distinct long-term visual contrasts created by the airport would result from the vegetation clearing in the airport safety area down to the Favorite Bay shoreline. Potential contrasts could be reduced by revegetating cleared areas or allowing natural revegetation to take place and feathering edges to provide a more natural transition between forest and cleared areas.

4.10. Energy Supply, Natural Resources, and Sustainable Design

This section addresses the degree to which the proposed airport alternatives would consume existing energy supplies and natural resources during construction, operations, and maintenance.

What is discussed in this section?

4.10.1. Background information

4.10.1.1. What do the terms "energy supply," "natural resources," and "sustainable design" mean?

- "Energy supply" for this project refers to a hydrocarbon fuel source such as diesel or gasoline, the burning of which powers construction equipment, vehicles, and generators.
- "Natural resources" are materials such as gravel, rock, water, and timber that would be consumed in the construction and operation of the airport. The term also refers to the land on which the project could be located.
- "Sustainable design" is an architectural concept that incorporates specific design principles to reduce a facility's direct energy needs (for example, fuel consumption for construction) or its indirect energy needs (for example, facility maintenance).

4.10.1.2. What laws, policies, or regulations apply to energy supply, natural resources, and sustainable design in the Angoon area?

Federal policy requires a good faith effort to explore ways to minimize use of energy and natural resources (40 Code of Federal Regulations [CFR] 1502.16(e) and (f)) and to incorporate sustainable practices wherever possible (Executive Order [EO] 13123) when federal funds, permits, or authorizations are involved in a project. Appendix A of *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) acknowledges that airport projects consume natural resources and can change the short- and long-term energy needs of a given area. The Federal Aviation Administration (FAA) requires that the project's natural resource and energy needs be considered in light of the current and future natural resource and energy needs of the local community. This will help determine if the proposed airport project would have a significant effect on the community's ability to meet those needs.

Regarding sustainable design, FAA policy requires the agency to consider the degree to which an airport project incorporates measures to minimize or reduce consumption of natural resources and energy. For example, would the airport project consume all gravel sources in the area such that gravel is not available for other local projects? Is there sufficient fuel availability in the area to supply airport construction as well as existing and future community needs?

Energy access in rural Alaska

Access to fuel or electricity is an issue that rarely crosses the minds of most Americans—particularly those in the Lower 48 states. Construction and operation of new public facilities is almost never constrained by the available energy supply. But this is not the case in rural Alaska communities like Angoon. Energy supplies are limited, and these limits must be taken into account when planning new facilities. Water, mountains, or vast expanses of land geographically isolate rural Alaska communities like Angoon from fully developed energy infrastructure like transmission lines and pipelines, which transport electricity and fuel from production centers to residential and commercial users. Instead, electricity must be generated in the rural communities themselves. For many communities, this means using diesel generators that require thousands of gallons of fuel each year to produce electricity for residences, businesses, government offices, and public facilities. In turn, the fuel to operate these generators must be transported to the community, often by fuel barge or truck—where roads exist. All of this means that energy supplies to accommodate growth and development, including the addition of new public facilities, are very limited, and sufficient fuel to operate these new facilities may not be available and still allow for other existing and future uses. To address this, many rural Alaska communities, including Angoon, are increasingly looking at alternate energy sources such as wind, solar, and hydropower to expand their energy availability and facilitate economic and social development.

4.10.2. Existing conditions

4.10.2.1. How did the FAA determine which energy supplies and natural resources could be affected, and their existing conditions?

Terms to know

Construction aggregate: Quarried rock that has been crushed to meet specific engineering specifications.

Information about fuel, water, electricity, gravel, rock, and other construction materials in the Angoon area was gathered from existing data sources and field studies. Existing data sources that were specifically consulted include records of existing fuel storage capacity, water availability, and sources of ***construction aggregate***. Research was conducted by engineers at DOWL HKM on behalf of the FAA. These data are presented in the *Construction Methods and Issues Angoon Airport Environmental Impact Statement* (DOWL HKM 2013), included as Appendix C, to analyze the suitability of gravel and rock available in the Angoon area.

4.10.2.2. What energy supplies and natural resources could be affected? What is their capacity?

Construction and operation of a new land-based airport at Angoon would require many resources. These resources may or may not be present in the Angoon area today, as described below.

Asphalt and concrete: No asphalt or concrete mixing facilities currently exist in Angoon. Facilities for mixing asphalt and concrete would be barged to Angoon during construction.

Building supplies: Construction materials such as lumber, metals, and finishing materials are not available in Angoon. All materials must be brought in from other locations, primarily Juneau, by boat or barge. Angoon currently has a makeshift barge landing in Killisnoo Harbor for the offloading of construction materials. At the time of this environmental impact statement (EIS), the City of Angoon was engaged in a planning process for a new barge landing facility. This facility is independent of the airport project and would be constructed whether a land-based airport is built or not.

Construction aggregate: There is a single developed quarry on the Angoon peninsula that is located along the main Bureau of Indian Affairs [BIA] Road to Auk'Tah Lake. As discussed in section 3.4.2.2.2 in Chapter 3: Alternatives, expanding this existing site as a construction materials source is considered possible and is included in this EIS's environmental analysis as an on-island materials source. However, because the quality of the materials from an expansion of this source is currently unknown, this EIS also analyzes the potential to barge in gravel and rock for construction.

Electricity: At present, electricity in Angoon is produced at a single diesel-burning power plant next to the Angoon city storage building on Chatham Road. A new land-based airport would require a periodic supply of electricity for airport lighting and navigation aids, but it would not be cost-effective to connect the airport to the existing power plant. An on-site generator would be stationed at the airport and operated remotely by a pilot in flight. It is anticipated that 500–1,000 gallons of diesel fuel would be maintained at the airport to power the generator. In 2009, the U.S. Forest Service issued a record of decision providing for the construction of a hydroelectric facility on Forest lands at Thayer Lake, north of Angoon on Admiralty Island (U.S. Forest Service 2009). This facility would be developed for the benefit of Angoon residents. Construction on the facility is scheduled to be completed in 2015. When the Thayer Lake facility is completed, the airport could connect to this facility if it is cost-effective. The City of Angoon and Kootznoowoo, Inc. are pursuing alternative sources of hydroelectricity for Angoon; the current sources under consideration are located off Admiralty Island.

Fill: Construction of an airport and access road would require excavating and removing soils and rock. The FAA expects that much of this material would serve as fill in other areas of construction, although some of it may not be suitable for airport or access road construction uses. Efforts would be made to balance the amount of excavated materials during final design of the airport. Any excess would be removed from the construction site and stockpiled in the Angoon area for future uses.

Fuel for aircraft and vehicles: Aviation fuel is not commercially available in Angoon nor would aviation fuel facilities be constructed for any action alternative. Vehicle fuel (diesel and gasoline) is available through a single commercial supplier, Angoon Oil and Gas, which reports a total capacity of 36,000 gallons of No. 1 and No. 2 diesel fuel and 19,000 gallons of gasoline (Thompson and Thompson 2012). Their mobile fuel capacity is 2,700 gallons. According to Angoon Oil and Gas, approximate diesel and gasoline turnover is 20,000 gallons per month (Thompson and Thompson 2012). Currently, fuel for Angoon is transported by barge or ferry and offloaded at one of two locations, the fuel dock west of town or the city dock in Killisnoo Harbor. Fuel for construction of a land-based airport and access road would be transported to and offloaded at the barge area.

Land: Open and undeveloped land is plentiful in the Angoon area; however, the terrain limits the availability of that land for airport development (sufficiently large and flat areas to meet runway length and slope standards are necessary, as is clear terrain around runways for safe aircraft approaches and departures). Land availability is also limited by ownership and management guidelines, which are discussed in greater detail below and in section 4.3 Compatible Land Use.

Water: Freshwater would be needed during construction for controlling dust, compacting soil, and mixing concrete. Water for dust control and soil compaction would likely be pumped into a water truck from a pond or creek near the construction area; concrete mixing may require clarified or potable water. If clarified or potable water is needed, it would likely be obtained from the Angoon municipal water system and the City of Angoon confirmed that this water would be made available (City of Angoon 2012a).

4.10.3. Project effects

All of the alternatives, including the no action alternative, would consume energy supplies and natural resources. No new energy sources would be developed in the Angoon area for any of the alternatives.

4.10.3.1. How did the FAA determine the effects of the alternatives?

Effects from project alternatives on energy supply and natural resources occur from both direct disturbance and consumption and indirect consumption or induced changes. Direct effects can occur in the short term and in the long term, and these are specified where appropriate. Indirect effects would occur after construction were complete and in the long term. The sources of potential effects and descriptions of how those sources would create effects on energy supply and natural resources are discussed below.

What is discussed in this section?

4.10.3.1.1. Direct effects

Direct effects on energy supplies and natural resources would come from consumption of energy and materials during construction, maintenance, and operation of an airport and access road. Specific sources of direct effects include the following:

- Commitment of land: Under the action alternatives, between 350 and 408 acres of land would need to be directly used for the airport and access road. Most of these lands would not have other uses while the airport was in operation. The lands under consideration for the action alternatives are currently undeveloped, with the exception of a portion of the materials source. Further analysis and discussion of the effects to land uses and subsistence gathering from the action alternatives is included in section 4.3.3 of Compatible Land Use, and section 4.13.3 in Subsistence Uses and Resources.
- Landscape disturbance: The actions related to construction of the airport and access road would consist of terrain disturbance, vegetation removal, paving, tree felling, and temporary use areas for bridge construction (see section 4.1 for more detail on these actions). For analysis in this section, these actions are grouped into a single type of action called landscape disturbance because, either temporarily or long term, the natural resources would be removed and not available for use.
- Fuel use for construction-related equipment: For the purpose of the analysis in this EIS, the FAA estimated the type and number of pieces of construction-related equipment likely to be used for any action alternative in Angoon by comparing those alternatives to other similar projects in Southeast Alaska (Appendix C). The FAA estimate indicates the need for 35–50 pieces of construction equipment that would be powered by gasoline or diesel fuel. This equipment includes wheeled and tracked vehicles. For the purpose of analysis, the FAA assumed a maximum 3-season construction duration for Airport 3a and Airport 4, regardless of access road option, and a maximum 2-season construction duration for Airport 12a with Access 12a (construction seasons, see section 4.1 Introduction for information on construction timing).
- Use of gravel and rock fill, asphalt, and concrete: Asphalt paving, concrete mixing, and depositing of fill material during construction would require the consumption of natural resources (in this case, aggregate). The volume of these materials needed varies by alternative depending on the nature of the terrain and the length of the access road. The volumes needed for each alternative are discussed in section 4.10.3.3. Studies conducted for this EIS suggest that sufficient quantities of the necessary types of aggregate could exist in the Angoon area. However, because the quality of the materials from the on-island material source is unknown at this time, this EIS also analyzes the potential for all aggregate to be barged in from other locations.

- Removal of soil and rock: Construction of an airport and access road would require excavating and removing soils and rock in the construction areas. Although the FAA expects that much of the material excavated during construction would be reused in other areas of construction, some materials are likely to not be suitable for airport or access road construction. These materials would be removed from the construction site or stockpiled in the Angoon area for future uses after construction completion. In the case of excess materials from the Monument–Wilderness Area lands, these materials would be removed according to U.S. Forest Service regulations and permits.
- Dust control, soil compaction, and concrete mixing: Dust control, soil compaction, and concrete mixing during construction would all require freshwater. In most cases, untreated water could be used. However, concrete mixing might require treated water. The FAA anticipates that water used for construction purposes would be acquired from local sources near the alternatives. The amount of water needed would range between 2,000 million gallons and 10,000 million gallons, regardless of alternative. See the blue sidebar titled "Putting water use in context."
- Maintenance and operation: Road and airport maintenance, occasional snow clearing, and operation of a generator for airport lighting would occur under any of the action alternatives. All equipment used for maintenance and operation is assumed to be powered by gasoline or diesel fuel. Minor consumption of aggregate for asphalt or concrete patching is also assumed to be necessary over the life of the project but is expected to be negligible in volume. The road is expected to experience light traffic (less than 400 average daily traffic), primarily from passenger vehicles, and would therefore experience less damage requiring repair than more heavily traveled roads.
- Use of other construction materials: Metals and lumber would be used to construct facilities at the airport, including navigation equipment, safety equipment, and so on. Timber and steel would be the primary components of the bridge over Favorite Creek if either Airport 3a or 4 (and their access roads) were constructed. Steel would be used in culverts over drainages and other water bodies under all action alternatives.
- Operation of runway lights and other equipment: The operation of runway lights and other electrical equipment at the airport would consume energy. For this EIS, the FAA assumed that electricity for such equipment would be provided by a diesel generator at the airport. As such, electricity for airport operations would require diesel fuel for the life of the airport.

Putting water use in context

Millions of gallons of water used for construction may sound like a lot, but it is actually sustainable in an area like Angoon. For example, during a peak 2-year flood event, Favorite Creek can discharge 805,500 gallons a minute. Daily water use for construction of the Angoon Airport, assuming 18 months of construction, would average 28,000 gallons a day.

4.10.3.1.2. Indirect effects

Indirect effects of a new land-based airport regarding energy supplies and natural resources are expected to be limited to the following:

- Increased travel: As discussed in Chapter 2: Purpose and Need for a Land-Based Airport at Angoon, a new land-based airport is expected to cause an increase in air traffic beyond that of the existing Angoon Seaplane Base. Each additional flight would consume additional fuel compared to current fuel uses. Travel to and from an airport in Angoon would also consume fuel. The volume of fuel consumed is dependent upon a number of factors, including the fuel efficiency of the vehicle used and the distance between the airport and the traveler's origination point. By comparison to the seaplane base, which is less than 2 miles round-trip from the city center and therefore within walking distance, residents would travel between 4.7 miles (for Airport 12a with Access 12a) and 17.2 miles (for Airport 3a with Access 3) round-trip from the city center to reach a new airport; given the distance, these miles are expected to be traveled in gasoline- or diesel-powered vehicles.

4.10.3.2. How did the FAA determine the significance of the anticipated effects from the alternatives?

The FAA's *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b) states that significant effects on energy supplies and natural resources occur when "an action's construction, operation, or maintenance would cause demands that would exceed available or future natural resource or energy supplies."

4.10.3.3. How would each alternative affect energy supply and natural resources?

Consumption of energy supplies and natural resources for airport construction varies between the alternatives. This is due to the quantity of cut and fill needed at each alternative location, and the differences in the length of the access road for each alternative. Differences in consumption of natural resources relate to the commitment of land required for the airport and access road and for the amount of material needed to achieve acceptably level terrain for each alternative. The direct energy and natural resources needs for each alternative are provided in Tables ENR1 through ENR5, and a summary for all the alternatives is provided in Table ENR6.

4.10.3.3.1. No action alternative

Under the no action alternative, use of energy and natural resources would be the same as currently occurs in the Angoon area. Fuel, both gasoline and diesel, would continue to be consumed for travelers using the Angoon Seaplane Base. Energy to operate the seaplane base would continue to be provided by diesel generator until such time as an alternative electrical source is available in the community. No new consumption of natural resources would occur beyond existing levels of consumption for operation and maintenance of the seaplane base.

4.10.3.3.2. Airport 3a with Access 2 (proposed action)

Airport 3a with Access 2 is at the higher end of estimated fuel supply and natural resource consumption compared to other alternatives. This is due to its requirements for having the second-longest road, second-largest commitment of land, second-biggest area of vegetation removal, and the second-greatest need for construction aggregate. Table ENR1 summarizes the anticipated energy and natural resources consumption for this alternative, and Figure ENR1 illustrates the areas of natural resource use. Assuming a maximum 3-season construction duration, this alternative would approximately double the monthly fuel turnover in Angoon during construction compared to the no action alternative, which would not increase fuel consumption. Angoon Oil and Gas has existing infrastructure sufficient to store and mobilize this amount of fuel (Thompson and Thompson 2012), and no new facilities would need to be constructed. All fuel deliveries are currently on-demand via barge; therefore, it is expected that fuel barge traffic would approximately double during construction.

This alternative would consume an estimated 119,130 cubic yards of construction aggregate—the second-most of any action alternative. Data are not available regarding the amount of construction aggregate that is currently used in Angoon. However, studies conducted for this EIS indicate that the existing rock source is not suitable for all applications of airport and access road construction and is insufficient in quantity (Appendix 4 in Appendix C). For this reason, the vast majority of the aggregate that would be consumed for this alternative would come from a combination of reused materials at the construction site itself, materials from the on-island materials source site, and materials barged in from outside sources. Therefore, consumption of aggregate for this alternative could deplete available sources of such materials for other present and future projects in Angoon. The volume of rock shown in Table ENR1 would be delivered in approximately 45 barge trips. Angoon Oil and Gas does not have barge-fueling facilities; therefore, fuel for the barges would be purchased outside of Angoon.

This alternative would involve construction of a temporary and permanent bridge over Favorite Creek. During construction, 0.6 in-stream acre could be temporarily affected, and 316 square feet of in-stream habitat could be permanently affected (these effects are further discussed in section 4.5.2.3 in Aquatic Habitats and Associated Species). The temporary bridge, which would be in place for up to three seasons, would likely be constructed of wood timbers to support a wooden or steel structure. Neither wood timbers nor steel are available in Angoon, so all material for the temporary bridge would be

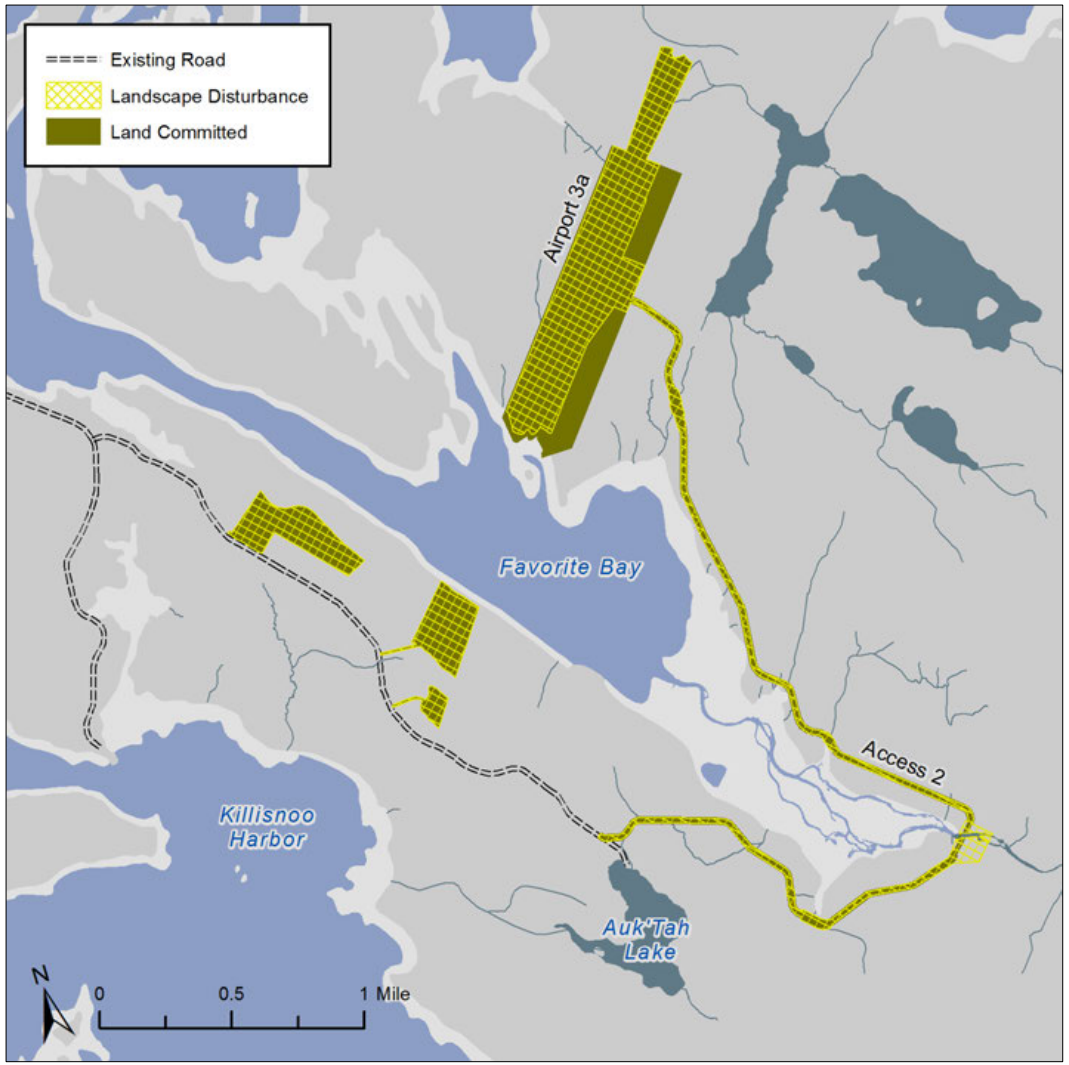


Figure ENR1. Locations of natural resource use for Airport 3a with Access 2.

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barged in for construction. The 650-foot-long permanent bridge over Favorite Creek would likely be constructed of steel and precast concrete. Due to the lack of availability in Angoon, these materials would be barged in for construction; however, some concrete would likely still need to be mixed on-site. Use of Angoon's municipal water source could be required if natural sources of water are not of suitable quality for mixing concrete.

Table ENR1. Estimated direct energy and natural resources consumption for Airport 3a with Access 2

Action alternative	New road (miles)	Land committed (acres)	Landscape disturbance (acres)	Cut and fill (cubic yards)	Construction aggregate (cubic yards)	Water use (Mgal[§])	Fuel use[†] (gallons)
Airport 3a with Access 2	4.4	408	344	471,200 cut; 409,000 fill	119,130	2,000–10,000	500,000 diesel, 20,000 gasoline

Source: DOWL HKM (2013), included as Appendix C, unless otherwise noted.

† Estimated quantities are for construction. Fuel would also be consumed by additional air traffic and additional passenger vehicles traveling to and from the airport, but a specific analysis of fuel use for those categories was not conducted. An estimated 500–1,000 gallons of fuel would be maintained at the airport to fuel the on-site lighting generator.

‡ Thompson and Thompson 2012.

§ Mgal = million gallons.

Water would be obtained by permit from a lake, pond, and/or stream, all of which are plentiful in the area. It is not anticipated that construction water needs for this alternative would substantially deplete available water sources.

During maintenance and operation of the airport and access road, fuel use in Angoon is expected to return to near preconstruction rates. Angoon Oil and Gas does not sell aviation fuel, and no aircraft fueling facilities would be constructed; therefore, all aviation fuel needed for the additional flights would be purchased outside Angoon. Based on the forecasts done for this project, the number of people traveling by air is expected to increase by 0.55% annually, which may result in a proportional increase in vehicles traveling to and from the airport. Readers are referred to section 4.12.3.3.3 of Socioeconomic Conditions for additional information regarding increased traffic estimates. Angoon Oil and Gas has sufficient storage capacity, and on-demand fuel deliveries are not limited; therefore, additional traffic is not anticipated to strain fuel supplies.

Irreversible and irretrievable effects

Construction of this alternative would result in irreversible and irretrievable effects to energy supplies and natural resources. Fuel committed to the project would be burned and not available for any other use. Construction aggregate is also considered to be irreversibly and irretrievably committed to the project. Other than the ***avigation easements***, the land used for the airport and access road would be unavailable for other uses during airport operation.

Terms to know

Avigation easement: A right-of-way tool used in airport planning to grant certain rights to the holder of the easement. For this EIS, avigation easements outside of airport property would provide the Alaska Department of Transportation and Public Facilities the right to access areas to clear them of obstructions and maintain that clearance.

4.10.3.3.3. Airport 3a with Access 3

Airport 3a with Access 3 requires the greatest estimated fuel supply and natural resources consumption of all the alternatives. It has the longest road, largest commitment of land, biggest area of vegetation removal, and the greatest need for construction aggregate. Table ENR2 summarizes the anticipated energy and natural resource consumption for this alternative, and Figure ENR2 illustrates the areas of natural resource and land use.

Fuel consumption for construction equipment for this alternative would be similar to Airport 3a with Access 2, and would approximately double the monthly fuel turnover in Angoon. This would result in a similar doubling of fuel barge traffic in Angoon because existing fuel storage facilities would need more frequently refilling compared to current conditions or the no action alternative. Existing infrastructure and fuel access in Angoon is currently sufficient to meet these needs as well as existing non-construction-related needs, and no new facilities would need to be constructed.

This alternative would consume an estimated 122,748 cubic yards of construction aggregate—the most of any action alternative. As with Airport 3a with Access 2, aggregate consumption is not expected to affect local sources; most or all of it would come from a combination of reused materials at the construction site itself, materials from the on-island materials source site, and materials barged in from outside. The FAA estimates approximately 45 barge trips to transport aggregate materials to Angoon for this alternative. Barge fuel would be purchased outside Angoon.

As with Airport 3a with Access 2, this alternative would

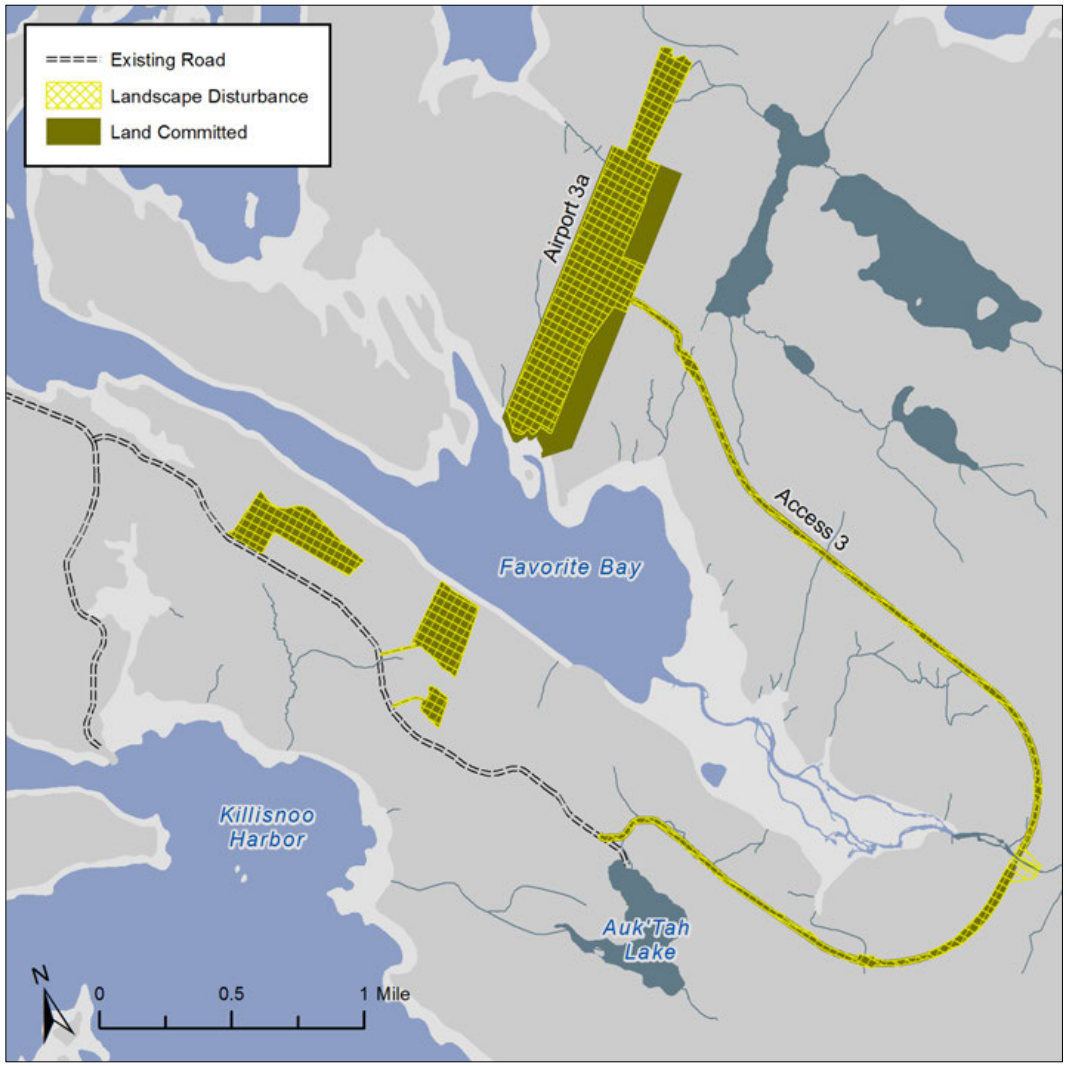

Figure ENR2. Locations of natural resource use for Airport 3a with Access 3.

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involve construction of temporary and permanent bridges over Favorite Creek. During construction, 0.3 in-stream acre could be temporarily affected, but no in-stream habitat would be permanently affected (these effects are further discussed in section 4.5.2.3 in Aquatic Habitats and Associated Species). The temporary bridge, which would be in place for up to three seasons, would likely be constructed of wood timbers that would support a wooden or steel structure (Appendix C:22). At 450 feet long, the permanent steel and precast concrete bridge under this alternative would be shorter than that for Airport 3a with Access 2. Neither wood timbers nor steel are available in Angoon, so any such materials needed for the temporary or permanent bridge would have to be brought in via barge from a non-local source; however, some concrete would likely still need to be mixed on-site. Use of Angoon's municipal water source could be required if natural sources of water are not of suitable quality for mixing concrete.

Table ENR2. Estimated direct energy and natural resource consumption for Airport 3a with Access 3

Action alternative	New road (miles)	Land committed (acres)	Landscape disturbance (acres)	Cut and fill (cubic yards)	Construction aggregate (cubic yards)	Water use (Mgal[§])	Project fuel use[†] (gallons)
Airport 3a with Access 3	4.7	408	349	1,176,500 cut; 379,000 fill	122,748	2,000–10,000	500,000 diesel, 20,000 gasoline

Source: DOWL HKM (2013), included as Appendix C, unless otherwise noted.

† Estimated quantities are for construction. Fuel would also be consumed by additional air traffic and additional passenger vehicles traveling to and from the airport, but a specific analysis of fuel use for those categories was not conducted. An estimated 500–1,000 gallons of fuel would be maintained at the airport to fuel the on-site lighting generator.

§ Mgal = million gallons.

Total water use for dust control and soil compaction is expected to be roughly identical to that which would occur under Airport 3a with Access 2. As with Airport 3a with Access 2, fuel use in Angoon is expected to return to near-preconstruction rates during the operation and maintenance of the completed airport and access road.

Irreversible and irretrievable effects

Construction of this alternative would result in irreversible and irretrievable effects to energy supplies and natural resources. Fuel committed to the project would be burned and not available for any other use. Construction aggregate is considered to be irreversibly and irretrievably committed to the project. Other than the avigation easements, the land used for the airport and access road would be unavailable for other uses during operation and maintenance of the facilities.

4.10.3.3.4. Airport 4 with Access 2

Airport 4 with Access 2 is at the middle range of estimated fuel supply and natural resource consumption compared to other alternatives. It has a shorter road, smaller commitment of land, smaller area of vegetation removal, and less need for construction aggregate than Airport 3a with either access alternative. Table ENR3 summarizes the anticipated energy and natural resource consumption for this alternative, and Figure ENR3 illustrates the areas of natural resource and land use.

As with the Airport 3a alternatives, this alternative is expected to need a maximum 3-season construction duration. However, this alternative falls between the doubling of fuel turnover under the Airport 3a alternatives and the roughly 20,000-gallon monthly turnover under the no action alternative. Existing infrastructure and fuel access in Angoon is sufficient to meet the needs of this alternative and to meet existing non-construction-related needs. No new facilities would need to be constructed.

As with all other action alternatives, consumption of aggregate under this alternative is not expected to affect local sources; most aggregate would come from outside sources. This alternative would consume an estimated 102,430 cubic yards of construction aggregate—the second-least of any action alternative. The FAA estimates approximately 40 barge trips to transport this quantity of aggregate to Angoon (Appendix C:18). This is fewer barge trips than would be needed under the Airport 3a alternatives but more than estimated for Airport 12a. Barge fuel would be purchased outside Angoon.

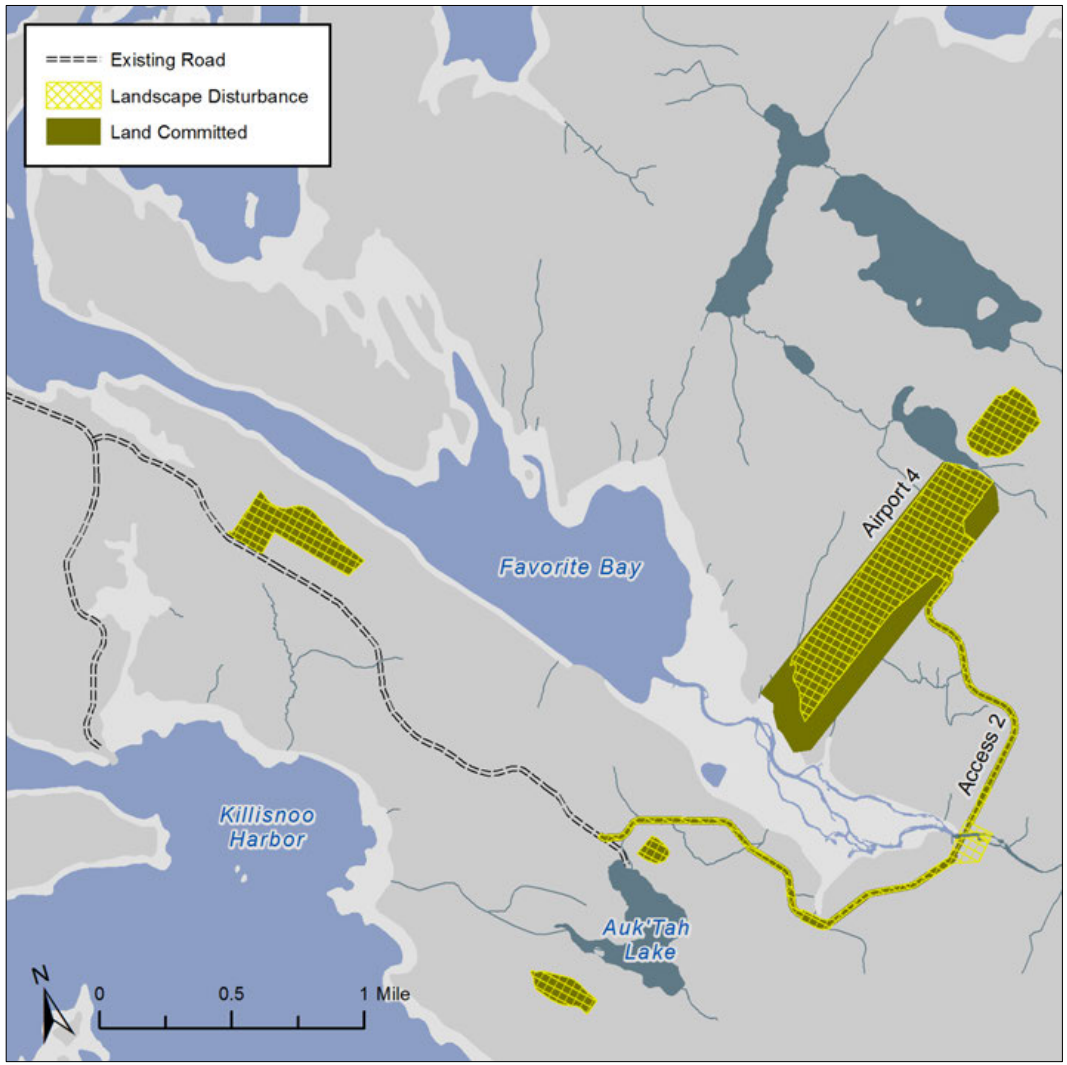

Figure ENR3. Locations of natural resource use for Airport 4 with Access 2.

Timber, steel, and concrete needs for construction of the bridge over Favorite Creek would be the same as those described for Airport 3a with Access 2 because both alternatives would have the same length of bridge and construction sequencing. During construction, 0.6 in-stream acre could be temporarily affected for up to three seasons, and 316 square feet of in-stream habitat could be permanently affected (these effects are further discussed in section 4.5.2.3 in Aquatic Habitats and Associated Species). As with all alternatives that include a bridge over Favorite Creek, the FAA expects that all timber and steel used in construction would be imported from non-local sources; however, some concrete would likely still need to be mixed on-site. Use of Angoon's municipal water source could be required if natural sources of water are not of suitable quality for mixing concrete. Total project water use for dust control and soil compaction is expected to be the same as for the Airport 3a alternatives. This water would be obtained by permit from a lake, pond, or stream, all of which are plentiful in the construction area. It is not anticipated that the construction water needs for this alternative would substantially deplete available water sources.

Table ENR3. Estimated direct energy and natural resource consumption for Airport 4 with Access 2

Action alternative	New road (miles)	Land committed (acres)	Landscape disturbance (acres)	Cut and fill (cubic yards)	Construction aggregate (cubic yards)	Water use (Mgal[§])	Project fuel use[†] (gallons)
Airport 4 with Access 2	2.9	360	290	650,700 cut; 553,400 fill	102,430	2,000–10,000	400,000 diesel, 15,000 gasoline

Source: DOWL HKM (2013), included as Appendix C, unless otherwise noted.

† Estimated quantities are for construction. Fuel would also be consumed by additional air traffic and additional passenger vehicles traveling to and from the airport, but a specific analysis of fuel use for those categories was not conducted. An estimated 500–1,000 gallons of fuel would be maintained at the airport to fuel the on-site lighting generator.

§ Mgal = million gallons.

As with all other action alternatives, fuel use in Angoon is expected to return to near-preconstruction rates after construction of the airport and access road.

Irreversible and irretrievable effects

Construction of this alternative would result in irreversible and irretrievable effects to energy supplies and natural resources. Fuel committed to the project would be burned and not available for any other use. Construction aggregate is considered irreversibly and irretrievably committed to the project. Other than the avigation easements, the land used for the airport and access road would be unavailable for other uses during the operation and maintenance of the facilities.

4.10.3.3.5. Airport 4 with Access 3

Airport 4 with Access 3 is at the middle range of estimated fuel supply and natural resource consumption compared to other alternatives. It has a shorter road, smaller commitment of land, a smaller area of vegetation removal, and less need for construction aggregate than Airport 3a with either access alternative, but it has a longer road than Airport 4 with Access 2. Table ENR4 summarizes the anticipated energy and natural resource consumption for this alternative, and Figure ENR4 illustrates the areas of natural resource and land use.

As with the Airport 3a alternatives and Airport 4 with Access 2, the FAA estimates a maximum 3-season construction duration. Given the quantity and types of construction equipment estimated for this alternative, monthly fuel turnover in Angoon would less than double. As with Airport 4 with Access 2, which would result in a comparable fuel turnover, no new fuel-storage facilities would be required, and all existing and estimated construction fuel needs could be met by the current fuel supply system. Fuel barge traffic would less than double during construction.

Most construction aggregate consumed under this alternative would come from non-local sources, as with all other action alternatives. This alternative would consume an estimated 105,748 cubic yards of construction aggregate —more than Airport 4 with Access 2 and Airport 12a with Access 12a but less than the Airport 3a alternatives. The FAA estimates that up to 40 barge trips would be necessary to transport the aggregate materials consumed under this alternative (Appendix C:18).

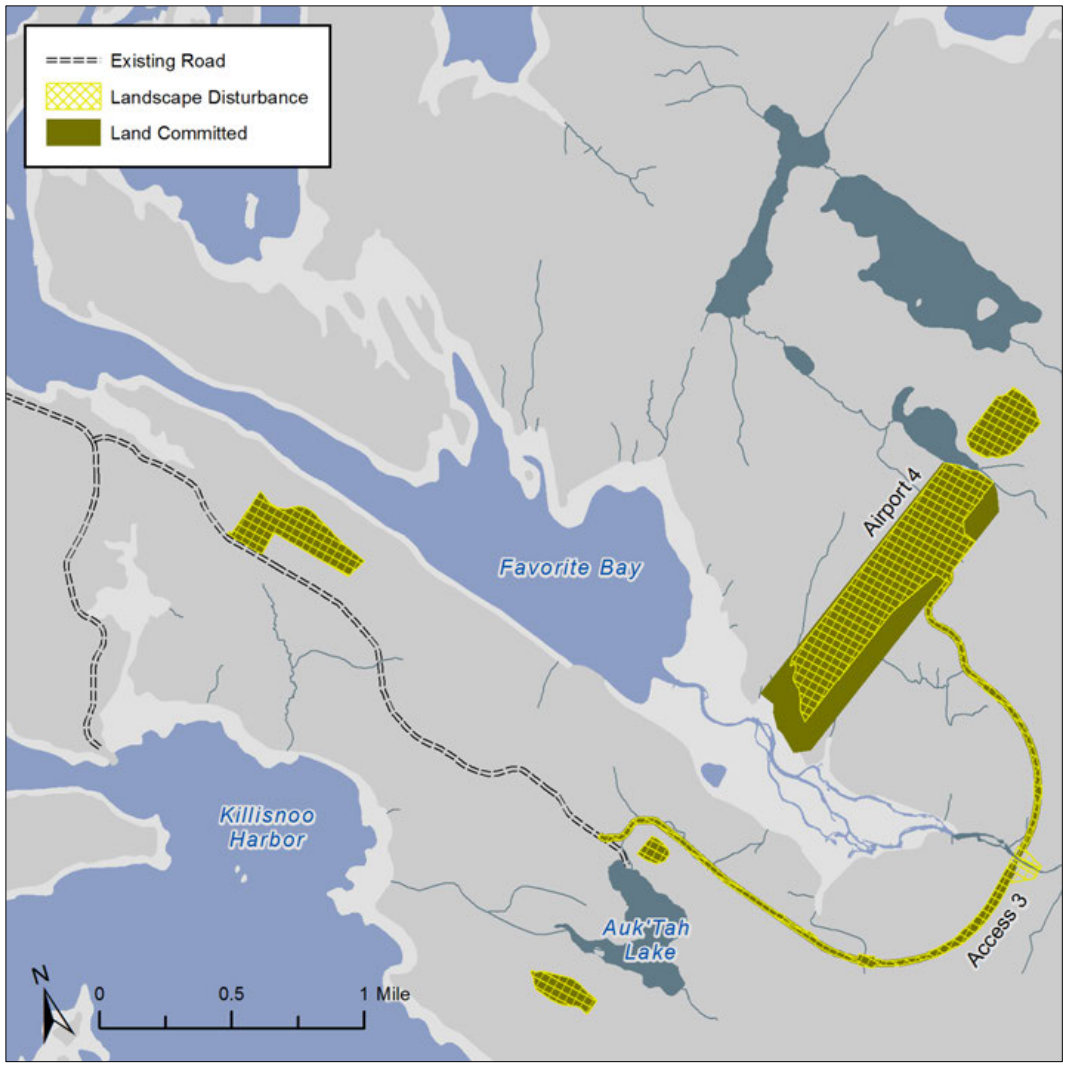

Figure ENR4. Locations of natural resource use for Airport 4 with Access 3.

Timber, steel, and concrete consumption for construction of the bridge over Favorite Creek would be the same as that described for Airport 3a with Access 3 because both alternatives would have a bridge of the same length—450 feet—and both would cross the creek at the same location. Again, a temporary bridge would be built and be in place for up to three seasons to facilitate construction of the permanent bridge. Timber and steel bridge components would be obtained from outside the Angoon area and would therefore not consume any such resources in the local area; however, some concrete would likely still need to be mixed on-site. Use of Angoon's municipal water source could be required if natural sources of water are not of suitable quality for mixing concrete. Total project water use for dust control and soil compaction is expected to be the same as for all Airport 3a and Airport 4 alternatives. It is not anticipated that construction water needs for this alternative would substantially deplete available water sources. As with other action alternatives, fuel use in Angoon is expected to return to near-preconstruction rates following construction of the airport and access road.

Table ENR4. Estimated direct energy and natural resource consumption for Airport 4 with Access 3

Action alternative	New road (miles)	Land committed (acres)	Landscape disturbance (acres)	Cut and fill (cubic yards)	Construction aggregate (cubic yards)	Water use (Mgal[§])	Project fuel use[†] (gallons)
Airport 4 with Access 3	3.2	365	295	1,286,100 cut; 554,600 fill	105,748	2,000–10,000	400,000 diesel, 15,000 gasoline

Source: DOWL HKM (2013), included as Appendix C, unless otherwise noted.

† Estimated quantities are for construction. Fuel would also be consumed by additional air traffic and additional passenger vehicles traveling to and from the airport, but a specific analysis of fuel use for those categories was not conducted. An estimated 500–1,000 gallons of fuel would be maintained at the airport to fuel the on-site lighting generator.

§ Mgal = million gallons.

Irreversible and irretrievable effects

Construction of this alternative would result in irreversible and irretrievable effects to energy supplies and natural resources. Fuel committed to the project would be burned and not available for any other use. Construction aggregate is also considered to be irreversibly and irretrievably committed to the project. Other than the avigation easements, the land used for the airport and access road would be unavailable for other uses during operation and maintenance of the facilities.

4.10.3.3.6. Airport 12a with Access 12a (preferred alternative)

Airport 12a with Access 12a would require the least estimated fuel supply and natural resource consumption compared to all other action alternatives. It has the shortest road, smallest commitment of land, smallest area of vegetation removal, and the least need for construction aggregate. Table ENR5 summarizes the anticipated energy and natural resource consumption for this alternative, and Figure ENR5 illustrates the areas of natural resource and land use.

The FAA estimates a maximum 2-season construction duration for this alternative. Fuel consumption would be lower than all other action alternatives, at approximately 1.6 times the current monthly fuel turnover. As with the other action alternatives, the existing infrastructure and fuel-delivery system are sufficient to store and transport the fuel needed for this alternative. No new facilities would need to be constructed. Fuel barge traffic would increase and would be less than double the current amount during the construction period.

As with all other action alternatives, most construction aggregate consumed under this alternative would come from non-local sources. This alternative would consume an estimated 72,500 cubic yards of construction aggregate—the least of any action alternative. The FAA estimates that up to 30 barge trips would be necessary to transport the aggregate materials consumed under this alternative (Appendix C:18). This is the fewest trips of all action alternatives.

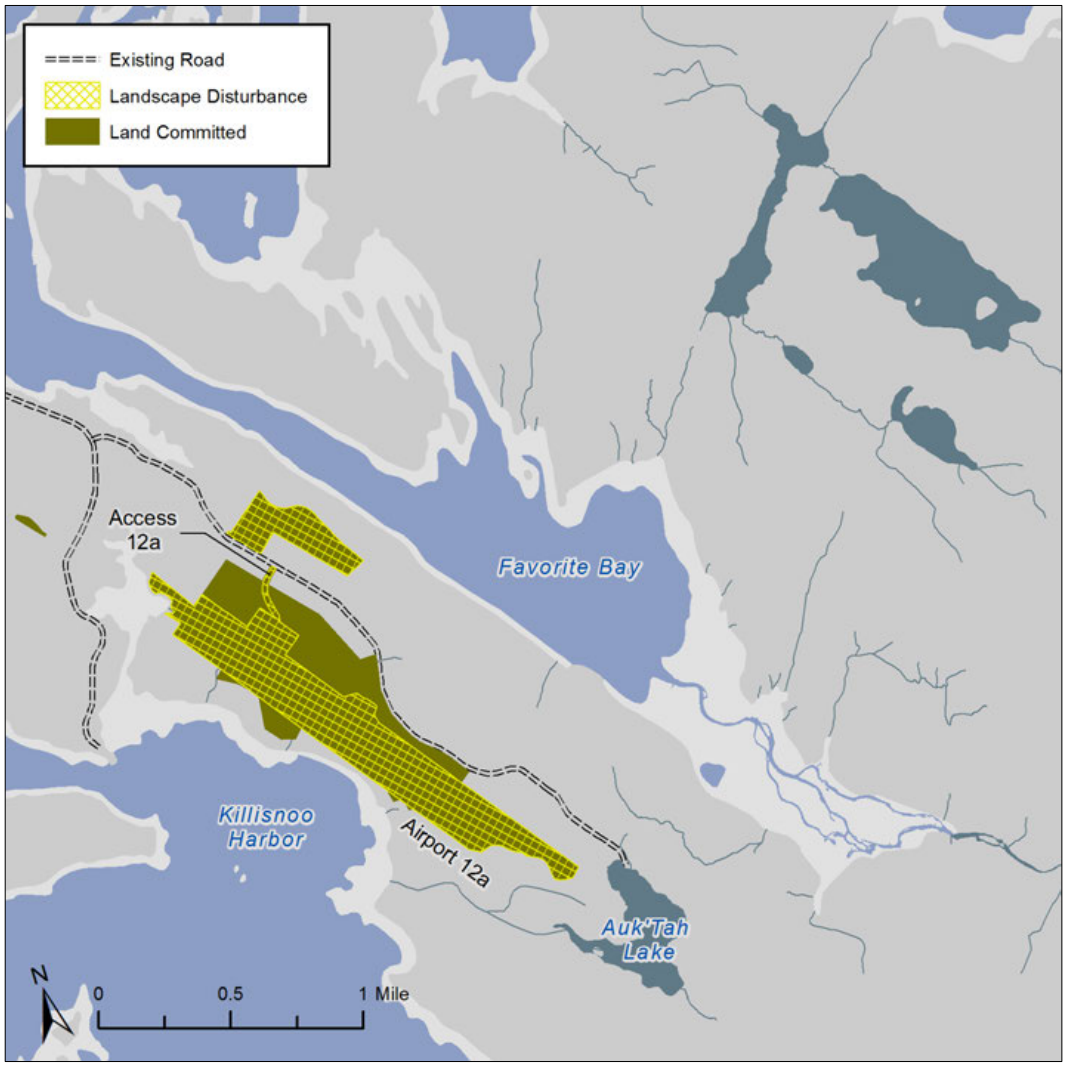

Figure ENR5. Locations of natural resource use for Airport 12a with Access 12a.

Total project water use for dust control and soil compaction is expected to be the same as for all other action alternatives. It is not anticipated that construction water needs for this alternative would substantially deplete available water sources.

Table ENR5. Estimated direct energy and natural resource consumption for Airport 12a with Access 12a

Action alternative	New road (miles)	Land committed (acres)	Landscape disturbance (acres)	Cut and fill (cubic yards)	Construction aggregate (cubic yards)	Water use (Mgal[§])	Project fuel use[†] (gallons)
Airport 12a with Access 12a	0.2	350	258	342,300 cut; 291,700 fill	72,500	2,000–10,000	300,000 diesel, 10,000 gasoline

Source: DOWL HKM (2013), included as Appendix C, unless otherwise noted.

† Estimated quantities are for construction. Fuel would also be consumed by additional air traffic and additional passenger vehicles traveling to and from the airport, but a specific analysis of fuel use for those categories was not conducted. An estimated 500–1,000 gallons of fuel would be maintained at the airport to fuel the on-site lighting generator.

§ Mgal = million gallons.

As with all other action alternatives, fuel use in Angoon is expected to return to near-preconstruction rates following construction of the airport and access road.

Irreversible and irretrievable effects

Construction of this alternative would result in irreversible and irretrievable effects to energy supplies and natural resources. Fuel committed to the project would be burned and not available for any other use. Construction aggregate is also considered to be irreversibly and irretrievably committed to the project. Other than the avigation easements, the land for the airport and access road would be unavailable for other uses during the operation and maintenance of the facilities.

4.10.3.4. How do the effects to energy supplies and natural resources compare?

To enable a comparison of the alternatives regarding consumption of energy supplies and natural resources, the length of new road, area of land committed, and area of vegetation removal, as well as the volumes of cut/fill material, construction aggregate, and fuel use were tallied (Table ENR6). The largest use of fuel supplies and natural resources would occur under Airport 3a with Access 3. The smallest use of fuel supplies and natural resources among the action alternatives would occur under Airport 12a with Access 12a.

Table ENR6. Estimated direct energy and natural resource consumption by alternative

Alternative	New road (miles)	Land committed (acres)	Landscape disturbance (acres)	Cut and fill (cubic yards)	Construction aggregate (cubic yards)	Water use (Mgal[§])	Project fuel use[†] (gallons)
No action	0	0	0	0 cut, 0 fill	0	0	20,000 diesel and gasoline / month[‡] (existing usage)
Airport 3a with Access 2	4.4	408	344	471,200 cut; 409,000 fill	119,130	2,000–10,000	500,000 diesel, 20,000 gasoline
Airport 3a with Access 3	4.7	408	349	1,176,500 cut; 379,000 fill	122,748	2,000–10,000	500,000 diesel, 20,000 gasoline
Airport 4 with Access 2	2.9	360	290	650,700 cut; 553,400 fill	102,430	2,000–10,000	400,000 diesel, 15,000 gasoline
Airport 4 with Access 3	3.2	365	295	1,286,100 cut; 554,600 fill	105,748	2,000–10,000	400,000 diesel, 15,000 gasoline
Airport 12a with Access 12a	0.2	350	258	342,300 cut; 291,700 fill	72,500	2,000–10,000	300,000 diesel, 10,000 gasoline

Source: DOWL HKM (2013), included as Appendix C, unless otherwise noted.

† Estimated quantities are for construction. Fuel would also be consumed by additional air traffic and additional passenger vehicles traveling to and from the airport, but a specific analysis of fuel use for those categories was not conducted. An estimated 500–1,000 gallons of fuel would be maintained at the airport to fuel the on-site lighting generator.

‡ Thompson and Thompson 2012.

§ Mgal = million gallons.

4.10.3.5. Would any of the alternatives have a significant effect on energy supplies and natural resources?

Given the FAA threshold for effects to energy supplies and natural resources, none of the alternatives is expected to have significant effects. None would create demands for energy and natural resources that would exceed available or future natural resources or energy supplies in the Angoon area. The materials that would be barged in for this project are in sufficient supply in other locations in Southeast Alaska (see section 3.4.2.2.2 in Chapter 3: Alternatives for further description of the potential materials source site).

4.10.3.6. How could the effects be avoided, minimized, or mitigated?

Because no significant effects are anticipated for energy supplies and natural resources, no additional mitigation measures beyond those discussed in Chapter 7: Mitigation would be implemented under any action alternative. Chapter 7 describes best management practices that would be implemented during construction. Best management practices are relatively common activities in construction, and are intended to prevent pollution, minimize environmental harm, and assure that appropriate response action is taken if unacceptable environmental effects occur. Through the use of these best management practices, effects are reduced during construction. The best management practices described in Chapter 7 were considered during effects analysis for this resource.

4.10.3.7. How would sustainable design be incorporated into project design?

Sustainable design would be incorporated during final design of the airport. All action alternatives would use non-reinforced asphalt for paving, eliminating the need for additional materials such as rebar. All alternatives would also use natural sources of water for dust control and soil compaction rather than diverting potable water for this purpose. Alternatives that require a bridge over Favorite Creek would use precast components, reducing the need for water and on-site concrete mixing. All alternatives would reuse suitable cut as fill to minimize barge trips. The actual alignment of the access road would be adjusted during final design and all efforts would be made to minimize the excess cut.

4.11. Noise

This section identifies noise-sensitive areas and describes existing noise conditions in the area of the airport and access road alternatives. It also addresses potential changes to current noise levels from construction and operation of the proposed land-based airport. This section does not address noise effects to wilderness and other land uses in the Angoon area. See section 4.16 Wilderness Character and section 4.3 Compatible Land Use for information on those effects.

What is discussed in this section?

4.11.1. Background information

4.11.1.1. What do the terms “noise,” “sound,” and “noise-sensitive areas” mean?

“Noise” is sound that is perceived as unpleasant, annoying, and unwanted. “Sound” is a form of energy produced when an action causes air molecules to vibrate and produce pressure waves. These pressure waves are detected by the human ear and then interpreted by the brain. Noise and sound are measured in units known as decibels (dB).

A wide range of sounds can be considered noise. For example, the sound of dogs barking, construction equipment operating nearby, airplanes flying overhead, and loud music can be considered noise if the listener finds it unpleasant, annoying, and unwanted.

A “noise-sensitive area” is an area where noise could interfere with normal human activities and could affect human health or behavior. Typical noise-sensitive areas include residences, schools, health or medical facilities, religious properties, parks, recreational areas (especially designated wilderness areas), wildlife refuges, and certain cultural and historical sites.

For this environmental impact statement (EIS), the term “noise” is used. This is because changes in noise—not changes in pure sound—are the effects of concern.

4.11.2. Existing conditions

What is discussed in this section?

4.11.2.1. How did the FAA determine which noise-sensitive areas could be affected, and their existing sound levels?

4.11.2.2. What are noise levels like at noise-sensitive areas in and around Angoon, and what are the sources?

The information in this section is summarized from the *Noise Analysis for Angoon Airport Environmental Impact Statement Angoon, Alaska* (BridgeNet International 2013b), which is included as Appendix G, and from other sources cited in the text.

For the purposes of noise analysis, the operations occurring at the Angoon Seaplane Base in 2011 are used as the measure of existing conditions (defined in this EIS as operations at the seaplane base in 2011, which would "…remain consistent between 2011 and 2019" [Appendix G:11], when the land-based airport would open). Based on the 2011 operations, existing conditions for 2011–2019 are 1,150 flights at the seaplane base for an average of three flights per day over the year. All operations are by small, single-engine aircraft such as the de Havilland Beaver and Cessna 182 (see Figure NO1 for an example). Additionally, radar data indicate that on an average day there are approximately 10 flights over the area, most of which are Boeing 737-400 aircraft flying at altitudes of at least 30,000 feet above sea level generally between Juneau or Anchorage (Appendix G).

4.11.2.1. How did the FAA determine which noise-sensitive areas could be affected, and their existing noise levels?

Noise-sensitive areas that could be affected by the proposed land-based airport were identified based on Federal Aviation Administration (FAA) guidance (14 Code of Federal Regulations [CFR] 150) and local land use information. Identified areas are shown in Figure NO2 and include the following:

- Two schools
- Four churches
- The Angoon medical clinic
- The Angoon Senior Center
- The Angoon Community Center
- Three clan houses
- Three lodges and one bed and breakfast
- Residential areas, including existing homes and subdivisions planned for future residential use
- Portions of the Kootznoowoo Corridor Lands
- Portions of the Admiralty Island National Monument and Kootznoowoo Wilderness Area (the Monument–Wilderness Area)

Figure NO1. The de Havilland Beaver is the typical type of plane that uses the Angoon Seaplane Base.

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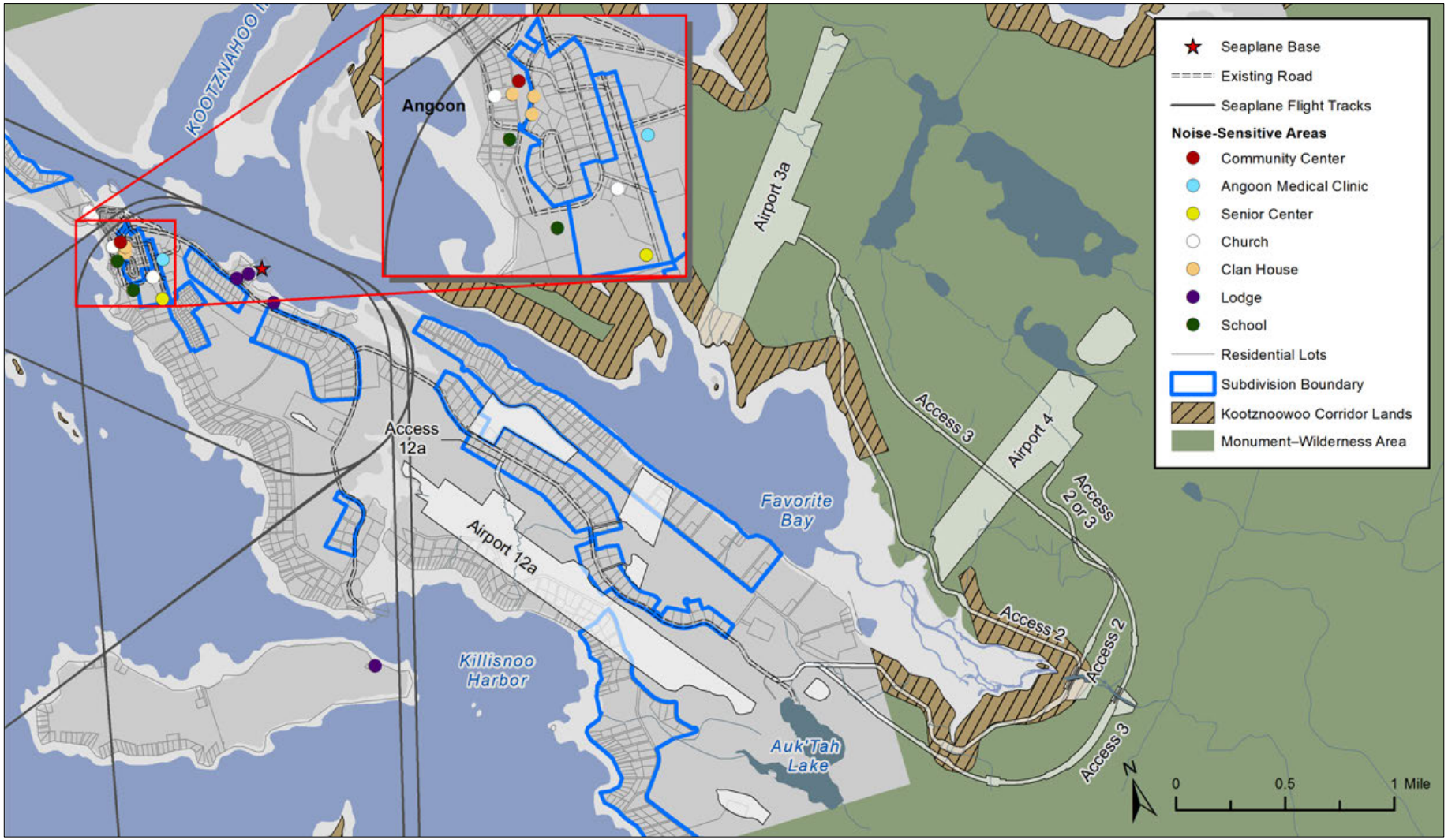


Figure NO2. Noise-sensitive areas in and around Angoon and existing seaplane flight tracks.

Noise can adversely affect known or assumed historic properties by disrupting human use of the sites for the purposes that make them eligible for the National Register of Historic Places. However, there are no known or assumed historic properties located in the noise area of potential effects (APE) (see section 4.8.3.1.2 in Cultural Resources for more on how the FAA identified the noise APE). Therefore, cultural resources are not carried forward as a noise-sensitive resource in this section.

A detailed noise analysis is not required by the FAA for proposed airport actions where no significant noise effects are expected, such as at the proposed Angoon Airport. However, because increases in noise over the Monument–Wilderness Area are possible, the FAA has chosen to provide a more detailed analysis for disclosure purposes in this EIS.

To describe existing noise conditions for all noise-sensitive areas that would be affected by existing seaplane or future land-based aircraft ***flight tracks***, analysis was conducted in two parts—an FAA-required analysis of day-night average sound levels, known as DNL (see section 4.11.2.1.1), and a supplemental analysis using ***grid points*** (see Figure NO3 and section 4.11.2.1.2).

For both the required DNL noise contours and the supplemental grid point analysis, changes in sound level during airport operations were determined by running Integrated Noise Model (INM) Version 7.0b, a computer program that the FAA requires for assessing possible noise effects caused by aviation activity. Using a database of aircraft performance and engine noise characteristics, the INM generated and plotted DNL noise contours based on airport operational information, such as the number of flights and weather conditions. The INM was also used to generate the supplemental grid point analysis. Additional discussion of the noise ***modeling*** methodology is provided in Appendix G.

Terms to know

Flight tracks: Routes aircraft follow when approaching or leaving a runway.

Grid point: Used here, a grid point is a specific location established at predetermined intervals of 1 nautical mile (see definition below). This spacing of the points results in a geometric pattern known as a grid.

Modeling: Used here, modeling means using a computer and known information to generate additional data that cannot be directly gathered.

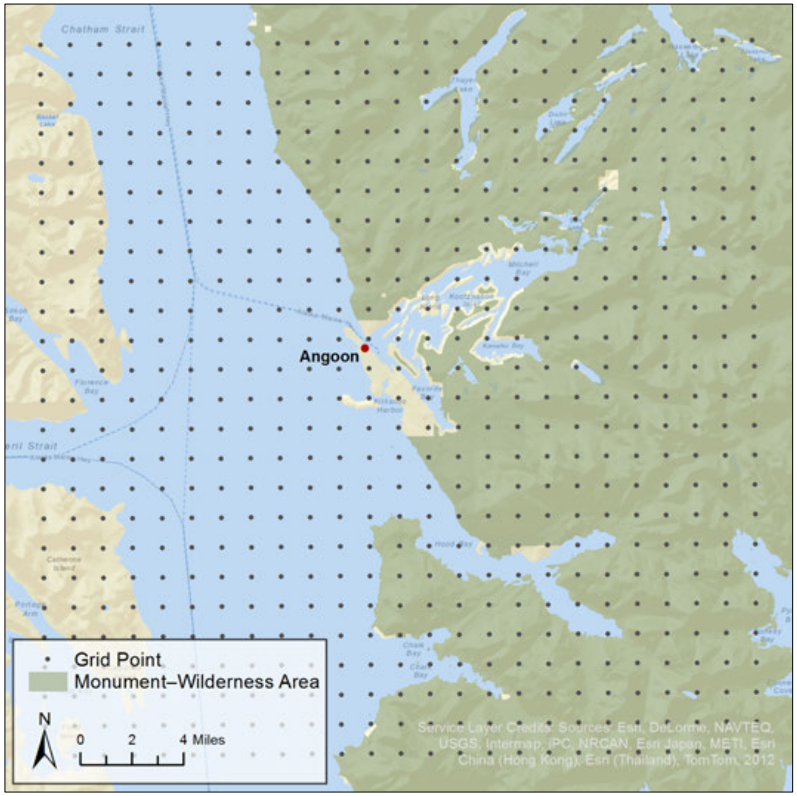


Figure NO3. The grid used in the supplemental grid point analysis.

Both types of analysis are based on an FAA-approved protocol (Appendix G) developed in coordination with the U.S. Forest Service and in accordance with the *FAA Guidance on Procedures for Evaluating the Potential Noise Impacts of Airport Improvement Projects on National Parks and Other Sensitive Park Environments* (FAA 2007c).

4.11.2.1.1. FAA-required DNL analysis

FAA Orders 1050.1E, Chg 1 (*Policies and Procedures for Considering Environmental Impacts* [FAA 2006a]) and 5050.4B (*National Environmental Policy Act [NEPA] Implementing Instructions for Airport Actions* [FAA 2006b]) establish day-night average sound levels (DNL) as the primary ***metric*** for evaluating noise for environmental analysis related to airports.

The DNL metric uses units of measure known as ***A-weighted decibels (dBA)*** to describe the average sound level experienced during an entire 24-hour day. This metric includes a penalty for nighttime operations: Noise occurring between the hours of 10:00 p.m. and 7:00 a.m. is increased by an additional 10 dBA to account for higher sensitivity to noise heard at night.

For the FAA-required DNL analysis, DNL values are reported as noise contours (see the blue sidebar at right). The DNL metric is also used in the supplemental grid point analysis described in section 4.11.2.1.2.

The DNL noise contour analysis to determine existing conditions consists of the following steps:

- Identify the DNL 65 dBA noise contour through modeling (see section 4.11.2.1 for a description of the model used and the sidebar titled "Understanding the FAA's approach to noise contours").
- Measure in acres the area that is within the DNL 65 dBA contour (as a result of aviation noise from the seaplane base).
- Evaluate the number and location of noise-sensitive areas within the DNL noise contour.

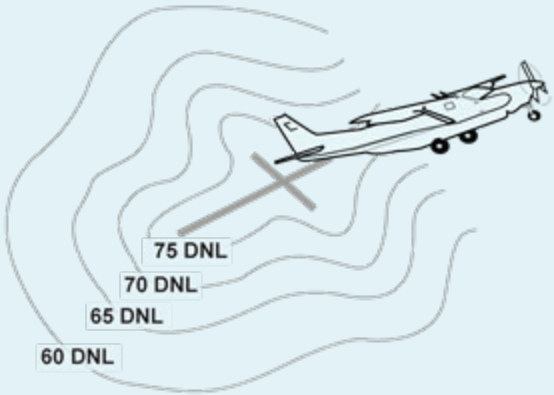
Terms to know

A-weighted decibel (dBA): An adjusted unit of measure for noise within the range that humans hear.

Metric: Used here, an indicator of noise level or duration.

Understanding noise contours

Noise can be depicted as a contour line around a noise source. Contours are created by connecting points of equal value, usually in 5-dBA increments. The change in noise level occurs gradually across these contours.



4.11.2.1.2. Supplemental grid point analysis

Although DNL noise contours are considered the primary way of describing aircraft noise exposure, FAA Orders 1050.1E and 5050.4B do permit use of supplemental noise analyses to provide a more complete description of noise effects when warranted. In this EIS, supplemental analysis is warranted because the results of the FAA-required DNL noise contour analysis cover a small area and do not provide information for most of the Monument–Wilderness Area. Per Orders 1050.1E and 5050.4B, the FAA is not required to provide this detailed level of noise analysis, but has chosen to do so in this EIS for disclosure purposes.

The supplemental grid point analysis uses the following four metrics:

- DNL: In this analysis, day-night average sound levels are modeled for individual grid point locations (see the explanation of grid points immediately following these bullets).
- Equivalent noise level (Leq): This metric is similar to DNL, but no nighttime noise penalty is assessed. The Leq is the average noise level measured in dBA within a set time period, which can range from minutes or hours to days or weeks. In this EIS, Leq is assessed as a 24-hour period to be consistent with DNL.
- Maximum sound level (Lmax): The loudest noise level (measured in dBA) reached during a single noise event. For example, the closer the aircraft gets, the louder it becomes until the aircraft is directly overhead. This point of maximum noise is Lmax.
- Time above ***ambient*** (TAA): The total time in minutes that aircraft noise exceeds existing ambient noise levels in a 24-hour period.

Supplemental analysis used 2011 operations at the Angoon Seaplane Base as the baseline of existing conditions (just as the FAA-required DNL analysis did). The values for each metric were modeled at predetermined locations—the grid points—spaced at 1 ***nautical mile*** apart along a grid extending 16 nautical miles east–west and 20 nautical miles north–south (see Figure NO3). This EIS uses this type of grid point analysis because it has been used successfully for previous airport projects across the United States.

Understanding the FAA's approach to noise contours

Per FAA Order 1050.1E, a noise analysis should generate noise contours at DNL 65 dBA, DNL 70 dBA, and DNL 75 dBA because these contours represent thresholds at which noise levels could interfere with human activities and make the area incompatible with airport operation.

Generally speaking, most noise-sensitive areas are incompatible with noise levels above DNL 65 dBA. However, some land uses—such as commercial or transportation uses—are compatible up to higher noise levels. (This threshold of incompatibility is described in more detail in section 4.3.)

In this EIS, no estimated DNL values reached 70 dBA or greater. Therefore, only findings for the DNL 65 dBA contour are reported.

Terms to know

Ambient: A term describing the background noise level at a given location. For this EIS, the noise level that is considered ambient is 27 dBA.

Nautical mile: A unit of length equal to 1.9 kilometers, or about 6,076 feet.

The supplemental analysis maps used in this section have been modified from the noise analysis report to permit easier viewing and interpretation. Specifically, instead of showing only the values at the grid points, the values between grid points were ***interpolated*** and are shown as well, to provide a gradation of noise values across the entire assessed area. See the noise analysis report (Appendix G) for original grid point maps.

Terms to know

Interpolate: To estimate missing values between two known values.

For the supplemental grid point metrics, this EIS reports cumulative values, which means each value includes noise from flights arriving and departing the Angoon area as well as those simply flying over Angoon en route to other areas. Cumulative values are considered the truest representation of existing and future noise conditions in the Angoon area. This applies to the values reported for existing conditions as well as for anticipated project effects (section 4.11.3). See the noise analysis report (Appendix G) for non-cumulative findings.

4.11.2.2. What are noise levels like at noise-sensitive areas in and around Angoon, and what are the sources?

Angoon and the surrounding area are considered quiet, with ambient (background) noise levels at 27 dBA, the equivalent to rustling leaves in an outdoor setting (Appendix G). Based on monitors set up in Angoon to measure existing noise levels, the loudest daily noise source in Angoon is that generated by the existing aviation service to the Angoon Seaplane Base, although roadway traffic and other human activity also contribute to noise levels to a lesser degree. Periodic seaplane noise from the Angoon Seaplane Base and other aircraft flights overhead—for example high-altitude commercial jets and lower-altitude regional jets and propeller airplanes—can also be heard in the Monument–Wilderness Area; aircraft are permitted to fly above the Monument–Wilderness Area.

4.11.2.2.1. Existing DNL conditions

As a result of seaplane takeoffs and landings at the Angoon Seaplane Base in 2011, an area measuring approximately 1.3 acres were exposed to sound levels of DNL 65 dBA or greater. Because 2011 was a typical year for aircraft operations, this EIS assumes that the size and location of the areas exposed to these noise levels are representative of current conditions in Angoon. As illustrated in Figure NO4, no noise-sensitive areas are located within the DNL 65 dBA area because this area is limited to the seaplane takeoff and landing areas, which are located on water. Aircraft typically arrive from the northwest over the channel of Favorite Bay and depart over the same area in what are called "contra-flow" operations, in which aircraft land and depart in the same direction.

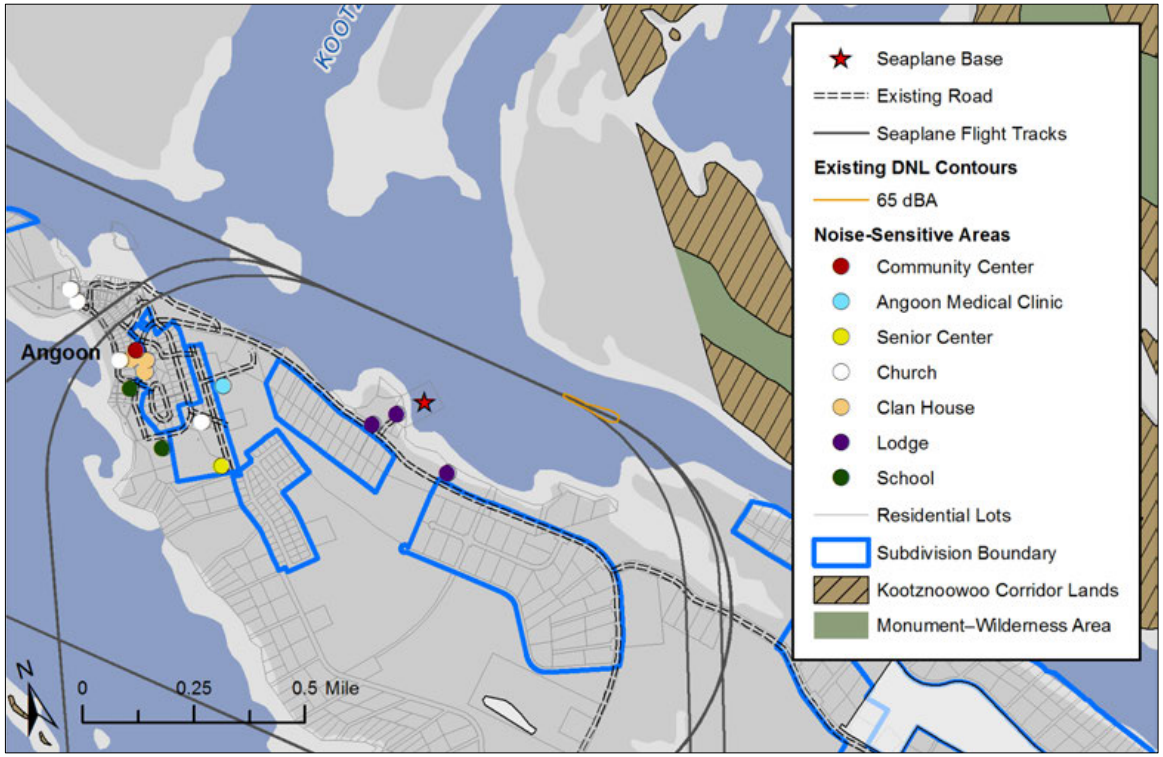


Figure NO4. Noise contours for the Angoon Seaplane Base. These contours are over water only and are localized, indicating that noise louder than DNL 65 dBA occurs in a small area and affects no noise-sensitive areas.

4.11.2.2.2. Supplemental grid point analysis

The cumulative values modeled for each metric under the supplemental grid point analysis are reported in Figure NO6.

DNL and Leq (equivalent noise level) metrics are similar to the FAA-required DNL contours in that grid points with average daily noise levels above ambient conditions, ranging from 27.1 to 41.0 dBA, are concentrated along the seaplane landing area and flight tracks over the Favorite Bay channel. Other flight tracks do not receive enough seaplane traffic to cause average daily noise levels to rise above ambient conditions.

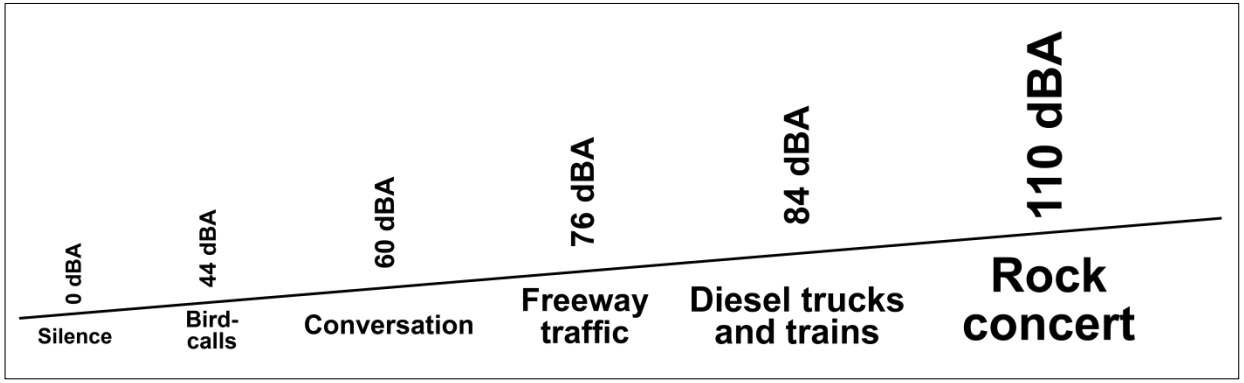


Figure NO5. Examples in the spectrum of noise levels.

The Lmax (maximum sound level) metric shows that the loudest noise generated by aircraft occurs closest to the Angoon Seaplane Base. (The aircraft used to determine Lmax is the Cessna 206, the loudest aircraft currently operating at the Angoon Seaplane Base or flying over the area.) In areas to the east and north, the Lmax values decrease to below 60 dBA within 2 to 3 miles. To the west and south, the Lmax values remain at 60 to 70 dBA for approximately 4 to 10 miles. The differences in the distance over which noise continues at a certain level are due to differences in flight track use, terrain (for example, hilly versus flat), and the amount of vegetation present (for example, open water versus dense spruce forest). To put noise levels between 60 and 70 dBA in context, they are roughly equivalent to the noise of vehicle traffic traveling at highway speed (Figure NO5).

The TAA (time above ambient) metric shows that most of the area north and east of the Angoon Seaplane Base is exposed to more than 20 minutes per day of cumulative aircraft noise above 27 dBA; in areas to the west and south, the TAA range is typically between 6.0 and 19.9 minutes per day above ambient noise levels.

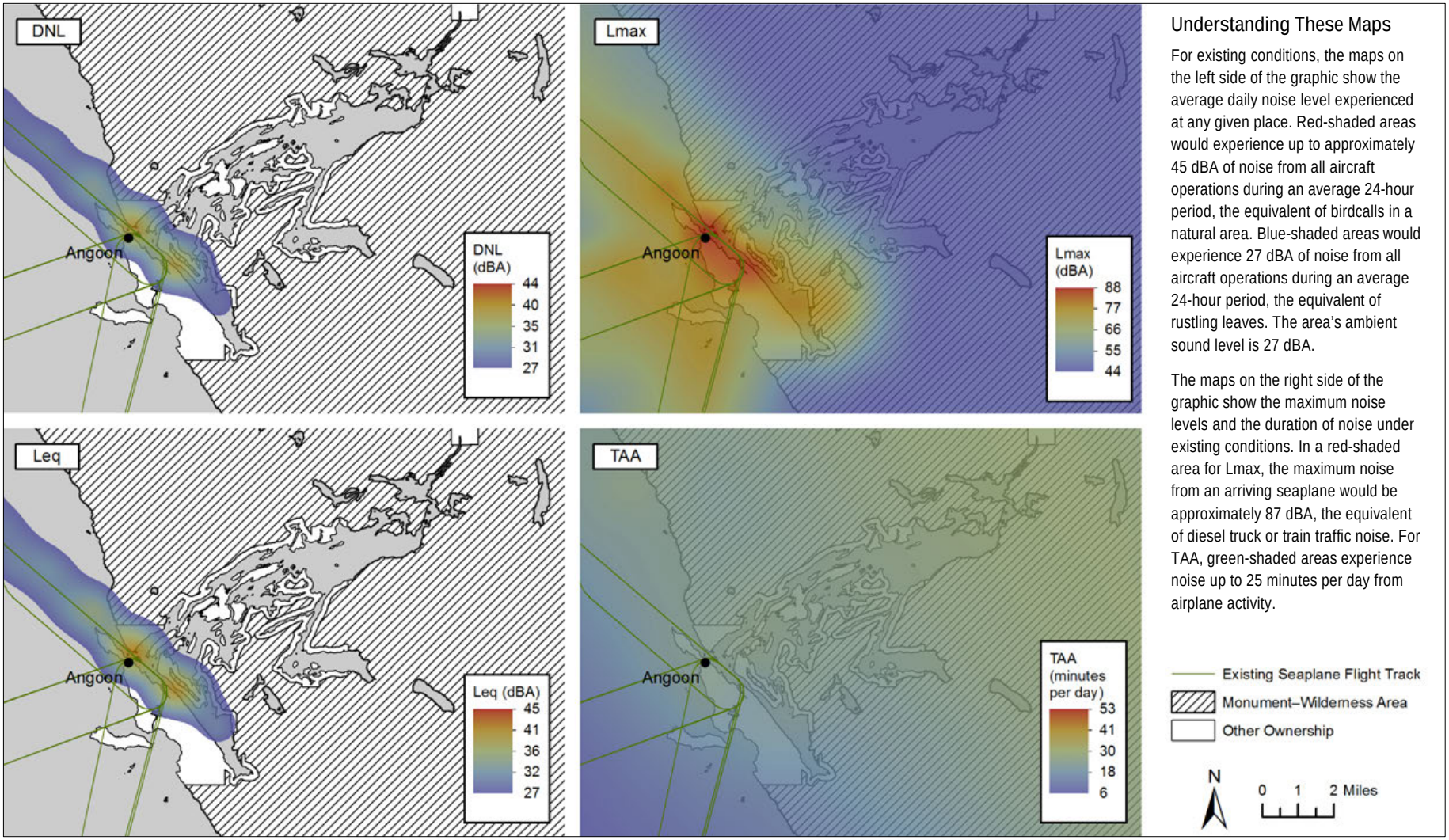


Figure NO6. Supplemental noise metrics and values for existing conditions.

4.11.3. Project effects

For each of the action alternatives, construction and operation of an airport and access road would affect noise levels around Angoon. Although the source of the effects would be the same for each action alternative, the magnitude and extent of effects would differ. The sections below describe the actions causing the effects and the effects themselves; the methods for evaluating effects; and the similarities and differences in the magnitude and extent of effects between the alternatives.

4.11.3.1. How did the FAA determine the effects of the alternatives on noise levels?

Operation of a new land-based airport at Angoon would change the type and number of aircraft arriving and departing the area, and would create a new runway location in addition to the seaplane base. It would also reduce seaplane base operations by about 75% (Appendix G). These actions would generate a long-term change in the location, frequency, and magnitude of aviation-based daytime noise, as well as add limited, new nighttime noise associated with flight takeoffs and landings. Construction activities—removing vegetation; grading and recontouring the ground surface; paving runways and roads; potentially extracting construction materials such as gravel, soil, and rock from an on-island materials source via blasting; and constructing a bridge across Favorite Creek—would also generate temporary increases in noise levels due to the operation of equipment and vehicles, blasting activity, and bridge construction.

As described in section 4.11.2.1.1, FAA Orders 1050.1E and 5050.4B provide guidance on how aviation-based noise must be addressed for airport projects, and also allows for supplemental analysis, as warranted. According to these FAA orders, aircraft noise is typically evaluated for its probable effect on human activities at noise-sensitive locations, and includes an assessment

What is discussed in this section?

Terms to know

Future conditions: FAA orders require that the DNL analysis consider future project noise effects both without an airport (discussed in this EIS as the no action alternative or existing conditions) and with an airport for two timeframes: on opening day and 5–10 years after opening. Because forecasted operations for the seaplane base would "remain consistent between 2011 and 2019" [Appendix G:11], future conditions without an airport were assumed to be the same as existing conditions in 2011.

For this EIS, future aviation noise effects with an airport were estimated for the years 2019 (the time of opening) and 2024 (5 years after opening). Between 2019 and 2024, the airport is forecasted to experience a 4% increase in aviation traffic. However, this increase would not result in an appreciable change in noise exposure; therefore, a separate analysis for 2024 was not conducted. For ease of reporting, this EIS uses the term "future conditions with an airport" to report findings applicable to both time periods.

of the change in noise exposure (measured by DNL) between future conditions with and without an airport. Project effects on future conditions were determined using the same two-part analysis used for existing conditions: FAA-required DNL analysis and supplemental grid point analysis.

4.11.3.1.1. FAA-required DNL analysis

The DNL (day-night average sound levels) contour analysis that was used to determine future conditions at each airport alternative consisted of the following steps:

- Identify the DNL 65 dBA noise contour through modeling (see section 4.11.2.1 for a description of the model used).
- Measure in acres the area that would be within the DNL 65 dBA contour.
- Evaluate the number and location of noise-sensitive areas within this DNL contour.
- Assess whether noise-sensitive areas that fall within the DNL 65 dBA contour would experience a noise increase of at least 1.5 dBA (see the blue sidebar at right).

Why does the FAA evaluate the change in noise exposure?

The FAA evaluates the change in noise exposure because this noise level change may be immediately noticed (and potentially perceived as annoying) by residents upon commencement of the proposed land-based airport. These noise changes may be noticed over the long term as well, although residents may become more habituated to noise levels over time.

FAA Order 1050.1E establishes specific increments for significant changes in noise exposure for DNL analysis and reporting (see bullets at left and section 4.11.3.2). These increases are based on previous research and findings correlating DNL to community annoyance levels.

4.11.3.1.2. Supplemental grid point analysis

FAA Order 1050.1E states that supplemental noise metrics can be used "to describe aircraft noise impacts for specific noise-sensitive locations or situations and to assist in the public's understanding of the noise impact" (FAA 2006a:A-64). As introduced in section 4.11.2.1.2, this EIS uses the following additional metrics (metric definitions are repeated below and later in this section to help remind the reader of each metric's purpose):

- DNL, which describes average daily sound levels, including a penalty for nighttime noise
- Leq, which describes average daily noise levels without a nighttime penalty
- Lmax, which describes maximum sound level
- TAA, which describes the time aircraft noise exceeds ambient conditions

These supplemental metrics provide a more complete picture of the magnitude and extent of noise changes that people could experience across the area. Per the noise analysis protocol (Appendix G) approved by the FAA and U.S. Forest Service, this EIS reports the following types of changes:

- A 5-dBA or greater change in cumulative noise exposure for DNL and Leq
- A 3-dBA or greater change in cumulative noise exposure using Lmax
- Any change in TAA compared to existing noise duration

Because FAA orders do not provide guidelines for these metrics, these change increments were established in the FAA-approved noise protocol developed for this EIS (Appendix G) and were selected to represent changes in noise conditions that would be noticeable by residents and land users.

The duration, location, and magnitude of construction-based noise is discussed based on the timing and type of construction equipment, assuming up to 55 construction vehicles and machinery operating for two to three seasons.

4.11.3.2. How did the FAA determine the significance of the anticipated effects from the alternatives?

FAA Order 1050.1E states that a "significant noise impact would occur if analysis shows that the proposed action will cause noise-sensitive areas to experience an increase in noise of DNL 1.5 dBA or more at or above DNL 65 dBA noise exposure when compared to the no action alternative for the same timeframe" (FAA 2006a:A-61).

For this proposed project, this means that an action alternative would have a significant effect if it would cause the sound levels at noise-sensitive areas exposed to DNL 65 dBA or higher to increase by at least DNL 1.5 dBA.

The FAA established 65 dBA as the threshold for significance because, based on previous studies, this decibel level represents a point at which a significant portion of a local community may perceive airport noise to be intrusive or annoying.

However, FAA Order 1050.1E notes that this significance threshold may not be adequate to address noise effects to particular noise-sensitive areas such as national wildlife refuges and historic sites. This includes noise effects in the Monument–Wilderness Area, which requires special consideration because it is managed for certain qualities and purposes, including quiet enjoyment. For such an area, the threshold at which sound is considered noise may be lower

than the DNL 65 dBA that is considered the typical threshold for other noise-sensitive areas. Supplemental metrics are provided in this section to summarize noise exposure changes that would occur in the Monument–Wilderness Area. See section 4.16.3 for a discussion of noise effects to wilderness qualities.

4.11.3.3. How would each alternative affect noise levels?

4.11.3.3.1. FAA-required DNL analysis

Under future conditions, the no action alternative (in other words, not building an airport) would be the same as existing conditions. The FAA's analysis indicates that, even without a land-based airport, little if any increase in operations at the Angoon Seaplane Base is likely. Therefore, no increase in aviation noise levels in the Angoon area would occur compared to existing conditions (Appendix G). DNL contours for future conditions would not change from existing conditions and would stay over the water in the area used for seaplane takeoffs and landings (see Table NO1 and Figure NO7). As is currently the case, no noise-sensitive areas would be affected by the future noise conditions under the no action alternative.

Table NO1. Future conditions DNL noise contours

Alternative	Acres in DNL 65 dBA contour
Existing conditions	1.3
Seaplane base, reduced operations (all action alternatives)	0.3
Airport 3a	3.7
Airport 4	2.6
Airport12a	3.7

Under future conditions for any of the action alternatives, the operation of a land-based airport means operations at the seaplane base would decrease. The FAA anticipates a decrease in seaplane activity from approximately 1,150 annual operations (as was the case in 2011) to 300 operations per year due to the travel benefits afforded by wheeled aircraft using a land-based airport compared to seaplanes. This would decrease the number of acres exposed to average daily sound levels of DNL 65 dBA or greater from seaplane activity, because with fewer operations there would be less total noise throughout the day (see Table NO1). However, the locations exposed to seaplane noise would remain more or less the same as they are today—over the landing and takeoff area in the water—and no residences or other noise-sensitive areas would be affected (Figure NO7).

Under future conditions, any of the Airport 3a or Airport 4 alternatives would generate new DNL 65 dBA noise contours at the location of the airport runway; these locations would be located on Monument–Wilderness Area (Figure NO7). The DNL 65 dBA noise contour for each of the three airport alternatives would be essentially the same size because operations at any of the alternatives would be the same. The slight variability in contour size (see Table NO1) between the alternatives is due to the location and topography of each site. The proposed land-based airport is forecast to accommodate approximately 3,704 annual aircraft operations upon commencement, for an average of four or five aircrafts arriving and departing each day.

No noise-sensitive areas would be affected by sound levels at or above DNL 65 dBA for Airport 12a. Commercial lands within the DNL 65 dBA noise contour are not considered noise-sensitive. Residential lots within the DNL 65 dBA noise contour would be acquired as part of airport and access road construction and converted to transportation use; therefore, they would no longer be considered noise sensitive. For Airports 3a and 4, approximately 3 to 4 acres of Monument–Wilderness Area would be exposed to sound levels at or above DNL 65 dBA. Although wilderness areas are generally considered to be noise sensitive, affected Monument–Wilderness Area lands would fall within the airport property, which, through the ANILCA process, would become a transportation system and therefore not noise sensitive. This does not mean there are no noise effects to wilderness qualities outside the airport property. Those effects are discussed throughout section 4.16.3 of Wilderness Character.

Figure NO7. The noise contour for each land-based airport alternative indicates that noise louder than DNL 65 dBA would not extend beyond the airport boundary.

4.11.3.3.2. Supplemental grid point analysis

Findings for the supplemental grid point analysis are provided per metric and are presented in the maps listed below.

- DNL, which describes average daily sound levels, including a penalty for nighttime sound: Figures NO8a and NO8b
- Leq, which describes average daily noise levels without a nighttime penalty: Figures NO9a and NO9b
- Lmax, which describes maximum sound level: Figures NO10a and NO10b
- TAA, which describes the time aircraft noise exceeds ambient conditions: Figures NO11a and NO11b

Results are summarized below for the no action and action alternatives, and consist of 1) values of noise exposure for future conditions, and 2) values of the change in the magnitude or duration of noise exposure between existing and future conditions. Readers are referred to the noise analysis report in Appendix G for additional maps and results and to the sidebar titled "Understanding grid point analysis maps" for guidance on map interpretation.

Understanding grid point analysis maps

Readers may find these questions and answers helpful in understanding and interpreting the grid point maps.

1. *Do the maps show how loud it would be at a given location?*

   The supplemental grid point maps can be used to estimate roughly how loud it would be at a given location. However, due to the 1-nautical-mile spacing between points, there are minor noise level differences between the points due to topography and vegetation, and these are not visible on the maps.

2. *Why don't these maps match the DNL contour results?*

   Given the small size of the proposed airport for any action alternative, the 1-nautical-mile spacing means that most grid points fall outside of the runway area. Therefore, the maps do not capture the higher noise levels that would be experienced within the proposed airport boundary.

3. *Why do the highest noise values or the greatest noise changes not always appear to be on the runway or flight track, even though that would be the loudest location?*

   The locations of the highest noise values or the greatest noise changes are a function of where the closest grid point lies relative to each alternative's runway and flight tracks (see Figure NO2). The locations of these grid points vary due to the position of the airport alternative relative to the grid point overlay; in most cases the closest points are above or adjacent to the runway and/or flight tracks.

4. *Why do the maps have areas with no color?*

   In areas of the maps where there is no color, it means either estimated noise would fall below ambient levels (27 dBA) or the noise change would fall below the threshold set in the FAA's approved noise protocol.

5. *Why, again, is the supplemental grid point analysis necessary?*

   The primary purpose of the grid point analysis is to capture noise level changes across the Monument–Wilderness Area. This is something that the FAA-required DNL analysis cannot capture.

DNL (day-night average sound level)

Under the no action alternative, future conditions DNL values would be the same as existing conditions (see Figure NO6 above and Figures NO8a and NO8b below), so there would be no change in noise exposure between existing conditions and future conditions.

Table NO2. DNL change of exposure grid points by alternative

Change of exposure	Number of grid points experiencing a 5-dBA or greater increase in DNL		
	Airport 3a	Airport 4	Airport 12a
>+5 dBA	21	21	21

Figures NO8a and NO8b show future conditions DNL for all action alternatives. For each alternative, the highest average noise levels would be at grid points closest to the runway and flight tracks used for landing and takeoffs. Maximum DNL (approximately 44 dBA) and minimum DNL (approximately 26 dBA) would be similar for all action alternatives. This range is equivalent to noise levels associated with birdcalls (for maximum values) and rustling leaves (for minimum values). The similarities between alternatives are a result of the assumptions used in the modeling, such as the number and type of aircraft, which did not change across alternatives.

Figures NO8a and NO8b also show a comparison of the change in noise exposure for any of the action alternatives, based on the difference between future conditions and existing conditions DNL values. For all action alternatives, operation of a land-based airport would result in an increase of DNL 5 dBA or greater over existing conditions for grid points nearest the proposed airport locations and along new arrival and departure tracks. The number of affected grid points would be similar across alternatives (Table NO2), but the location of grid points would differ. Affected grid points would be located primarily southwest and northeast of Angoon for Airports 3a and 4, with notable increases occurring in the Monument–Wilderness Area over or adjacent to Mitchell Bay. In contrast, grid points experiencing a notable rise in DNL over existing conditions for Airport 12a (preferred alternative) would be located primarily on the Angoon peninsula and farther south over the Chatham Strait (see Figures NO8a and NO8b). The greatest change in noise exposure for DNL would occur at locations with minimal to no aircraft noise as of 2011. For this reason, lands within the Monument–Wilderness Area would tend to experience higher DNL increases compared to existing conditions, whereas areas with existing aviation noise, such as lands under the seaplane flight tracks and near the water landing area, would see less or no change in DNL between existing conditions and future conditions.

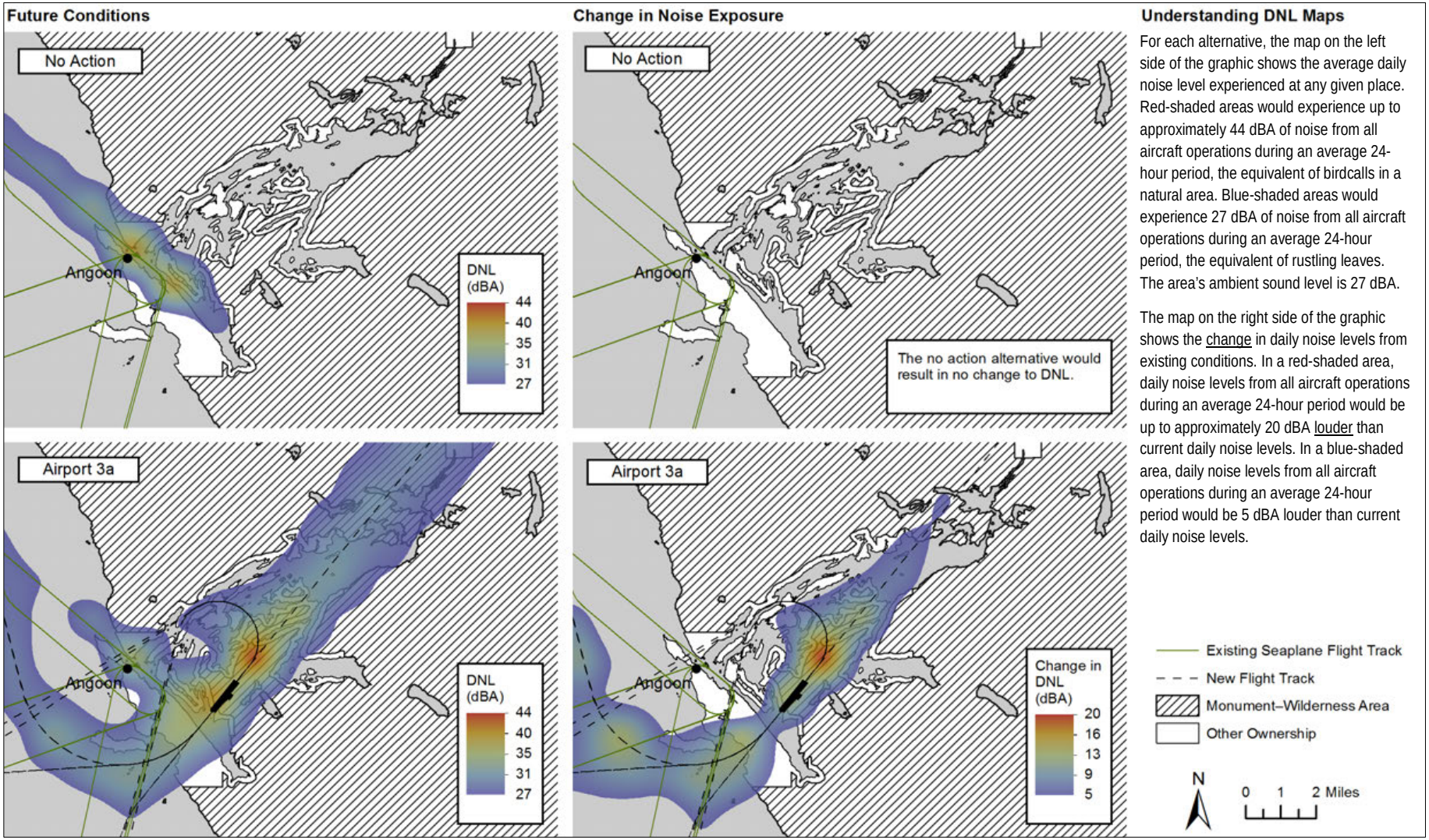


Figure NO8a. Future conditions DNL values (left) and change in noise exposure (right) for the no action alternative and Airport 3a.

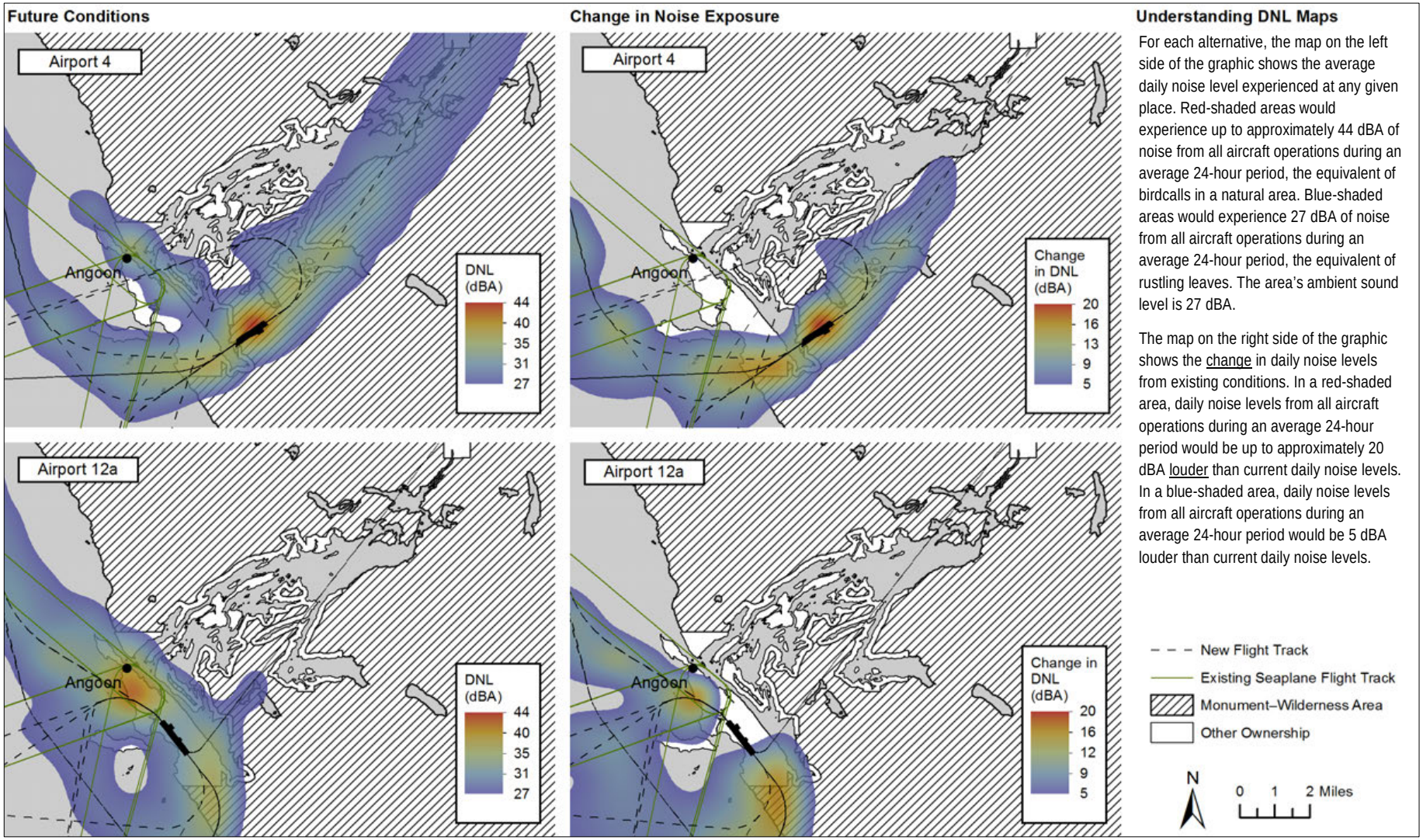


Figure NO8b. Future conditions DNL values (left) and change in noise exposure (right) for Airport 4 and Airport 12a.

Leq (equivalent noise level)

Under the no action alternative, future conditions Leq values would be the same as existing conditions (see Figure NO6 above and Figures NO9a and NO9b below), so there would be no change in noise exposure between existing conditions and future conditions.

Table NO3. Leq change of exposure grid points by alternative

Change of exposure	Number of grid points experiencing a 5-dBA or greater increase in Leq		
	Airport 3a	Airport 4	Airport 12a
>+5 dBA	31	32	24

The FAA's modeling of future noise conditions indicates that maximum and minimum Leq values would be similar to DNL (see Figures NO9a and NO9b for an illustration of these conditions). This is based on the fact that both Leq and DNL estimate average daily sound levels in the Angoon area. Also as with DNL, the locations of peak noise would vary per action alternative. The highest Leq values would be at grid points closest to each runway and flight tracks used for landing and takeoffs.

Figures NO9a and NO9b also show a comparison of the change in noise exposure for all action alternatives based on the difference between future conditions and existing conditions Leq values. Operation of a land-based airport at any action alternative location would result in a noticeable increase of Leq 5 dBA or greater over existing conditions for grid points nearest the proposed airport runways and along new arrival and departure tracks. The number and location of affected grid points would vary by alternative. The Airport 4 alternative would expose the most land to substantive Leq increases (Table NO3). For location, affected grid points would be located primarily to the southwest and northeast of Angoon for Airports 3a and 4, with notable increases occurring in the Monument–Wilderness Area directly over, or just adjacent to, Mitchell Bay. In contrast, grid points experiencing a notable rise in Leq over existing conditions for Airport 12a would be located primarily on the Angoon peninsula and farther south over the Chatham Strait (see Figures NO9a and NO9b).

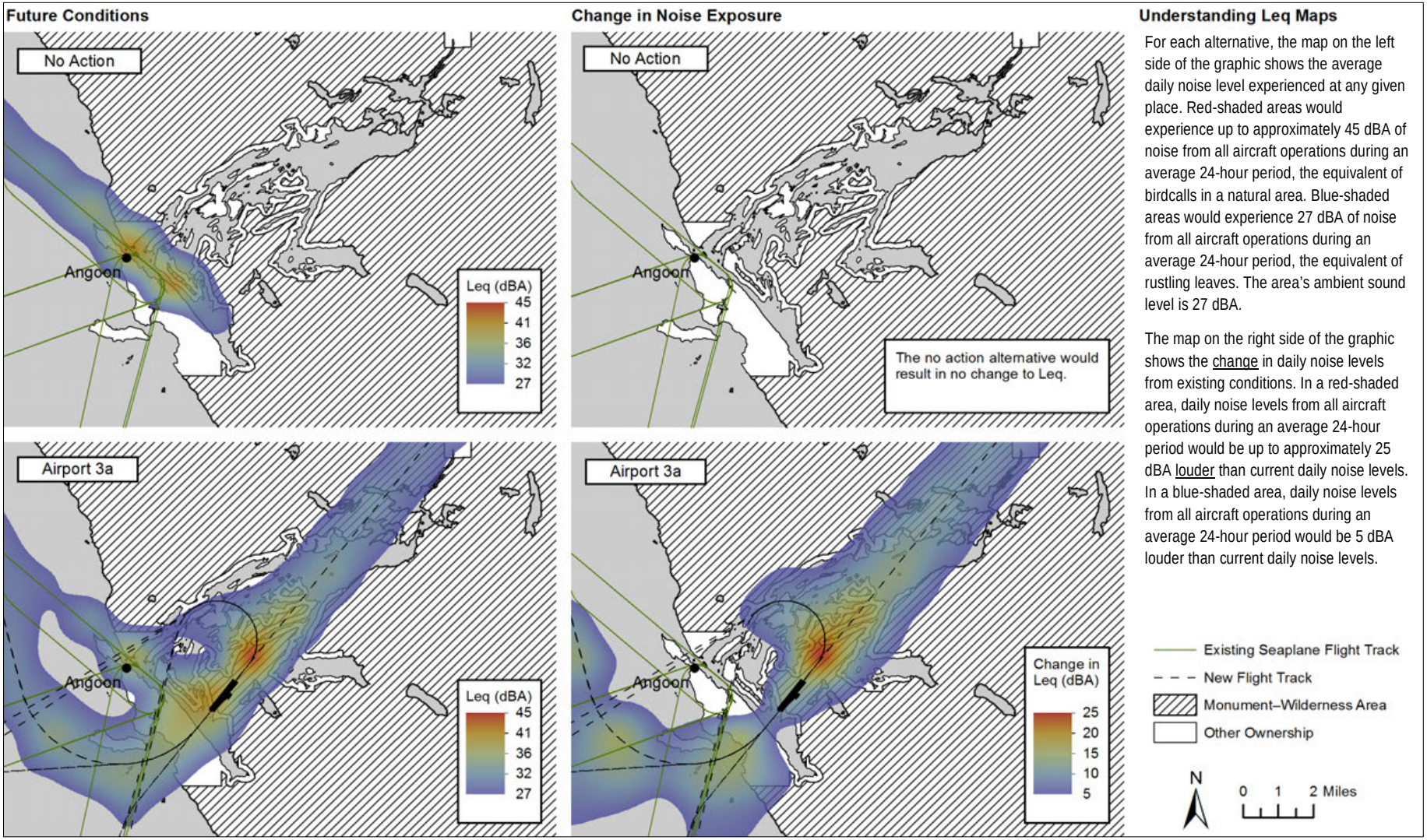


Figure NO9a. Future conditions Leq values (left) and change in noise exposure (right) for the no action alternative and Airport 3a.

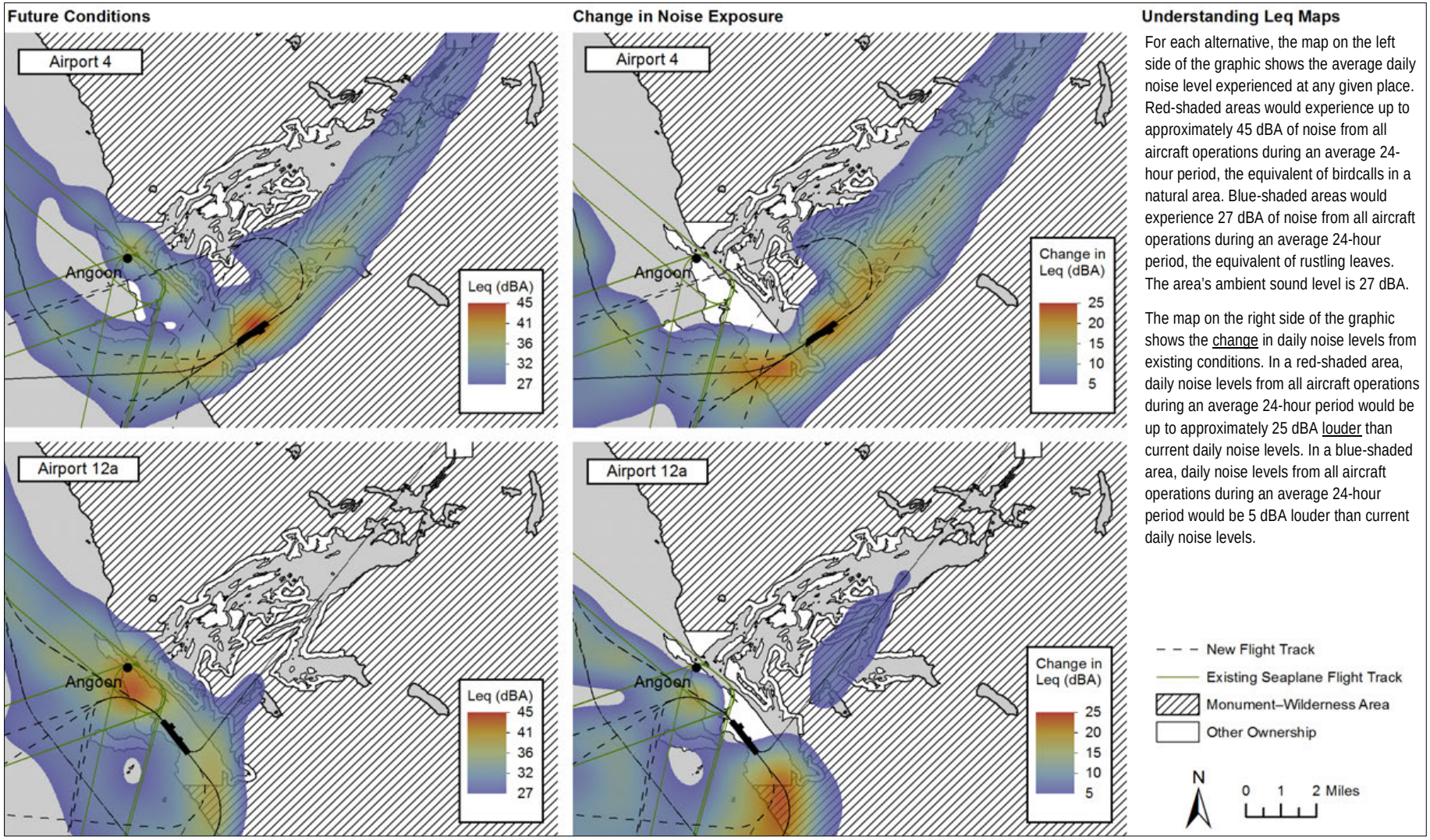


Figure NO9b. Future conditions Leq values (left) and change in noise exposure (right) for Airport 4 and Airport 12a.

Lmax (maximum sound level)

Under the no action alternative, future conditions Lmax values would be the same as existing conditions (see Figure NO6 above and Figures NO10a and NO10b below), so there would be no change in noise exposure between existing conditions and future conditions.

Under any of the action alternatives, maximum noise levels (approximately 87 dBA, equivalent to diesel truck traffic) would be similar for any of the action alternatives, but the location of peak noise levels would differ (see Figures NO10a and NO10b). The highest Lmax values would be at grid points closest to each proposed airport runway, the existing seaplane water landing area, and along arrival and departure tracks for aircraft.

Figures NO10a and NO10b show a comparison of the change in noise exposure for all action alternatives, based on the difference between future conditions and existing conditions Lmax values. For any of the action alternatives, operation of a land-based airport would result in an increase of Lmax 3 dBA or greater over existing conditions. The number and location of affected grid points would vary by alternative. Airport 4 would expose the most land to notable Lmax increases (Table NO4). For Airports 3a and 4, the highest increase in noise levels would be located at grid points primarily north and east of Angoon within the Monument–Wilderness Area, including areas directly over or just adjacent to Mitchell Bay. The maximum changes in noise exposure at Airport 12a would occur east and south of the airport, with smaller increases occurring across the Monument–Wilderness Area.

Table NO4. Lmax change of exposure grid points by alternative

Change of exposure	Number of grid points experiencing a 3-dBA or greater increase in Lmax		
	Airport 3a	Airport 4	Airport 12a
+3.0 to +4.9 dBA	11	14	15
+5.0 to +9.9 dBA	16	27	22
+10.0 to +19.9 dBA	28	39	39
+20.0 to +32.9 dBA	11	14	3
Total	66	94	69

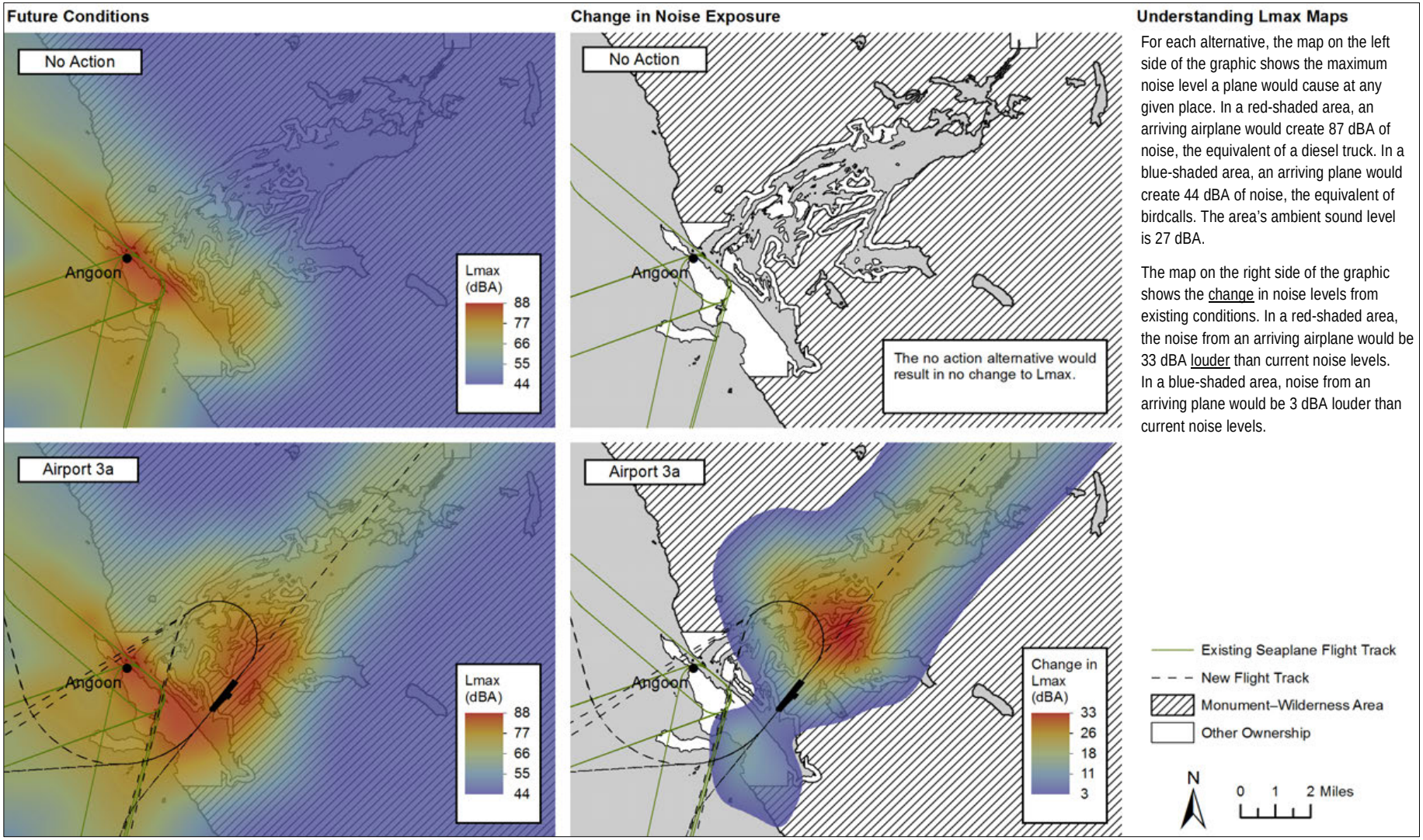


Figure NO10a. Future conditions Lmax values (left) and change in noise exposure (right) for the no action alternative and Airport 3a.

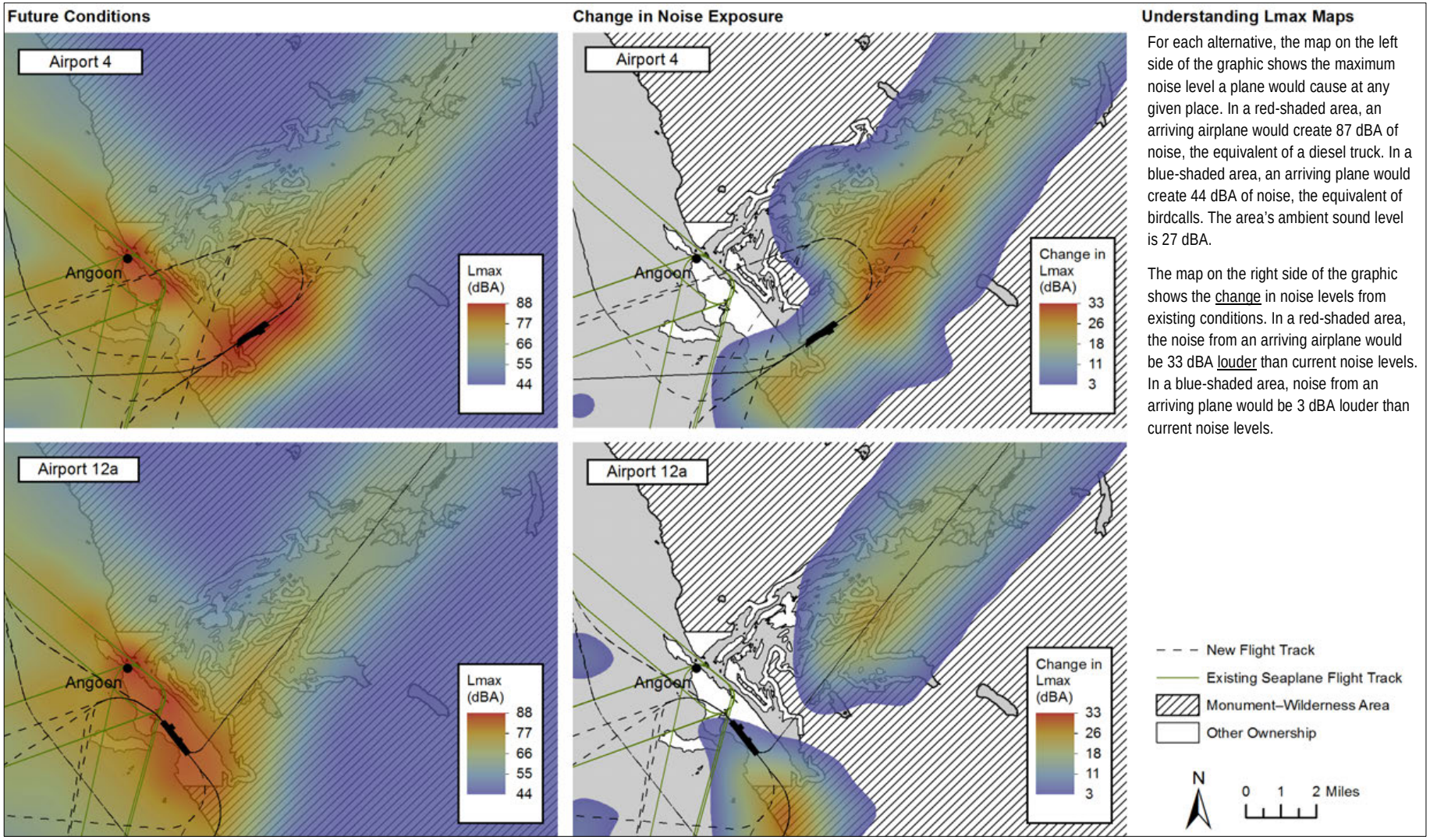


Figure NO10b. Future conditions Lmax values (left) and change in noise exposure (right) for Airport 4 and Airport 12a.

TAA (time above ambient)

Under the no action alternative, future conditions TAA values would be the same as existing conditions (see Figure NO6 above and Figures NO11a and NO11b below), so there would be no change in the duration of noise exposure between existing conditions and future conditions.

Figures NO11a and NO11b show future conditions TAA values for all action alternatives. Maximum duration of noise levels above ambient conditions (approximately 53 minutes) and minimum noise duration (6 minutes) would be similar for all action alternatives, but the location of peak noise duration would differ. For each alternative, the highest TAA would be at points closest to the proposed airport runway and flight tracks used for landing and takeoffs.

Figure NO11a and NO11b also show a comparison of the change in noise duration for all action alternatives, based on the difference between future conditions and existing conditions TAA values. For any of the action alternatives, operation of a land-based airport would result in more time above ambient over existing conditions for grid points nearest the runway and along the arrival and departure tracks for aircraft. The number and location of affected grid points would vary by alternative. The Airport 4 alternative would expose the most land to noticeable TAA increases (Table NO5). For location, affected grid points would be primarily north and east of Angoon for Airports 3a and 4, with notable increases occurring in the Monument–Wilderness Area directly over or just adjacent to Mitchell Bay. In contrast, grid points experiencing a notable increase in TAA over existing conditions for Airport 12a would be located primarily on the Angoon peninsula and farther south over Chatham Strait (see Figures NO11a and NO11b).

Table NO5. TAA change of exposure grid points by alternative

Increase in exposure	Number of grid points experiencing an increase in TAA		
	Airport 3a	Airport 4	Airport 12a
0.1–4.9 minutes	320	368	379
5.0–9.9 minutes	62	70	31
10.0–19.9 minutes	19	36	31
20.0–29.9 minutes	1	4	7
30.0–39.9 minutes	0	1	5
Total	402	479	453

Airport 3a and Airport 4 would result in a slight decrease in TAA (1 minute or less) at the location of the seaplane base, compared to existing conditions, due to the reduction in seaplane operations and movement of land-based aviation activity to the Monument–Wilderness Area.

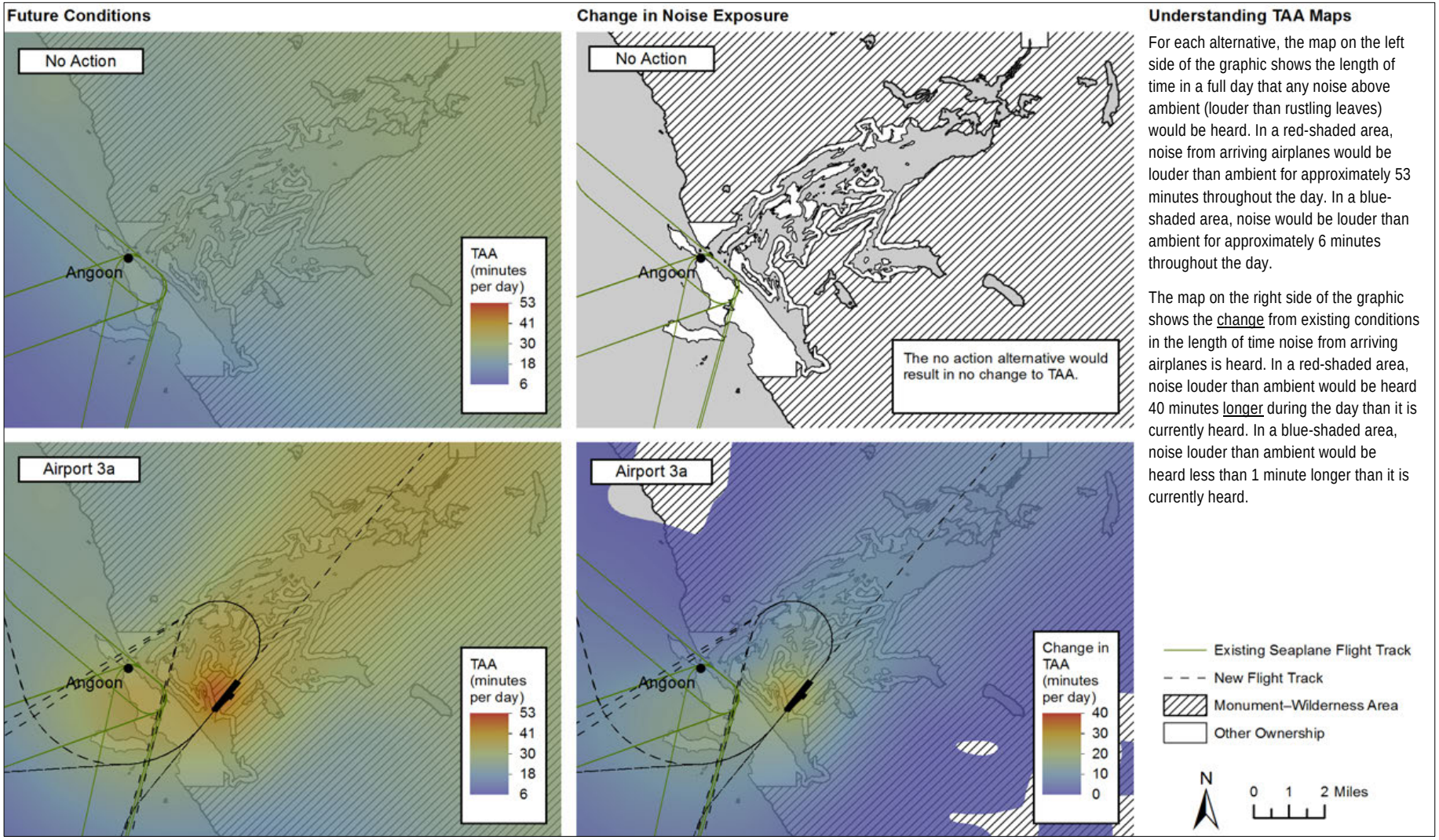


Figure NO11a. Future conditions TAA values (left) and change in noise exposure (right) for the no action alternative and Airport 3a.

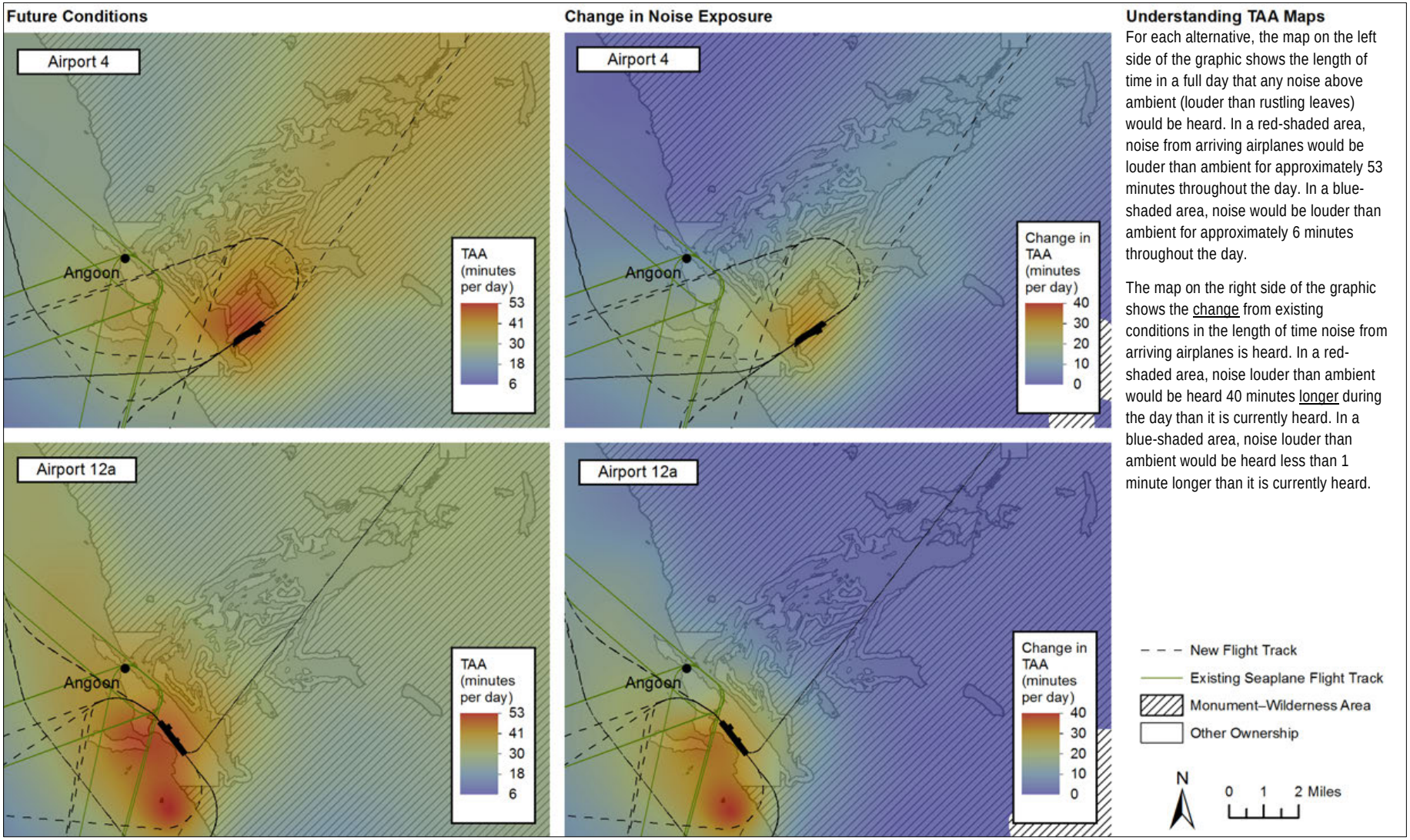


Figure NO11b. Future conditions TAA values (left) and change in noise exposure (right) for Airport 4 and Airport 12a.

4.11.3.3.3. Construction noise

Under the no action alternative, no construction would occur so no new noise would be generated. Existing noise sources consist of sporadic vehicle traffic, small machinery, aircraft activity, and natural sounds from wind, rustling vegetation, birds, and insects. Under the no action alternative, noise levels would continue to be influenced by these factors, and the noise conditions would remain relatively quiet, with periodic seaplane noise.

> **Terms to know**
>
> *Culvert:* A drain or pipe that allows water to flow under a road, runway, or similar structure.

Under any of the action alternatives, construction would take place over two or three seasons. The main sources of noise would be blasting (including the potential extraction of construction materials such as gravel, soil, and rock from an on-island materials source) and construction vehicle traffic and large machinery used during activities like site clearing, grading and excavation, paving, pile driving, and installing ***culverts*** in streams. Construction vehicle traffic would consist of approximately 55 construction vehicles (including trucks, worker vehicles, and equipment) traveling on local roads daily. The noise levels from construction activities would vary during the different activity periods, depending on the activity locations and the number and types of equipment in operation.

Table NO6. Standard noise levels for construction equipment

Equipment	Peak noise level range (dBA)* at 50 feet from operation
Backhoe	74–92
Front loader	77–96
Dozer	65–95
Grader	72–92

Source: Federal Highway Administration (2011).

These typical noise levels do not account for reduction resulting from air absorption, ground effects, and shielding from intervening topography or structures. Sound levels can be as much as 27 dBA lower indoors, with windows closed. Even in homes with windows open, indoor noise levels can be reduced by up to 17 dBA (Environmental Protection Agency 1978).

Table NO6 presents peak noise levels produced by common construction equipment. Based on these levels, construction activities associated with any of the action alternatives would generate measurable temporary increases in daytime and nighttime noise levels in localized areas. However, because noise levels decrease as distance increases and because terrain and homes block it (see the note in Table NO6), some construction activities would likely not be audible to residents in Angoon or to users of the greater Monument–Wilderness Area, depending on their location relative to construction activity.

4.11.3.4. How do all the effects to noise from the action alternatives compare?

Direct effects from construction activities to noise level would be identical under all action alternatives. Only the no action alternative, which would not produce construction-based noise, would have substantially different effects. For airport operation, action alternatives would only differ substantially by the extent and location of noise exposure changes. In general, Airports 3a and 4 would experience greater noise increases in the Monument–Wilderness Area, whereas noise increases for Airport 12a would occur more prevalently across the Angoon peninsula and Chatham Strait. Airport 4 would

also expose the most land to increases in noise exposure and duration, relative to existing conditions, for the supplemental metrics Lmax (maximum sound level), Leq (equivalent noise level), and TAA (time above ambient).

4.11.3.5. Would any effects be irreversible or irretrievable?

There would be irreversible and irretrievable effects to noise under any of action alternatives due to equipment operation and aviation activity during airport construction and ongoing operation.

4.11.3.6. Would any of the action alternatives have a significant effect on current noise levels?

Findings of significance in this section are based on the DNL metric. Even with the added penalty for nighttime flights, based on the preceding analysis, there would be no noise-sensitive areas within the DNL 65 dBA contour for any action alternative. Therefore, per significance thresholds in the FAA orders, there would be no significant effects from noise within the airport property boundary for any action alternative.

Significance of noise on wilderness qualities is not fully captured by established FAA noise thresholds. Because of the quiet nature of the wilderness area, the FAA also used supplemental noise metrics to evaluate a wider range of noise effects. Those metrics are summarized as follows: All action alternatives would increase daily noise levels over an average 24-hour period (Leq) by 5 dBA to approximately 20 dBA over existing conditions, but these noise levels would still be low (44 dBA, or the equivalent of bird calls in a nature area). All action alternatives would also increase maximum noise levels (Lmax) and the length of time airplane noise was heard per day (TAA). Lmax would peak around 87 dBA over the proposed airport runway and along arrival and departure flight paths, while TAA would increase by up to 40 minutes per day in the same general locations. Discussions of noise as it pertains to wilderness qualities can be found throughout section 4.16.3 of Wilderness Character.

4.11.3.7. How could the effects described above be avoided, minimized, or mitigated?

Because no significant effects are anticipated for noise, no additional mitigation measures are proposed.

4.12. Socioeconomic Conditions

This section describes socioeconomic conditions in the area of the airport and access alternatives. It also addresses the potential changes to those conditions from construction and operation of the proposed land-based airport.

What is discussed in this section?

4.12.1. Background information

4.12.1.1. What does the term "socioeconomic" mean?

The term "socioeconomic" refers to the field of social economics, which examines the relationship between social life and economic activity, and assesses social or economic change on human populations. When socioeconomic conditions are studied, researchers must consider a number of issues:

- Factors that could change the size and makeup of the population
- The availability and distribution of jobs, income, and wealth
- People's reliance on and use of resources
- The ways people interact socially

Socioeconomic effects from a project can range widely; they may affect only small groups within a community or they may cause changes to an entire society.

4.12.1.2. What laws, policies, or regulations apply to socioeconomic conditions in the Angoon area?

Two Federal Aviation Administration (FAA) orders, *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) and *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b), guide how socioeconomic conditions and direct effects to them should be assessed for a proposed airport action.

Additionally, these FAA orders, along with the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) of 1969 (Public Law [PL] 91-190), as amended, state that the potential indirect effects should be assessed, including "growth inducing effects and other effects related to indirect changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 Code of Federal Regulations [CFR] 1508.8).

Because two of the airport alternatives and their access alternatives are located wholly or partially on federal public lands in Alaska, the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 (PL 96-487) applies to the Angoon Airport project and must also be considered. Title VIII of ANILCA requires consideration of socioeconomic issues specifically as they relate to ***subsistence use***. This topic is discussed in detail in section 4.13 Subsistence Resources and Uses.

Terms to know

Subsistence use: According to Section 803 of ANILCA, "the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade." See section 4.13 Subsistence Resources and Uses for more information.

4.12.2. Existing conditions

Angoon is the only permanent community on Admiralty Island. The community is small, with a primarily Alaska Native population and few commercial services (see Chapter 1: Project Background for more details on life in Angoon).

4.12.2.1. Which socioeconomic factors did the FAA study to determine Angoon's existing socioeconomic conditions?

Per FAA *Orders 1050.1E* and *5050.4B*, this environmental impact statement (EIS) takes into account many socioeconomic factors, specifically the demographic makeup of Angoon's population; the area's available housing and planned residential areas; existing businesses; roads and traffic patterns; the community's tax base; community business activity and economic revenue; potential population growth; demand for public services and the public service facilities themselves, such as the electrical grid, water and sewer system, and landfill; transportation costs and facilities (the ferry dock and Angoon Seaplane Base); and how the land is used. These factors are described in the subsections that follow. The locations of these factors (those that can be shown on a map) are depicted on Figure SO1. Angoon's current overall socioeconomic condition was established through examinations of existing data from standard sources: federal, state, and regional government databases. However, these data did not provide enough information about Angoon for a complete analysis, and other sources of data, including interviews with Angoon residents, were also used to fill these data gaps. See Figure SO2 and the sidebar titled "Why did this EIS need local sources of data on socioeconomics?" as well as the technical report *Socioeconomic Existing Conditions Technical Report for the Angoon Airport Environmental Impact Statement; Angoon, Alaska* (Southeast Strategies 2013), included in this EIS as Appendix M, for more information on the data used in this analysis.

What is discussed in this section?

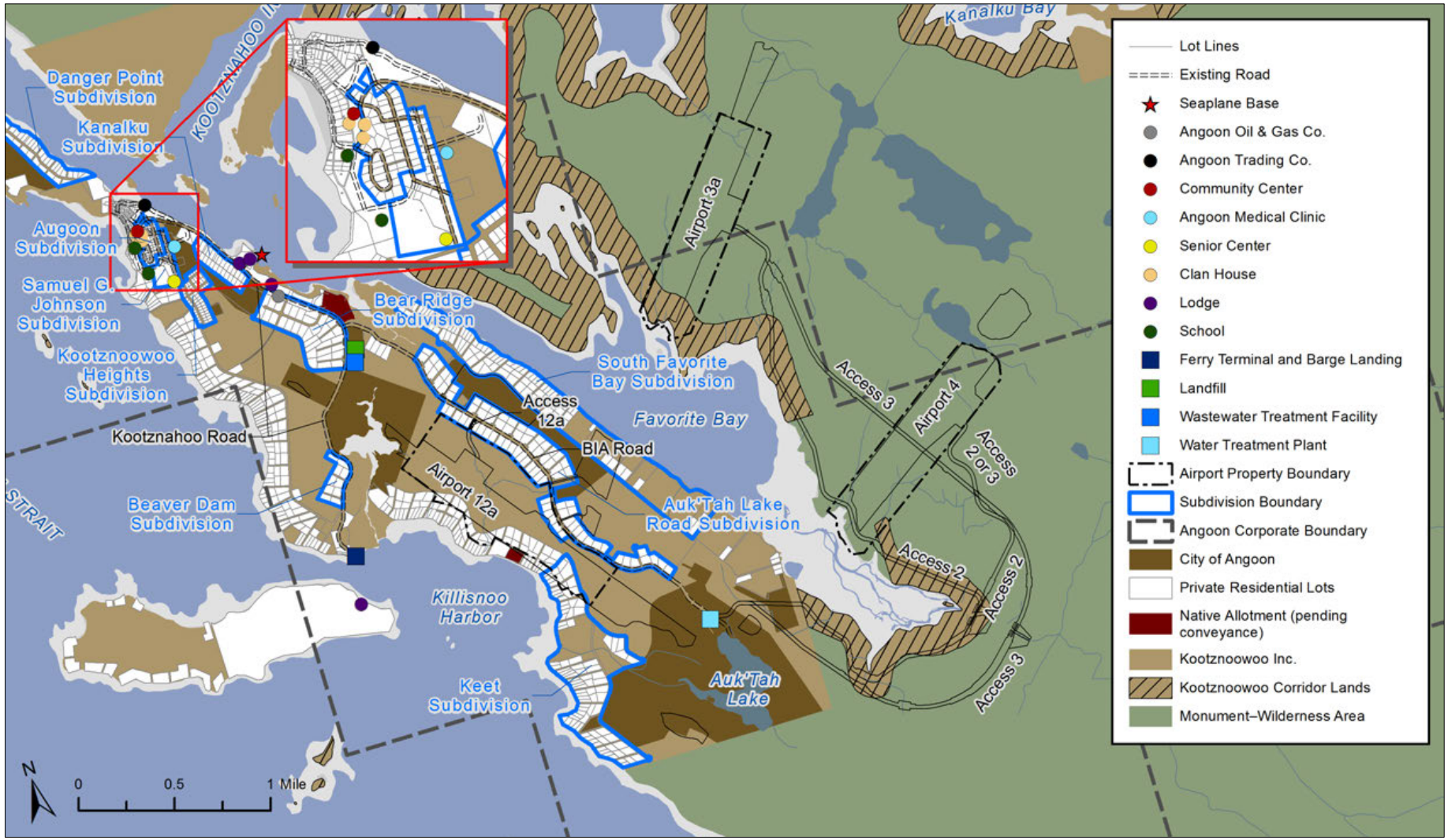


Figure SO1. Developed areas around Angoon, and the locations of the airport and access alternatives.

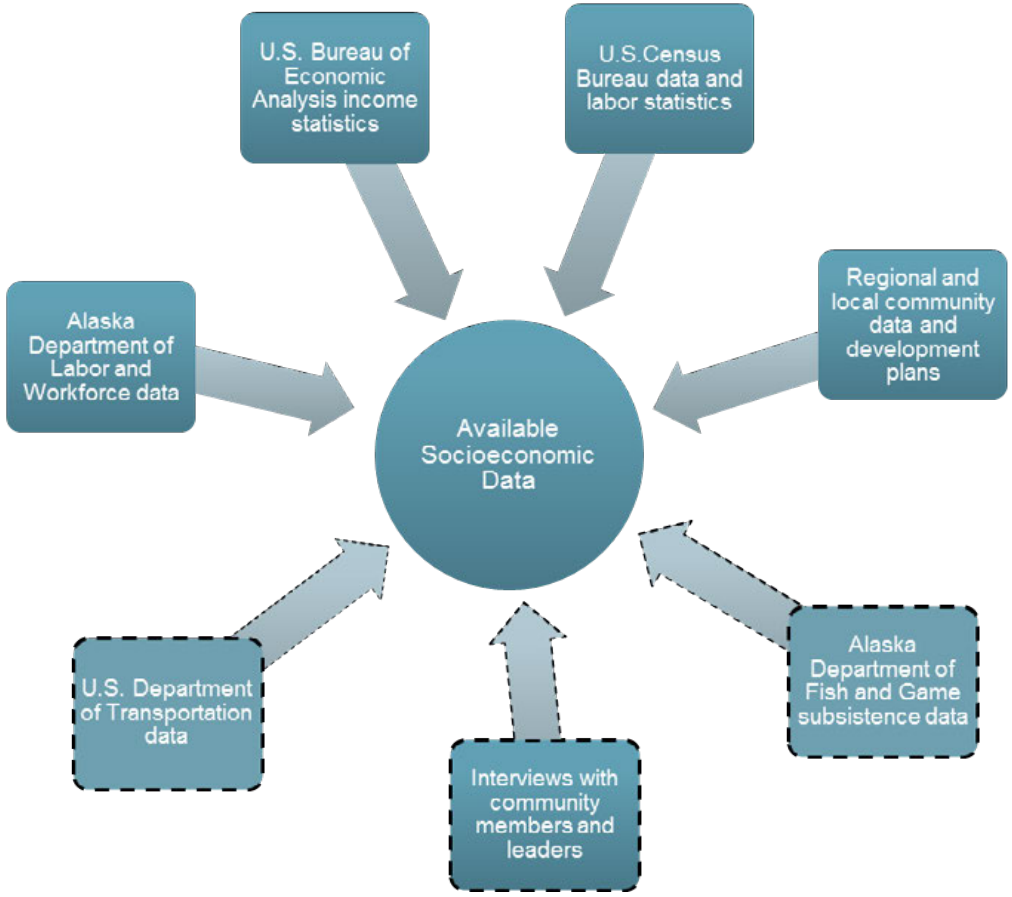


Figure SO2. Data sources used for the socioeconomic analysis. The entries with dotted lines are not typical data sources for a socioeconomic study. See the blue sidebar at right to understand why they were needed. (A detailed list is available in Appendix M.)

Why did this EIS need local sources of data on socioeconomics?

Gathering socioeconomic data for small, rural communities such as Angoon presents several challenges.

In Alaska, a community the size of Angoon is not typically included in data collected by state and federal databases (which tend to gather data on larger communities or broader geographic/socioeconomic areas). Many small local governments do not have the resources to collect and maintain detailed socioeconomic records for their own community.

Additionally, federal or state statistics about things like the workforce and income do not represent a complete picture of the unique socioeconomic nature of rural village life in Alaska. Subsistence use (see section 4.13 Subsistence Resources and Use, for more information) accounts for a substantial portion of the personal economies and cultural identity of Angoon residents. Self-employment activities such as commercial fishing, boat charters, or other tourism-oriented businesses are not included in state employment figures.

To overcome these challenges and provide a more comprehensive view of life in Angoon, residents there were interviewed and data from the Alaska Department of Fish and Game and the U.S. Department of Transportation were considered.

4.12.2.2. What is the population of Angoon like?

The 2010 U.S. Census documented 459 residents in the Angoon community. From 1940 to 1990, the local population grew steadily, from a low of 342 to a high of 665. Between 1991 and 2008, however, the population declined at an annual rate of 2%. Since 2009, the population has generally been increasing again, signaling a possible reversal of the previous downward trend. Figure SO3 shows the annual population from 1991 to 2012 and 10-year census data from 1940 to 1990.

Available demographic information for Angoon is provided in Figure SO4. Demographic data provide one way of understanding who Angoon residents are and how they might be affected by changing socioeconomic conditions. Angoon residents generally share the same cultural heritage, with most of the population being Alaska Natives known as the Tlingit. Residents are relatively young—only 12% of the population is over the age of 64—and fairly evenly proportioned by gender. Almost three-quarters of residents have a high school diploma, but college or advanced degrees are less common; 16% of residents had at least a bachelor's degree from 2007 to 2011. Approximately 89% of residents were born in Alaska, and approximately 83% of residents did not change housing in 2011.

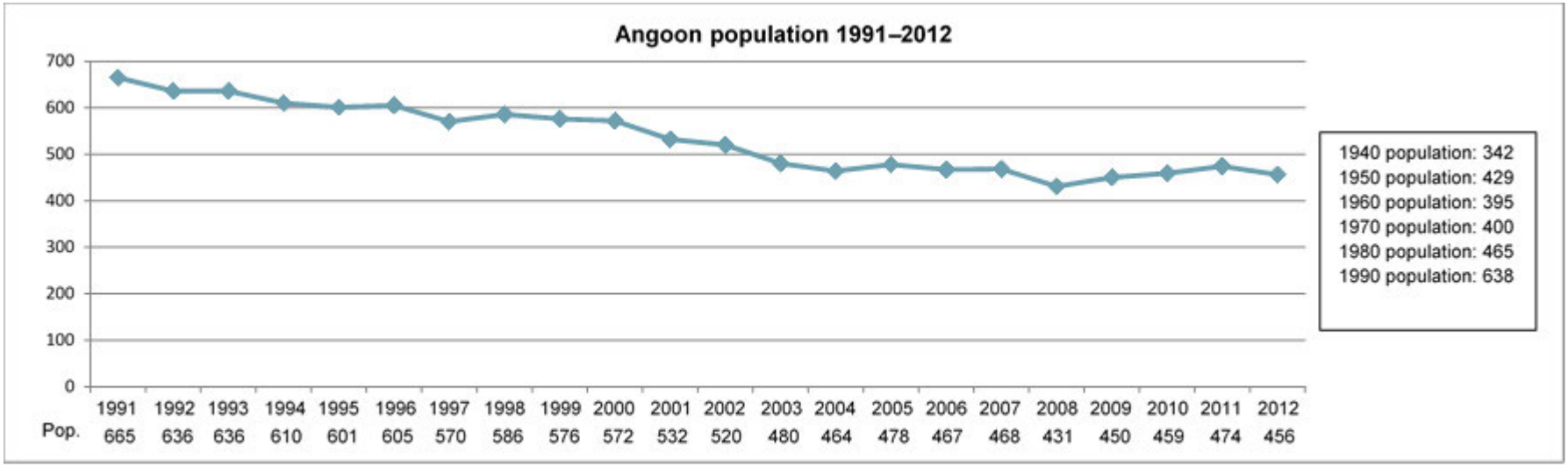


Figure SO3. Angoon population counts from 1991 to 2012 (Alaska Department of Labor and Workforce Development 2013a) and decennial census data from 1940 to 1990 (Alaska Department of Commerce, Community, and Economic Development 2012a).

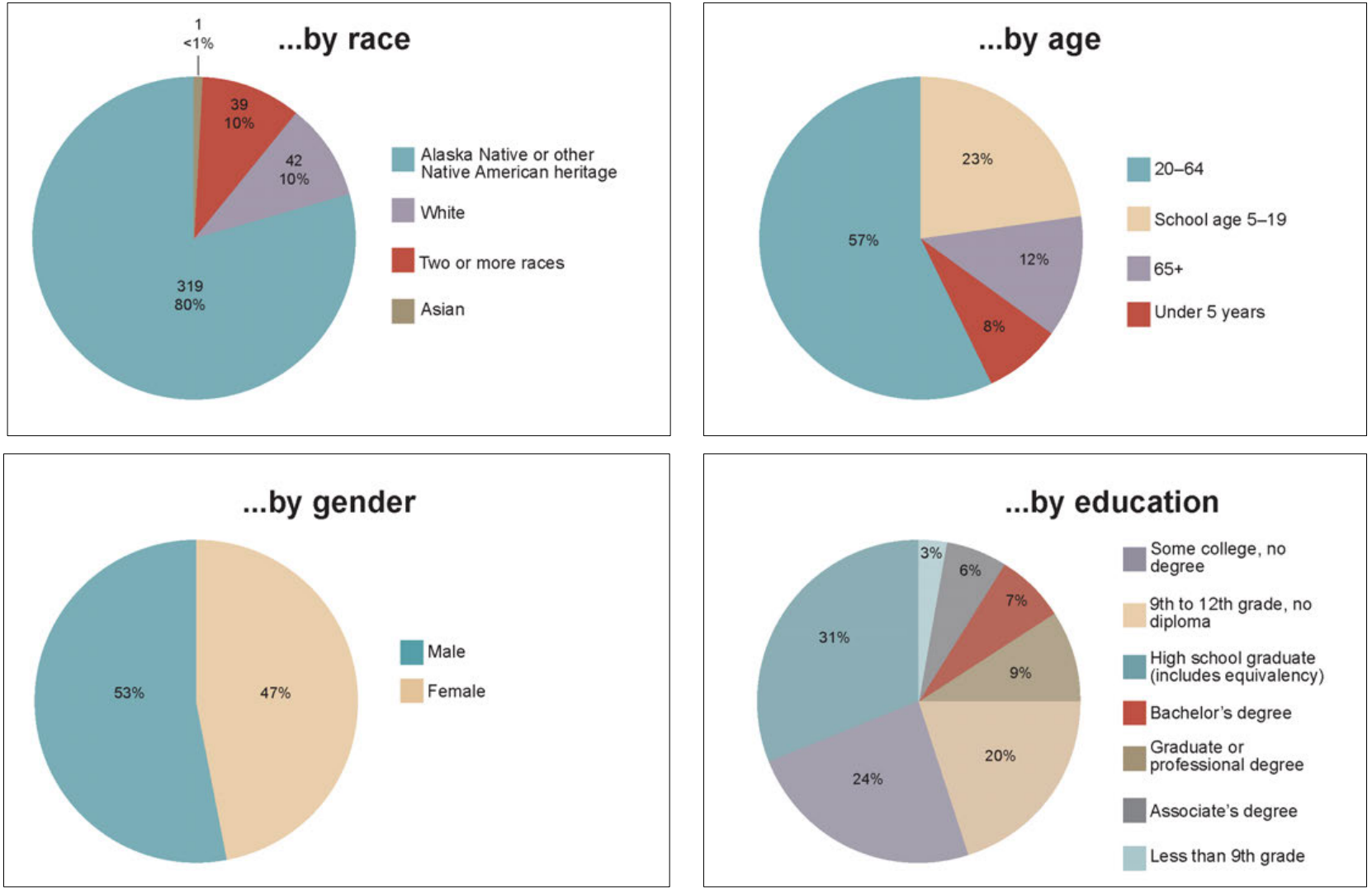


Figure SO4. Angoon demographics by race, age, gender, and education (U.S. Census Bureau 2013).

4.12.2.3. What housing is available in the area?

The U.S. Census Bureau reported that Angoon contained 256 housing units with 167 households and an average household size of 2.75 individuals in 2010. Most homes were occupied; approximately 35% (89) of housing units were vacant in 2010 (Figure SO5).

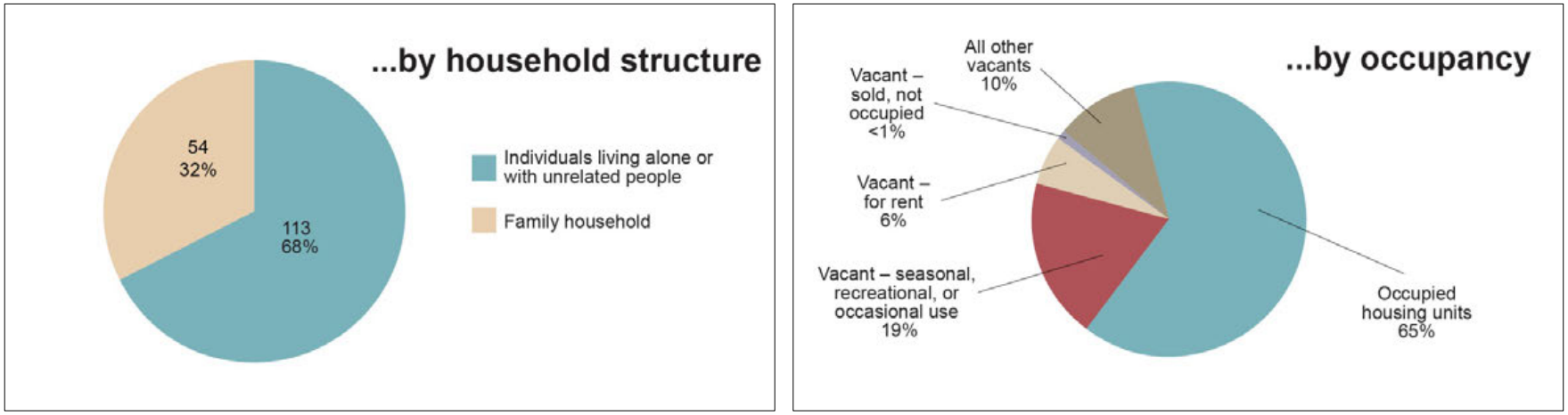


Figure SO5. Characteristics of housing in Angoon (U.S. Census Bureau 2010).

Most existing residences are located in the Angoon village core. However, the Angoon peninsula also includes lands transferred through the Alaska Native Claims Settlement Act (ANCSA) of 1971 (14(c)1) by Kootznoowoo, Inc. (the local village Alaska Native corporation) to individual shareholders as home sites. These home sites are primarily laid out in subdivisions, which are shown in Figure SO1 above.

Few homes have been built on these home sites; in 2009 two trailers were located in the Auk'Tah Lake Road Subdivision and three houses were located in the Keet Subdivision. Nevertheless, the area has been platted for residential use, and property owners may construct residences on their properties in the future.

4.12.2.4. What private businesses exist in the area, and where are they located?

Private businesses in the Angoon area consist of three fishing and hunting lodges, one bed and breakfast, a grocery store, and a gas station (see Figure SO1 above). All are located in the Angoon village core or in the nearby developed area.

4.12.2.5. What are Angoon's roads and traffic patterns like?

Developed roads consist of the main road from the ferry terminal to town (Kootznahoo Road), the roads in town, the road to the Angoon Seaplane Base, and the road to the community's water treatment plant (the Bureau of Indian Affairs [BIA] Road) (see Figure SO1 above). All roads except the BIA Road, which is a gravel road, are paved with asphalt.

The Alaska Department of Transportation and Public Facilities uses two standard measures in transportation planning: ***level of service*** and ***average daily traffic***. No information on the level of service of existing roads is available; however, the department reported average daily traffic in 2011 of 428 vehicles on Kootznahoo Road between the Angoon Seaplane Base and ferry terminal, and 136 vehicles for the road to the Angoon Seaplane Base. In comparison, average daily traffic for a highway in downtown Juneau, Alaska, which in 2010 had a population nearly 70 times greater than Angoon, can be more than 20 times higher than Angoon's main road (Alaska Department of Transportation and Public Facilities 2011a, 2011b).

Terms to know

Average daily traffic: The average number of vehicles passing a specific point on a road within a 24-hour period. Measurement of average daily traffic includes vehicles travelling in both directions, so average daily traffic estimates may count the same car multiple times if it travels back and forth on the same road in a 24-hour period.

Level of service: In socioeconomic studies, a measure of how well a given road is performing with regard to maintaining appropriate vehicle speeds and minimizing congestion and time delays.

4.12.2.6. What is the current economic condition like, including tax base, for the City of Angoon?

The City of Angoon reported its total revenue to be $487,590.46 in the 2011 fiscal year, of which $230,553.56 came from outside state or federal funding, $140,000 came from the state legislature budget, and $117,036.90 came from locally generated revenues, including $23,358.04 in sales taxes. At 3% sales tax, this represents approximately $778,601 of taxable goods and services sold in 2011. Sales tax and locally generated revenue for Angoon have been generally decreasing since the early 2000s, whereas total expenses and total revenue have fluctuated over time in response to changing community needs and external funding source availability (see Figure SO6).

The total gross salary (that is, total salary before taxes) and wages coming into the Angoon community in 2011 from public and private employers was about $3.8 million, as compared to more than $593 million for Juneau, Alaska (Alaska Department of Labor and Workforce Development 2013a). This difference is not surprising given the differences in their working population size; in 2011 Juneau had more than 72 times the number of employed residents as Angoon.

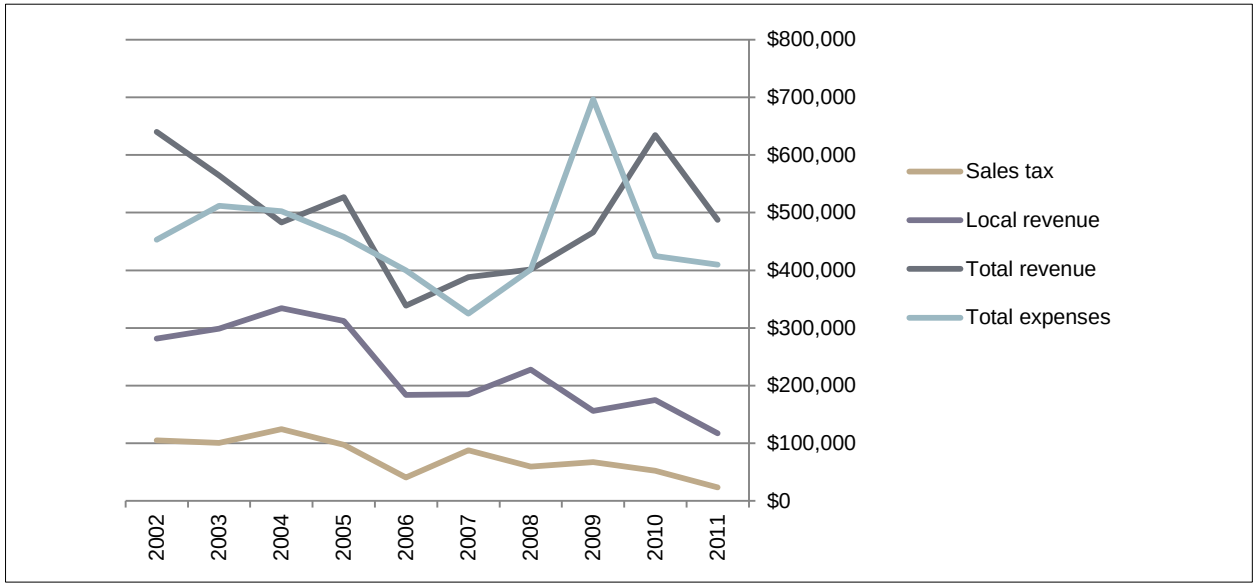


Figure SO6. Revenue and expenses for the City of Angoon, 2002–2011 (Alaska Department of Commerce, Community, and Economic Development 2013).

4.12.2.7. What are business activity and economic revenue like for Angoon residents?

Typical personal income for Angoon residents may include wages and salaries from jobs, self-employment income, rental income, and investment income as detailed in Figure SO7. Subsistence activities also affect residents' personal economies; Angoon residents use subsistence resources directly, and trade and barter them for other goods and services. It is difficult to quantify the frequency of these activities or the cash value of these non-cash transactions.

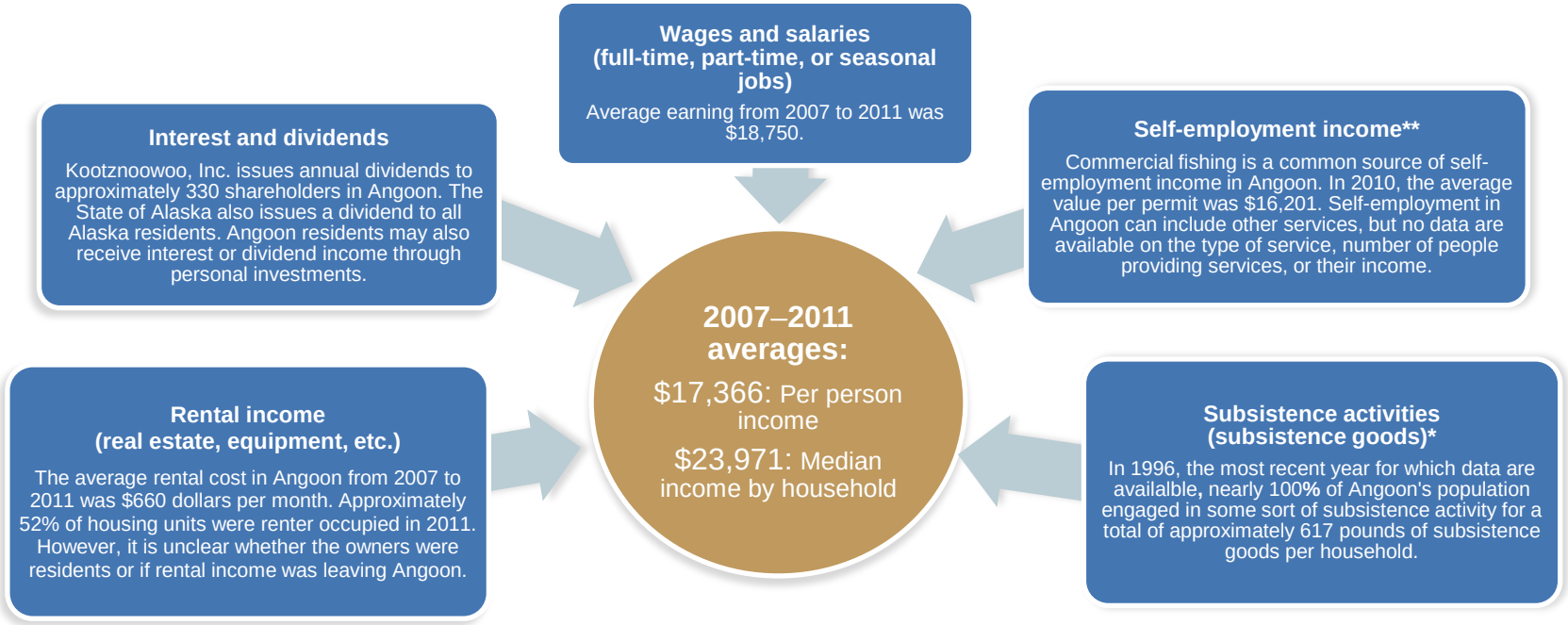


Figure SO7. Sources of personal income available to Angoon residents. *Sources*: Alaska Commercial Fisheries Entry Commission 2013**; Alaska Department of Fish and Game 2009*; U.S. Census Bureau 2013.

Wages and salaries for Angoon residents come from a variety of seasonal, part-time, and full-time jobs, with local government, tourism, education, and healthcare providing 77% of employment (Alaska Department of Labor and Workforce Development 2013b). (See the sidebar box titled "Angoon's seasonal economy" below for more information on the importance of this type of employment.)

Transportation, trade, and utilities jobs account for 9% of jobs. Figure SO8 presents available state data for average annual full-time equivalent employment by industry for 2011. The state does not track data related to self-employment income from commercial fishing or small businesses with no employees other than the owner.

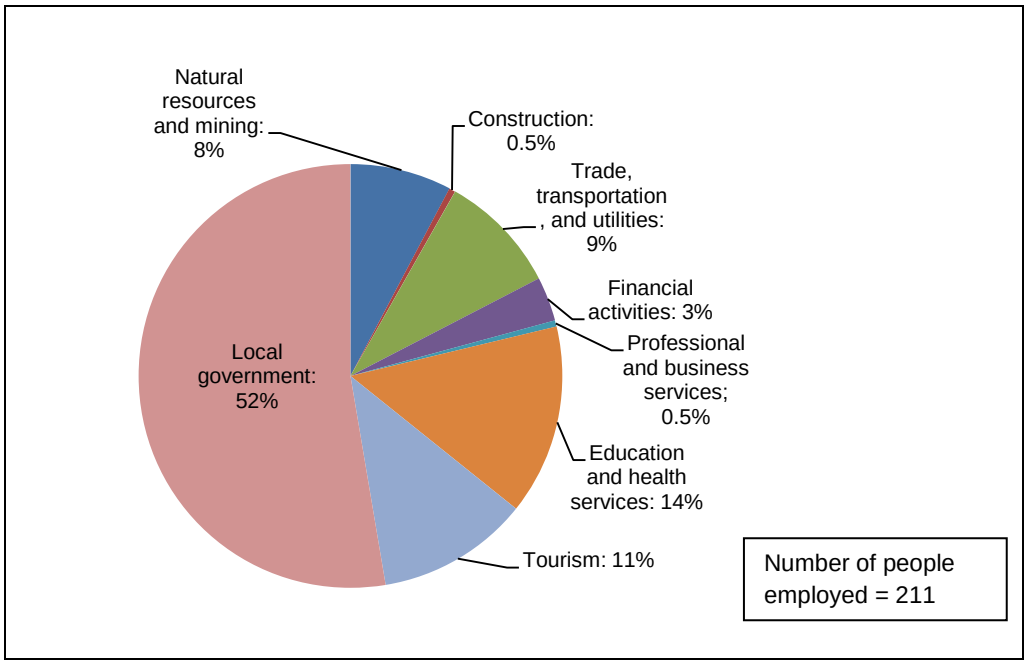


Figure SO8. Angoon 2011 average employment by industry sector (Alaska Department of Labor and Workforce Development 2013a). *Note:* Data do not include employment in state government or other industries due to the small number of employees and/or non-disclosure laws.

Angoon's seasonal economy

The data in Figure SO8 represent average annual full-time equivalent employment. As a result, they do not capture the seasonal fluctuation or part-time nature of much employment in the Angoon area. Data from 2011 indicate that only approximately 55% of employed Angoon residents work year-round (Alaska Department of Labor and Workforce Development 2013a). The seasonal economy is the result of construction, seafood processing, and tourism-related employment that influence the timing of available jobs.

The peak tourist season is May through September, and many jobs in the seafood industry occur during the summer months, as well. In Angoon, many non-governmental employment opportunities are related to tourism or, to a lesser degree, commercial fishing. Historically, commercial fishing has been one of Angoon's economic mainstays. With changes in fishing patterns and harvest seasons, loss of locally owned limited-entry fishing permits, and fluctuating fish prices, commercial fishing has become less of an economic factor in the community (McDowell 2010). In 2008, 15 of the 28 Angoon-held commercial fishing permits were reported to have been used. 2009 data indicated eight of 26 permits were used, whereas six of 18 permits were used in 2010 (Alaska Commercial Fisheries Entry Commission 2013).

Although commercial fishing has declined in recent decades, the value per permit rose steadily until 2008. The value decreased in 2009, then increased again in 2010, the most recent year for which detailed information was available.

2008	2009	2010
$14,860	$9,495	$16,201

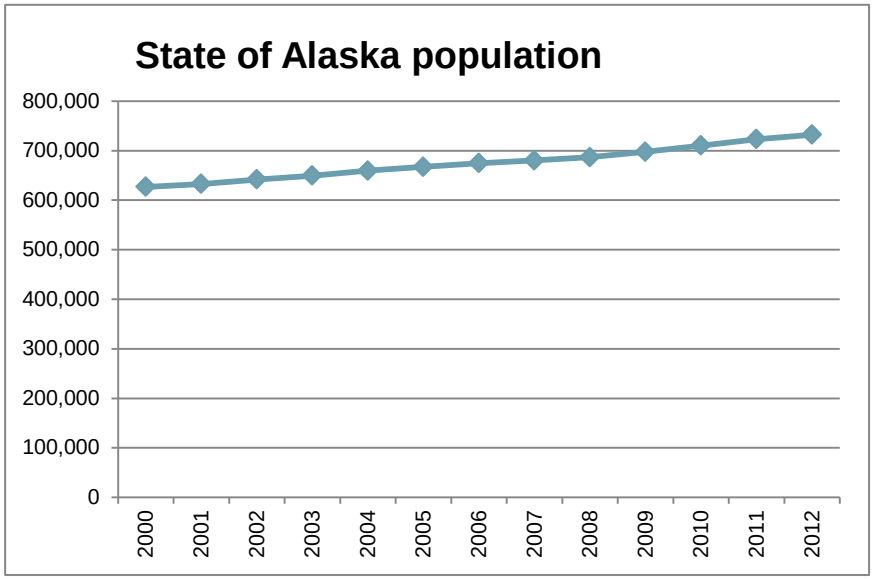
Source: Alaska Commercial Fisheries Entry Commission 2013.

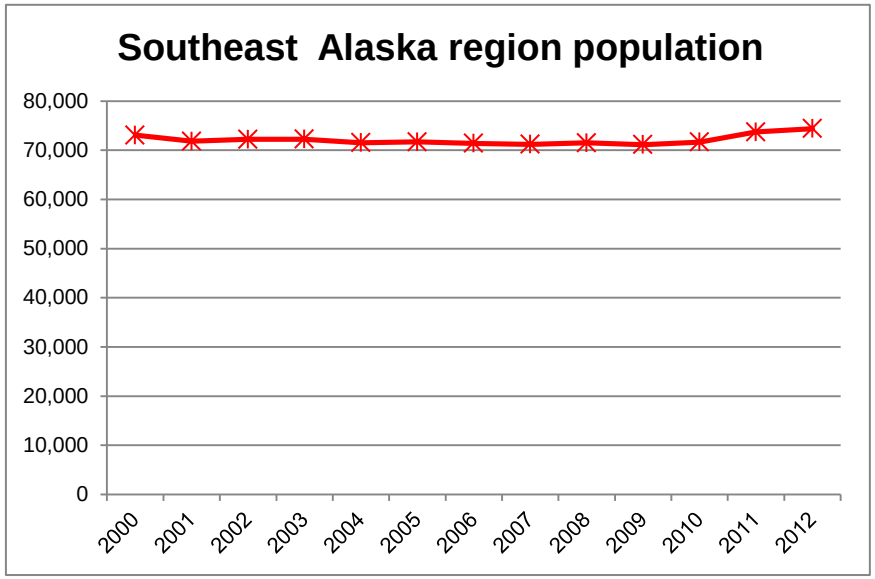
Angoon's tourism activity centers on charter-fishing excursions, kayaking, and other tours provided through one bed and breakfast and three fishing and hunting lodges, one of which was a top employer of Angoon residents in 2011 (Alaska Department of Labor and Workforce Development 2013b). Although Angoon does not collect data associated with this tourism activity, Whaler's Cove Lodge reported more than 500 guests for the 2011 and 2012 seasons, and employed 40 individuals, of whom approximately two-thirds were local and one-third came from outside the area. This is an increase from 2009, when Angoon's lodges and bed and breakfasts experienced a 20% decline in bookings and several lodges closed early in the season (Powers 2009; Powers 2012).

Recreational fishing and recreational hunting (mostly for Sitka black-tailed deer) also contribute modestly to the Angoon tourism economy through bookings at lodges. Although the cruise industry is a significant component of the broader Southeast Alaska economy, cruise ships do not stop at Angoon. Some independent visitors travel to Angoon to visit the Admiralty Island National Monument and Kootznoowoo Wilderness Area (referred to in this EIS as the "Monument–Wilderness Area") for canoeing, kayaking, camping, and other recreational activities, but no agency or other party tracks data about these visitors other than through Monument–Wilderness Area cabin reservations. For this reason, the number of independent tourists is not known, but it is estimated to be fewer than 600 per year (USFS 2014b). From 2010 to 2012, an average of 1,575 additional visitors visited the Monument–Wilderness Area using local outfitters and guides (USFS 2014a). Section 4.3 Compatible Land Use provides additional discussion of recreation in the Angoon area.

4.12.2.8. What do regional population forecasts indicate about future population movement and growth in the Angoon area?

Over the past decade, the Southeast Alaska region, which includes other communities of similar size and demographics as Angoon, has experienced a decline in population. This trend differs significantly from that of Alaska as a whole, where the overall population steadily increased over the same 10-year period. See Figure SO9 for comparisons.





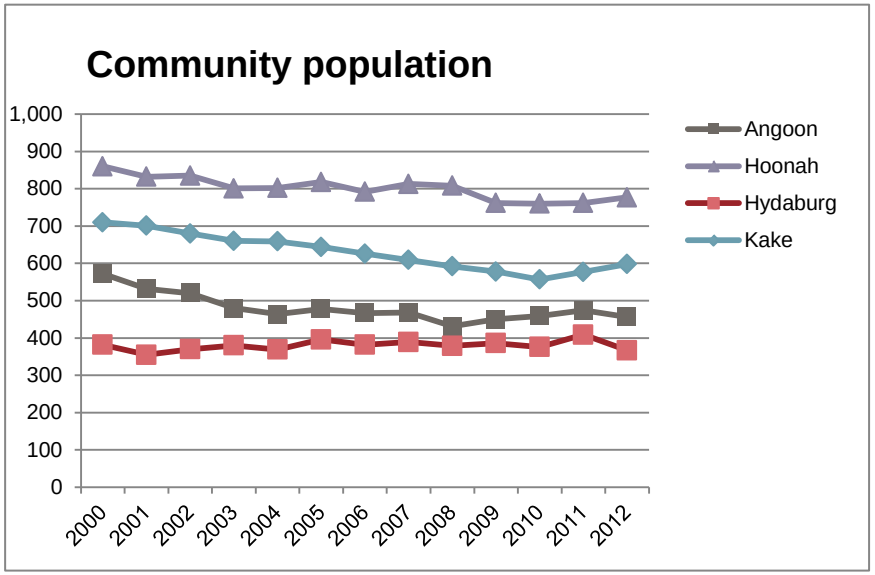


Figure SO9. Comparison of population trends from 2000 to 2012 for the state of Alaska, the Southeast Alaska region, and communities in the region (Alaska Department of Labor and Workforce Development 2013a).

Angoon is part of the U.S. Census Bureau's Hoonah-Angoon Census Area. From 2000 to 2010, the Hoonah-Angoon Census Area experienced a net loss of population as a result of outmigration (people moving out of the area to other locales) (Alaska Department of Labor and Workforce Development 2012). Although outmigration data specific to Angoon are not available, the 2012 study notes that younger people and parents of small children are the most likely to move for career and educational opportunities. The Alaska Department of Labor and Workforce Development also tracks migration patterns for Alaska, and reports that most outmigration from the Hoonah-Angoon Census Area was to larger Alaska cities, including Sitka and Juneau, from 2011 to 2012 (Hunsinger et al. 2012).

Recent population forecasts for this census area continue to predict an average annual 1.8% decline in population (from 2,150 to 1,518 residents) by 2035, which suggests future population declines for Angoon, as well (Alaska Department of Labor and Workforce Development 2012).

This estimate does not consider the potential role of nonlocal stakeholders on future population growth, however. Kootznoowoo, Inc. currently serves nearly 1,000 shareholders, approximately 33% of whom live in the Angoon community and 67% of whom live outside of Angoon (Kootznoowoo, Inc. 2013b). With the transfer of home sites under ANCSA to Kootznoowoo, Inc. stakeholders, these nonlocal stakeholders may choose to establish primary or second homes on the island in the future. An exact count of current second homeownership is unknown; however, the U.S. Census Bureau reported that 49 housing units were used for seasonal, recreational, or occasional use in 2010.

4.12.2.9. What public services does the City of Angoon provide to its residents?

Angoon's public services are outlined below.

- Electricity: Owned by the City of Angoon; provided by diesel-run generator via above-ground transmission lines.
- Sewer: City-owned; piped sewer system to sewage lagoon.
- Water: City-owned; water treatment plant at Auk'Tah Lake (4.5 miles from town); buried water lines to developed lots.
- Solid waste: City-provided; trash collection by city; disposed of at city-owned landfill with an open burning pit.

See also section 4.10 Energy Supply, Natural Resources, and Sustainable Design for more information about electrical utilities, and section 4.7 Hazardous Materials, Pollution Prevention, and Solid Waste for more information about water, sewer, and solid waste services.

4.12.2.10. What transportation options do Angoon residents have, and what are the associated costs?

The transportation options currently available to Angoon residents are listed below. See Chapter 2: Purpose and Need for more information about transportation options.

Commercial seaplane
Two to four times daily (by season).
Daylight and clear weather only.
$270 round-trip, per person.

Charter seaplane
As needed.
Daylight and clear weather only.
$1,123 to $2,226 round-trip.

State ferry
Two or three times per week, depending on season.
$74 round-trip, per person.

Charter ferry
As needed.
$1,000 per hour.

Passenger fare only without vehicle. Charter ferry and charter seaplane costs per person depend on the number of passengers.
Sources: Alaska Marine Highway System 2013b; Alaska Seaplane Services 2013a, 2013b; Gorsuch 2011.

The community receives seaplane service at the Angoon Seaplane Base and ferry service via the ferry terminal, both maintained by the Alaska Department of Transportation and Public Facilities. These facilities are within walking distance or a short drive from the city center.

Why do Angoon residents travel?

Angoon residents frequently travel to Juneau or other nearby communities to obtain services not available in Angoon. They also travel to shop; visit family and friends; and attend cultural, social, or regional athletic events. The first table below summarizes the results of a travel survey of Angoon residents 18 years and older conducted in 2001 for the *Angoon Airport Site Reconnaissance Study* (2004). The second table summarizes the costs for a family of four to travel to Juneau.

Percentages of travel locations and purposes

Trip purpose	Juneau	Sitka	Other SE Alaska cities	Beyond SE Alaska
Shopping	89.3%	35.0%	3.9%	13.6%
Medical	53.4%	72.8%	3.9%	10.7%
Work or business	41.7%	25.2%	9.7%	6.8%
School	8.7%	2.9%	2.9%	4.9%
Visiting friends or family	73.8%	32.0%	17.5%	11.7%
Vacation	35.0%	11.7%	8.7%	12.6%
Recreation or events	54.4%	5.8%	2.9%	2.9%
Other	7.8%	4.9%	4.9%	1.0%

Note: No more recent information regarding purpose of travel and travel destinations of Angoon residents is available (Alaska Department of Transportation and Public Facilities 2004).

The cost of family travel

Round-trip travel to Juneau for a family of four (two adults and two children, ages 6 and 11 years old)

State ferry service	$222
Scheduled air service	$1,080
Charter air service	$1,123–$2,226
Private charter ferry service	$6,000

Note: Air travel could require car rental or taxi service. Aircraft weight restrictions or passenger booking constraints could prevent a whole family and all luggage from traveling on one airplane. Ferry trips could require hotel rooms because there are only two trips per week; however, it is possible to take a motor vehicle on the ferry.

4.12.2.11. What role does subsistence use play in Angoon's economy?

Subsistence use forms a substantial portion of the community's socioeconomic base and plays a role in aspects of cultural tradition. The harvest and sharing of local resources for food, clothing, tools, heating, and other uses serve as the cornerstone of the local economy and culture. Economic aspects of subsistence are harder to measure than economic practices involving the exchange of money. Because prices of commercial products in remote Alaska communities are higher than the national average (see the blue sidebar titled "The cost of living in Angoon" at right), subsistence plays an economic role. For example, in 1996, Angoon residents used approximately 225 pounds of subsistence resources per resident. It would cost approximately $1,663 per person in 2012 dollars to replace these subsistence resources with items purchased at a grocery store (based on equivalent grocery costs at a Juneau retailer in 2012). See section 4.13 Subsistence Resources and Uses for additional information on subsistence activities.

4.12.2.12. What commercial land uses occur in the Angoon area?

Lands available for commercial development are limited because the community is surrounded by the Monument–Wilderness Area. Most available commercial land is owned by Kootznoowoo, Inc., which received title to approximately 2,800 acres in the Angoon area as part of ANCSA (see section 4.12.2.3 and Figure SO1). Under ANCSA, a for-profit corporate structure was established for all Alaska Native corporations, and the law mandated that lands conveyed under ANCSA should be financially profitable for corporation shareholders. For this reason, all Kootznoowoo, Inc. land is considered commercial, even if Kootznoowoo, Inc. has no current plans to develop it for tourism, mining, or other commercial ventures (Naoroz and Nease 2010).

The cost of living in Angoon

Nearly everything—from groceries to construction materials to vehicle fuel—must be imported to Angoon. Typical cost of living measures include electricity, heating, fuel, and consumables such as milk and eggs. In Angoon, these resources cost more than the national average.

Average	Angoon	National
Milk	$6 to $8/gallon	$3.50/gallon
Eggs	Up to $12/dozen	$2/dozen
Electricity	49¢ to 59¢/kWh	10¢ to 13¢/kWh

Average electric and heating bills for typical Angoon households range from $300 to $900 per month and can be $1,200 per month (Central Council of the Tlingit and Haida Indian Tribes of Alaska 2010).

Fuel prices disproportionately affect Angoon because 1) the city's electricity comes from diesel generation, 2) commercial transportation providers impose fuel surcharges or higher fares when fuel is costly, and 3) basic goods such as groceries must be imported. As of January 2012, heating fuel #1 was $5.20 per gallon and gasoline was $5.09 per gallon (Alaska Department of Commerce, Community, and Economic Development 2012b).

4.12.3. Project effects

For all action alternatives, construction, operation, and maintenance of an airport and access road would affect socioeconomic conditions. Although the nature of the effects would be the same for all action alternatives, the extent of effects would differ. The sections below describe the actions causing the effects and the effects themselves; the methods for evaluating effects; and the similarities and differences in magnitude and extent of effects between the alternatives.

What is discussed in this section?

4.12.3.1. How did the FAA determine the effects of the alternatives on socioeconomic conditions?

As required by FAA regulations, and as described in section 4.12.1.2 above, analysis of socioeconomic conditions must take into account certain socioeconomic factors. Potential direct and indirect effects to these factors are as follows:

Direct effects:

- The need for residents to relocate due to loss of property to airport uses
- The need for businesses to relocate due to loss of property to airport uses
- Any disruption of local traffic patterns that changes average daily traffic and level of service
- Loss of or gain in City of Angoon tax base

Indirect effects:

- Changes in business activity and economic revenue as induced by the presence of a land-based airport
- Changes in population movement and growth patterns because of the airport
- Changes in public service demand because of the airport
- Changes in other factors identified by the public as locally important (for example, transportation costs, land uses, and subsistence use); see the *Public and Agency Scoping Report* (SWCA 2009) provided in this EIS as Appendix A, for more information on public input

Many actions related to the construction and operation of an airport and access road could cause these direct and indirect effects. Table SO1 lists the potential effects, the actions causing them, and the measures used by the FAA to determine the magnitude of effect.

Table SO1. Effects, actions, and measures

Effect	Action causing effect	Direct or indirect	Short term, long term, temporary	Measure of effect
Relocation of residents	Property acquisition for airport property boundaries or noise	Direct	Long term	Number of residents relocated as a result of property acquisition or noise
Business relocation	Property acquisition for airport property boundaries	Direct	Long term	Number of businesses relocated as a result of property acquisition
Disruption in local traffic patterns	Operation of construction and personal vehicles or equipment	Direct	Temporary	Percentage of increase in average daily traffic from truck trips during construction
			Long term	Percentage of increase in average daily traffic during airport operation
Loss of or gain in tax base	Wages and spending among construction contractor and crew (hereafter referred to as "contractor") and residents during construction	Direct	Short term	Total tax revenue gained or lost from airport and road construction using the IMPLAN model. (See the definition of the IMPLAN model immediately following this table.) Earnings gained during construction could continue to be spent by residents and could continue to circulate in the community after construction ends.
	Property acquisition and resident spending during operation		Long term	Tax revenue gained or lost from airport retail sales or loss of residential or business property
Changes in business activity and economic revenue	Job creation during construction; contractor and resident wages and spending during construction	Indirect	Short term	Numbers of jobs and amount of earnings added due to construction using the IMPLAN model. Earnings gained during construction could continue to be spent by residents and could continue to circulate in the community after construction ends.
	Job creation and resident wages and spending during airport operation		Long term	Numbers of jobs added and amount of earnings added due to airport and road operation and maintenance
	Improved aviation availability and reliability		Long term	Qualitative assessment of tourism growth with and without airport
Changes in population movement and growth	Improved aviation availability and reliability	Indirect	Long term	Qualitative assessment of projected long-term population and demographic trends for Angoon with and without the airport
			Long term	Qualitative assessment of second homeownership with and without the airport
Changes in public service demand	Contractor use of water, sewer, electrical, and waste disposal services	Indirect	Temporary	Qualitative assessment of changes in demand for public services with and without the airport
	Airport operation use of water, sewer, electrical, and waste disposal services	Indirect	Long term	Qualitative assessment of changes in demand for public services with and without the airport
Changes in transportation costs	Change in airplane type and airport proximity to town	Indirect	Long term	Projected changes in airfares and cost of travel to the airport
Changes in commercial land use and subsistence use	Airport and road construction causing improved land access or conversion from existing land use	Indirect	Long term	Net effect to subsistence access during airport and access road operation, measured in acres
			Long term	Loss of lands for future economic development, measured in acres

IMPLAN (Minnesota IMPLAN Group 2011) is a computer-based economic model used to determine economic effects related to jobs, earnings, and tax. Using employment and expenses data specific to Angoon, it can establish a baseline for all economic activity that currently occurs in the area. That baseline can then be used to predict what would happen to the economy under a new scenario—in this case the establishment of a land-based airport and access road near Angoon. IMPLAN is frequently used to analyze local and regional economies in Alaska, and is considered an industry standard.

For this EIS, IMPLAN was used to estimate the short-term economic effects from construction of a land-based airport but not used to estimate longer-term effects from airport operation and maintenance (O&M). Although ideally IMPLAN would be used for both scenarios, the model (as indicated above) requires historic information about jobs and income in Angoon in order to predict how employment and income might change if additional business earnings enter the Angoon economy. More specifically, IMPLAN uses these historic data to track how businesses and their workers would spend their income in the local economy, which is called a multiplier effect.

For airport O&M activities, there are no existing government airport or road construction businesses so the change in the local economy cannot be modeled. Per the Department of Transportation and Public Facilities director of maintenance for the Southeast Alaska Region (Snow 2013), when the airport and access road are built, the Department of Transportation and Public Facilities will directly hire employees to perform these tasks. Because Angoon is small, and does not currently have an airport and has very few roads, however, there is no government entity in town that currently provides road maintenance or airport operations (although a private firm does provide some road maintenance support). Therefore, the IMPLAN model has no historic information about government O&M employment and income, or more importantly, their multiplier effects on Angoon.

Based on the above considerations, IMPLAN output was used to estimate revenue generated directly and indirectly from the construction of the Angoon Airport and access road. Direct employment and revenue could include jobs and wages for construction workers as well as the contractor's direct purchase of goods and services in Angoon, such as food and lodging for workers and transportation services for workers and materials. Indirect employment and income would include revenue and jobs from additional spending in the local area by businesses and individuals who would earn wages from construction activity. Indirect effects would also include wages for non-construction jobs produced in the community as a result of that spending.

Because IMPLAN cannot be used to estimate revenue as a result of airport O&M for this project, this EIS instead uses employment data and pay rates for the Hoonah Airport, a comparably sized airport and community in Southeast Alaska. Per the Department of Transportation and Public Facilities director of maintenance for the Southeast Alaska Region (Snow 2013), one full-time foreman and a seasonal (0.5 full-time equivalent [FTE]) maintenance worker are employed at Hoonah. Because Angoon effectively already has a 0.25 FTE maintenance worker from private road O&M activity (Snow 2013), the airport and access road at Angoon would require an additional 1.25 employees for O&M, consisting of a full-time foreman and a 0.25 FTE seasonal position. Income for these jobs was estimated by applying appropriate pay ranges from the current State of Alaska salary schedules. The foreman would likely be hired at a pay range of 52 under the Labor, Trades, and Crafts Class I. The seasonal position would likely be hired at a pay range of 53 under the Labor, Trades, and Crafts Class I. Because no jobs like this currently exist in Angoon, no salary schedule for the Labor, Trades, and Crafts unit designation is available for Angoon at this time. Therefore, the specific schedule for the Hoonah area for this unit designation was used for salary calculations. Pay ranges were multiplied by assumed annual hours (1,950 for the full-time position, and 487.5 hours for 0.25 FTE) to determine total annual income that would enter the Angoon economy from O&M activity.

4.12.3.2. How did the FAA determine the significance of the anticipated effects from the alternatives?

According to FAA Order 1050.1E, direct socioeconomic effects are considered significant if

- extensive relocation of residents is required but sufficient replacement housing is unavailable,
- extensive relocation of community businesses would create severe economic hardship for the affected communities,
- disruptions of local traffic patterns would substantially reduce the levels of service regarding roads serving the airport and its surrounding communities, or
- there would be a substantial loss in the community tax base.

Indirect socioeconomic effects are considered significant by the FAA if they result in a positive or negative long-term

- change in business and economic activity,
- shift in population movement and growth,
- change in public service demands, or
- change in other factors identified by the public as locally important, such as transportation costs, land use, and subsistence use.

The FAA order that establishes these thresholds for indirect effects do not define or establish specific quantitative measures for these changes or shifts, and none have been established for this EIS. However, FAA Order 1050.1E notes that these effects "will normally not be significant except where there are also significant impacts in other categories, especially noise, land use, or direct social impacts."

4.12.3.3. How would each alternative affect socioeconomic conditions?

This analysis is organized by the type of socioeconomic effect that could occur from any of the airport and access road alternatives. Under each type of effect, each alternative is discussed.

4.12.3.3.1. Relocation of residents

Under the no action alternative, no relocation of residents would be needed because no airport or road would be constructed.

For all action alternatives, there would be no noise-sensitive areas within the DNL 65 dB contour for any action alternative (see section 4.11.3 in Noise), therefore, no mandatory or voluntary resident relocation would be needed based on noise considerations.

The potential extraction of construction materials from an on-island materials source under any of the action alternatives would occur on Kootznoowoo, Inc. and City of Angoon land parcels, and would not require land acquisition of residential lots (see Figure SO10).

Construction of Airport 3a would require ***avigation easements*** but no land acquisition for an estimated five home sites in the South Favorite Bay Subdivision (see Figure SO10). Avigation easements would not result in mandatory resident relocation, however, because the easements would not require residents to sell or give up their home site. Residents would only be required to permit access by the Alaska Department of Transportation and Public Facilities for vegetation clearing associated with the proposed airport. Furthermore, although these parcels are zoned for residential development, they are currently undeveloped.

Construction of Airport 4 would not require avigation easements or land acquisition for zoned residential parcels (see Figure SO10). No resident relocation would be required. Construction of either Access 2 or Access 3 would not require easements or land acquisition of zoned residential parcels (see Figure SO10). No resident relocation would be required.

Terms to know

Avigation easement: A right-of-way tool used in airport planning to grant certain rights to the holder of the easement. For this EIS, avigation easements outside of airport property would provide the Alaska Department of Transportation and Public Facilities DOT&PF the right to access areas to clear them of obstructions and maintain that clearance.

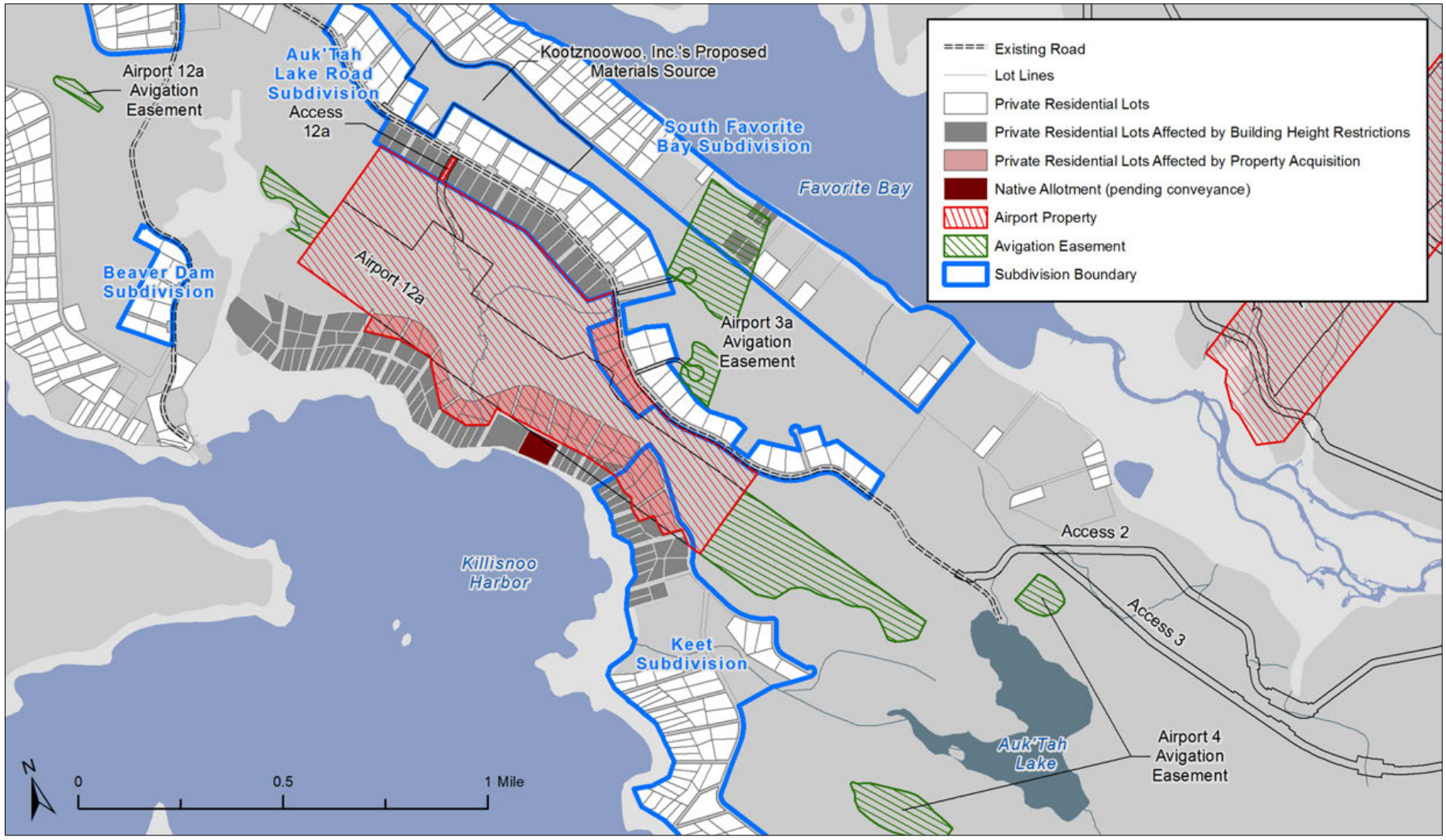


Figure SO10. Airport property acquisition and avigation easements in the vicinity of zoned residential parcels.

The airport property boundary for Airport 12a (preferred alternative) includes surrounding residential lots to control encroachment on the airport. Therefore, construction of Airport 12a with Access 12a would require the Alaska Department of Transportation and Public Facilities to acquire 37 zoned residential parcels for airport construction in the Keet and Auk'Tah Lake Road subdivisions; this represents 6% of total zoned home sites on the Angoon peninsula. The Alaska Department of Transportation and Public Facilities would also set building height restrictions on an additional 91 private, zoned, or planned residential parcels to prevent obstructions from becoming a hazard to aviation, but no resident relocation would be required (see Figure SO10).

Acquisition of zoned residential parcels would affect those Kootznoowoo, Inc. shareholders who received home sites as part of the ANCSA 14(c)(1) conveyance process, described in section 4.12.2.3 above. Although none of the affected lots have been developed yet for residential uses and there are no temporary or permanent houses present, this property acquisition would require affected stakeholders to sell their property, resulting in a net loss to all shareholders of residential property, and an inability of affected landowners to relocate to those particular lands in the future. However, there are vacant homes in Angoon's town core that displaced residents could choose to purchase.

4.12.3.3.2. Business relocation

Under the no action alternative, no business relocation would take place.

Based on the location of existing businesses, none would be displaced by any action alternative. (See Figure SO1 for the locations of businesses and alternatives.)

4.12.3.3.3. Disruption in local traffic patterns

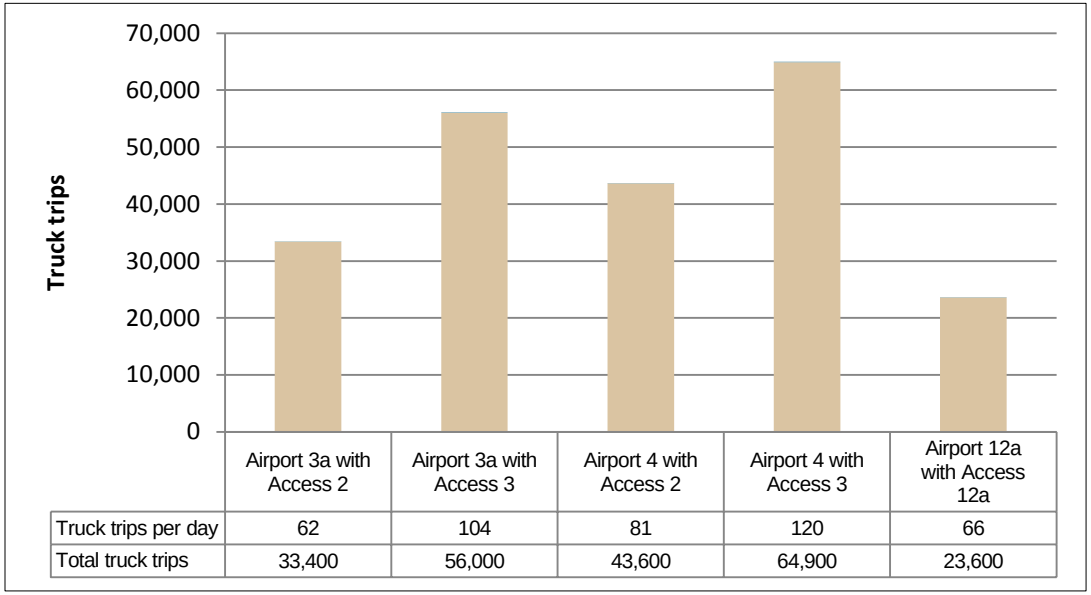
Under the no action alternative, local traffic patterns remain as they currently are. However, the community could experience future traffic pattern changes as a result of other, unrelated economic activities that influence population growth and development.

Temporary traffic effects

All action alternatives would change traffic patterns temporarily. During construction, traffic would increase on the Kootznahoo Road and the BIA Road to accommodate approximately 50 construction vehicles (trucks, worker vehicles, and equipment). For all action alternatives, this represents a 12% increase over current average daily traffic.

The timing and intensity of this traffic increase would differ by action alternative. As shown in Figure SO11, the daily number and total number of truck trips required to transport materials would vary by airport and access road due to the different distances required and different terrain characteristics of the construction site. Sites that are farther from Angoon or that have steeper or more variable terrain would require more materials and more truck trips.

The greatest increase in truck trips over the no action alternative would occur under Airport 4 with Access 3, which would require an average of 120 truck trips per day. The smallest increase in truck trips would occur under Airport 3a with Access 2, with an average of 62 truck trips per day. Although Airport 12a with Access 12a would have the fewest total truck trips, it would also have a shorter construction period (estimated at two seasons) and, therefore, a relatively high average daily truck trip estimate of 66.



	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Truck trips per day	62	104	81	120	66
Total truck trips	33,400	56,000	43,600	64,900	23,600

Figure SO11. Estimated construction traffic by alternative.

For all action alternatives, this increase in traffic could result in periodic traffic congestion or time delays on Angoon roads. Additionally, increased traffic from barge activity could affect Angoon youth's ability to congregate by the ferry for social gatherings. However, due to the short construction period and relatively low volume of additional construction traffic, airport and access road construction would not likely result in a substantially decreased level of service for roads in the Angoon area or have lasting effects on youth activities.

Long-term traffic effects

Every action alternative would change traffic patterns in the long term. It is estimated that the opening of a land-based airport (assumed for 2019) would decrease passenger use of the Angoon Seaplane Base by the same levels that flight operations would decrease—74%—for a total of 455 passengers per year at the seaplane base (based on 1,746 passengers in 2010). However, it is estimated that 4,344 passengers would use the land-based airport during the same year (Barnard

Dunkelberg and Company 2008a). Assuming that each passenger would drive individually to the land-based airport, and assuming that 50% of seaplane passengers would drive to the seaplane base (because the remainder would walk there), there would be an additional 3,699 round-trip car trips per year on local roads. This increase in vehicle traffic represents an approximate 2%–5% increase over current average daily traffic (depending on how many round trips occur in a 24-hour period).

The presence of a new road could also increase the number of car trips for pleasure (for example, teenagers driving around just for something to do) or for subsistence activities. The new access road would also create more traffic along the existing BIA Road past several planned subdivisions. Although it is not possible to quantify the magnitude of this effect, the increase in vehicle travel could result in periodic increases in traffic noise near planned subdivisions, and traffic congestion or time delays, particularly during airplane arrivals and departures. It would not likely result in a substantially decreased level of service, however, due to the overall negligible increase in traffic volume as compared to existing conditions.

4.12.3.3.4. Tax base

Under the no action alternative, the area's current tax revenue would not change because no airport or road would be constructed.

Based on IMPLAN modeling results, all action alternatives would result in a short-term increase in sales tax revenue for Angoon during construction. This new tax revenue would come from the purchase of taxable goods and services in the community by the construction contractor and by Angoon residents and businesses earning income from the construction project. Based on the length of the access road, the action alternatives would vary in the amount of projected tax revenue they generate. In other words, either Airport 3a or Airport 4 with Access 3 (the longest road option) would require a longer construction period and more construction staff, and would therefore result in more spending and tax revenue.

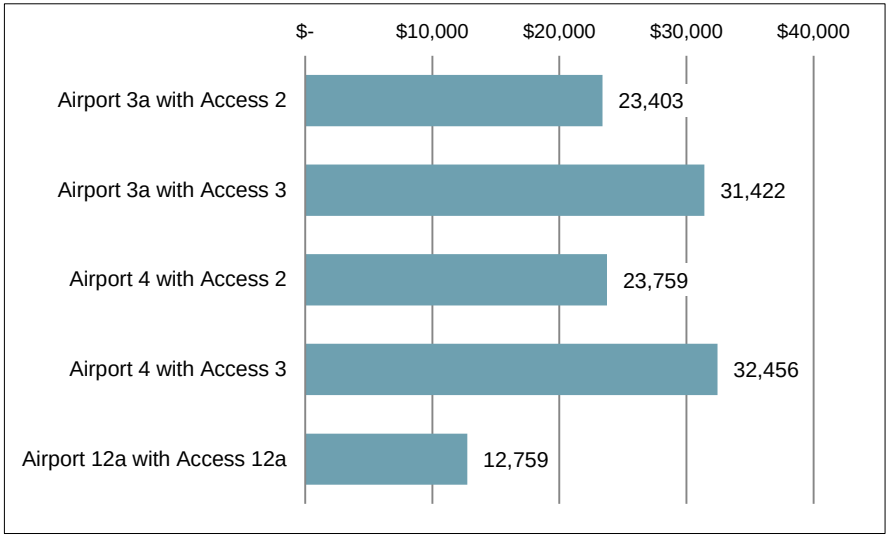


Figure SO12. Estimated tax revenue by alternative.

Over the two- to three-season construction period, all action alternatives would generate an estimated $12,759 to $32,456 in new taxes for the City of Angoon. Figure SO12 shows the total estimated tax revenue by alternative. Under any action alternative, there would be no retail sales and therefore no additional business taxes. Neither would there be any long-term loss of real estate taxes because the City of Angoon does not charge property tax. Under Airport 3a and Airport 4, lease lots are planned for future use, but the physical use of those lots is not a reasonably foreseeable action at this time and has not been evaluated in this EIS.

4.12.3.3.5. Business activity and economic revenue

Under the no action alternative employment opportunities and economic activity would not change because no airport or road would be constructed.

Under all action alternatives, airport construction is estimated to support 45 temporary construction-related jobs. The number of jobs supported by access road construction would vary by alternative because of the different road lengths required (Figure SO13). Job estimates for airport and road construction are based on information received from the Alaska Department of Transportation and Public Facilities for the average number of workers needed to complete a project of this size.

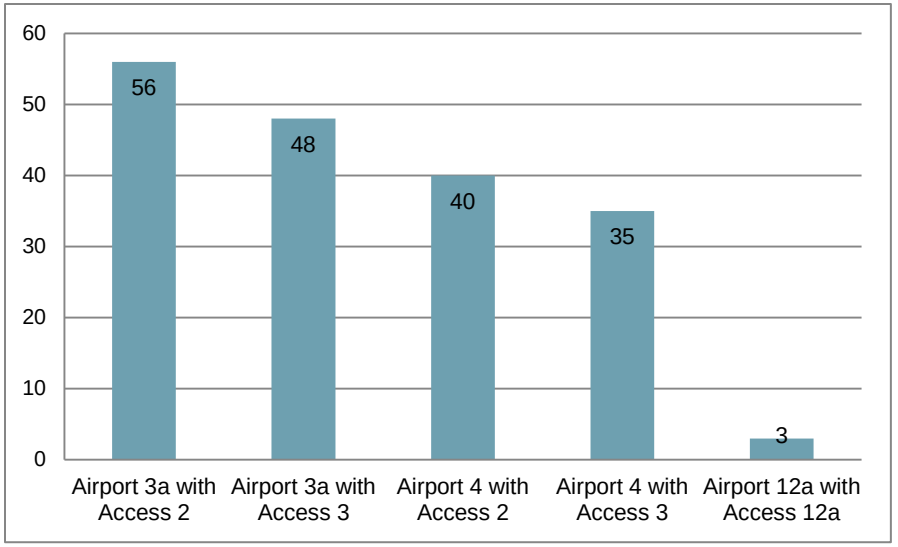


Figure SO13. Numbers of jobs supported by access road construction per alternative.

These temporary construction jobs would be staffed mostly by nonlocal workers because of job skill requirements. The IMPLAN model estimates that one to two construction jobs would be filled by Angoon residents. IMPLAN results also indicate that additional spending by workers, local residents, and businesses earning income from construction could generate additional short term job opportunities for Angoon residents. Table SO2 provides a summary of estimated construction-related jobs for Angoon residents by alternative.

Table SO2. Estimated numbers of jobs for Angoon residents during construction

Job	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Road and airport construction	2.2	1.9	2.1	1.7	1.4
Spending-related	11.2	14.5	11.6	15.0	5.8
Total	13.4	16.4	13.7	16.7	7.2

All action alternatives would generate 1.25 long-term maintenance and operation jobs, and an additional 0.25 spending-related job for the duration of the airport's operation (Snow 2013).

Based on IMPLAN results, construction of any action alternative would generate short-term economic benefits as a result of income generated directly and indirectly during construction (Table SO3). Operation and maintenance of the airport under any action alternative would result in an additional $70,678 in new wages per year (Snow 2013).

Terms to know

Natural amenities: Factors associated with a community such as scenic value, environmental quality, outdoor recreation opportunities, climate, and a desirable pace of life.

Under all action alternatives, economic revenue from tourism activity could also increase as a result of improved aviation availability and reliability. Several studies report that the ability to attract residents and visitors (through high-quality ***natural amenities*** or other factors) can affect economic growth in rural communities in Southeast Alaska (see, for example, Mazza 2004 and Mazza and Kruger 2005). The Monument–Wilderness Area provides high-quality natural amenities in the Angoon area. However, tourism levels have historically remained low in the Angoon area, and aviation demand forecasts suggest that aviation activity would increase by 0.50%–0.55% annually over the next 20 years. Therefore, the potential magnitude of long-term economic benefit from tourism growth is uncertain.

Table SO3. Economic benefit from airport construction*

Predicted economic benefit	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Construction worker wages and salaries	$77,921	$66,170	$70,982	$59,930	$45,637
Contractor purchase of local goods and supplies	$116,530	$98,950	$106,150	$89,623	$68,248
Additional worker wages and salaries from individual and business spending	$408,243	$549,921	$421,610	$568,393	$222,433
Business revenue from individual and business spending	$780,086	$1,047,413	$791,973	$1,081,855	$425,312

* These benefits do not include any wages of nonlocal construction workers or spending outside of Angoon.

4.12.3.3.6. Population movement and growth

Under the no action alternative, neither the location of Angoon's population nor the pattern of growth in the Angoon community would change because no airport or road would be constructed. However, based on feedback from Angoon residents that is discussed in the *Public and Agency Scoping Report* (Appendix A), the expense of travel and the limited economic and educational opportunities for Angoon residents could lead to continued outmigration to other communities in Alaska or the Lower 48 states. This outmigration, in particular, would likely affect younger residents who are over 18 and in the active labor workforce (Hunsinger et al. 2012), thereby also potentially shifting community demographics toward an older age bracket as younger residents leave for other opportunities.

Neither Airport 3a nor Airport 4 would displace residents or businesses, and therefore they would not cause a shift in population location nor influence the pattern of population growth. Airport 12a with Access 12a would require acquisition of 37 (6%) of the area's available home sites, and therefore its effects would be too small to result in large-scale shifts in population or to influence the pattern of growth. None of the action alternatives would affect existing residences in Angoon's city center.

As addressed in section 4.12.3.3.8, a land-based airport could result in lower airfares. This EIS assumes that Angoon residents would travel more if airfares were lower, and also assumes that they could therefore more easily achieve their economic, educational, or other goals without having to move away from Angoon. For these reasons, compared to the no action alternative, all action alternatives could help offset the trend identified by the Alaska Department of Labor and Workforce Development toward outmigration of younger working residents. Improved reliability and availability of aviation service could also increase the potential for immigration of new residents drawn to Angoon's natural amenities or for second homeownership by nonlocal Kootznoowoo, Inc. shareholders, but it is not possible to quantify the extent of this potential population increase at this time.

4.12.3.3.7. Public service demand

Under the no action alternative, existing public demand for city services, including electricity, sewer, water, and waste disposal, would not change because no airport or road would be constructed.

Construction of any action alternative would result in a temporary increase in public demand for city services, including electricity, sewer, water, and waste disposal. Details on existing and potential changes in demand for these services are provided in section 4.10 Energy Supply, Natural Resources, and Sustainable Design, and section 4.7 Hazardous Materials, Pollution, and Solid Waste. In general, however, Angoon has sufficient infrastructure, storage capacity, and resource availability to meet increased service demands.

Operation of any action alternative would not require city sewer, water, and waste disposal services. Electricity to support airport lighting and navigation aids would come from an on-site generator stationed at the airport, and, therefore, these alternatives would not have an appreciable effect on the demand for city services during operation. Although the remoteness and length of either access to Airport 3a or Airport 4 could result in increased local road maintenance, maintenance would be the responsibility of the Alaska Department of Transportation and Public Facilities and not the City of Angoon.

4.12.3.3.8. Transportation costs

Under the no action alternative, transportation costs would not change because no airport or road would be constructed. Residents would continue to travel less than 2 miles round-trip to reach the Angoon Seaplane Base from the city center. This distance equals approximately 0.1 gallon of fuel consumption, or $0.50 per trip, based on January 2012 gasoline prices in Angoon. Actual travel costs would vary by vehicle, depending on the vehicle make and model and fuel costs at the time of travel.

For all action alternatives, estimated travel distance and costs would be higher than under the no action alternative. Depending on the alternative, residents would travel between 4.7 miles (for Airport 12a with Access 12a) and 17.2 miles (for Airport 3a with Access 3) round-trip from the city center to reach a new airport (see Table SO4). Round-trip fuel consumption and cost for residents to travel to any new airport is estimated be roughly 1.0 gallon or less per trip, or up to approximately $5.00, based on January 2012 gasoline prices in Angoon. As with the no action alternative, actual travel costs would vary by vehicle, depending on the vehicle make and model and fuel costs at the time of travel. Travel times and cost to travel to alternative airport sites could also vary based on weather and road conditions; travel could take longer or even be inaccessible during poor weather or road conditions.

Table SO4. Travel distance to airport alternatives

Alternative	Miles from City Center (round trip)
No Action Alternative	0 miles
Airport 3a with Access 2	16.6 miles
Airport 3a with Access 3	17.2 miles
Airport 4 with Access 2	13.6 miles
Airport 4 with Access 3	14.2 miles
Airport 12a with Access 12a	4.7 miles

Under all action alternatives, a new land-based airport could increase the number and types of airplanes that provide service to Angoon, potentially increasing competition and decreasing air travel costs for passengers and cargo. Because of the greater passenger and cargo capacity on wheel-based aircraft, fares on wheel-based aircraft are lower per average seat mile than fares on seaplanes, the only type of aircraft currently serving Angoon (DOWL Engineers and Southeast Strategies 2008). Actual fares would be determined by aircraft carriers based on various factors, including demand and fuel costs.

4.12.3.3.9. Subsistence resources

Under the no action alternative, subsistence activity would not change because no airport or road would be constructed.

All action alternatives would result in a temporary loss of access to subsistence use areas during construction and a long-term loss of access as a result of perimeter fencing around the airport. However, over the long term, the presence of a new road north of Favorite Bay to either Airport 3a or Airport 4 would result in improved and new access to subsistence use areas (Figure SO14 and Table SO5; see also section 4.13.3 Subsistence Resources and Uses for additional information on effects to subsistence resources and uses, including how improved and new subsistence use areas were determined and calculated). This improved and new access could increase subsistence users' harvest of deer, fish, and other subsistence resources. In contrast, the reduced access from perimeter fencing associated with Airport 12a with Access 12a could decrease subsistence users' harvest. However, because residents do not exclusively rely on subsistence resources to meet their food needs, this EIS expects no measurable change in residents' need to purchase groceries and associated grocery costs as a result of harvest changes for all alternatives.

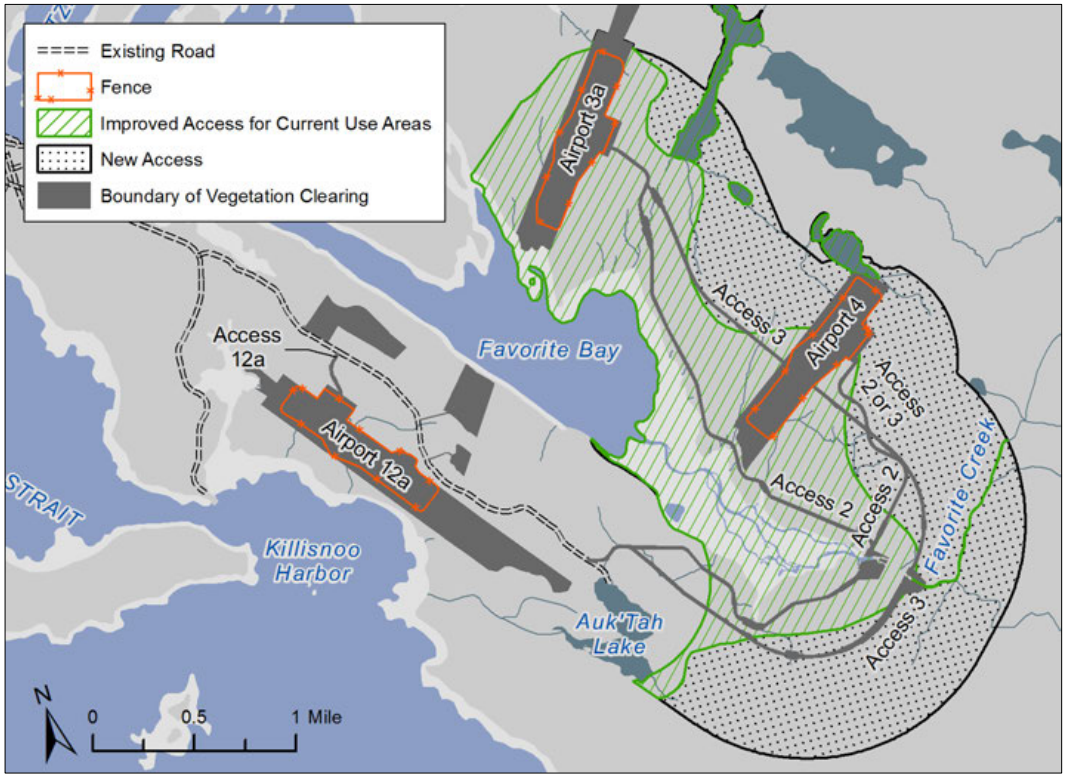


Figure SO14. Changes to subsistence access from action alternatives.

Table SO5. Access to subsistence lands by alternative

Alternative	Acres of temporary reduced access	Acres of long-term reduced access	Acres of improved access	Acres of new access
No action alternative	0.0	0	0	0
Airport 3a with Access 2	344	98	2,021	726
Airport 3a with Access 3	349	98	2,116	1,416
Airport 4 with Access 2	290	100	1,425	896
Airport 4 with Access 3	295	100	1,442	1,180
Airport 12a with Access 12a	258	96	0	0

4.12.3.3.10. Commercial land use

Under the no action alternative, existing commercial land uses would not change because no airport or road would be constructed.

Under all action alternatives, commercial land managed by Kootznoowoo, Inc. would be acquired through purchase, rights-of-way, permits, and/or leases, and converted from its former commercial use to airport use (see section 4.3.3 Compatible Land Use for additional discussion of land use changes). Figure SO15 summarizes long-term commercial land conversion by alternative.

Airport 12a with Access 12a would cause the greatest reduction in long-term commercial land use—a 10% decrease from existing Kootznoowoo, Inc. land holdings on the Angoon peninsula—compared to the other action alternatives, which would each result in less than a 1% decrease in the long-term availability of commercial lands. In all cases, this land conversion is consistent with Kootznoowoo, Inc.'s goal of profitability for their lands, although it would preclude the use of

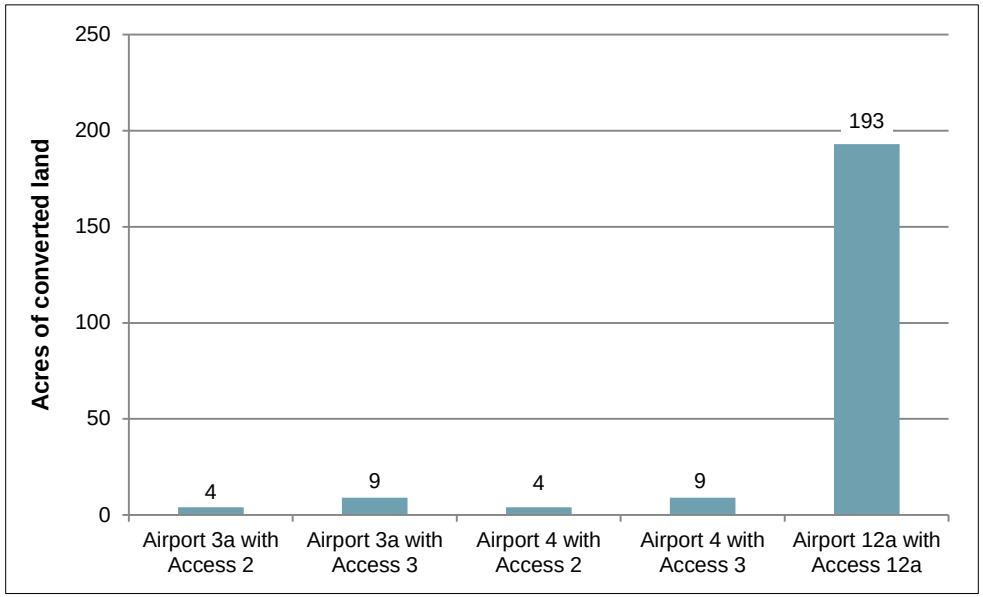


Figure SO15. Commercial land converted to airport and road uses per alternative.

those lands for other income-generating activity. Airport 12a with Access 12a would also remove several large, adjoining land parcels that could be used for larger-scale economic enterprises, leaving smaller, land-locked parcels for future economic growth opportunities (see Figure SO15).

4.12.3.4. How do all the effects to socioeconomic conditions compare?

Direct and indirect effects to socioeconomic conditions include both benefits and drawbacks for the community of Angoon. Table SO6 summarizes these effects by alternative.

Table SO6. Summary of socioeconomic effects by alternative

Effect	No action alternative	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Relocation of residents	• No relocation of residents	• No relocation of residents	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Acquisition of 37 zoned residential parcels
Business relocation	• No relocation of businesses	• No relocation of businesses	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2
Disruption in local traffic patterns	• No change in average daily traffic • No change in level of service	• 12% increase in average daily traffic during construction • 2%–5% increase in average daily traffic during operation • 62 daily truck trips during construction • No substantial decrease in level of service	• Average daily traffic during construction and operation same as Airport 3a with Access 2 • 104 daily truck trips during construction • No substantial decrease in level of service	• Average daily traffic during construction and operation same as Airport 3a with Access 2 • 81 daily truck trips during construction • No substantial decrease in level of service	• Average daily traffic during construction and operation same as Airport 3a with Access 2 • 120 daily truck trips during construction • No substantial decrease in level of service	• Average daily traffic during construction and operation same as Airport 3a with Access 2 • 66 daily truck trips during construction • No substantial decrease in level of service
Loss or gain in tax base	• No change to tax base	• $23,403 in new sales taxes during construction	• $31,422 in new sales taxes during construction	• $23,759 in new sales taxes during construction	• $32,456 in new sales taxes during construction	• $12,759 in new sales taxes during construction

Table SO6. Summary of socioeconomic effects by alternative

Effect	No action alternative	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Changes in business activity and economic revenue	• No change to long-term economic activity, revenue, employment	• 13.4 construction-based jobs created • $1,382,780 in economic benefit generated during construction • 1.5 operation-related jobs created	• 16.4 construction-based jobs created • $1,762,454 in economic benefit generated during construction • 1.5 operation-related jobs created	• 13.7 construction-based jobs created • $1,390,715 in economic benefit generated during construction • 1.5 operation-related jobs created	• 16.7 construction-based jobs created • $1,799,801 in economic benefit generated during construction • 1.5 operation-related jobs created	• 7.2 construction-based jobs created • $761,630 in economic benefit generated during construction • 1.5 operation-related jobs created
Changes in population movement and growth	• No effect on projected long-term population trends • Continued outmigration by younger residents	• Potential decrease in outmigration and subsequent population rise	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2
Changes in public service demand	• No change to city service demand • Continued difficulty in meeting ferry/seaplane demand due to reliability and availability issues	• Increased city service demand • Improved service capacity to meet aviation demand	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2
Changes in transportation costs	• No change in current travel costs and airfare	• Less than 1 gallon of fuel (approximately $5) to drive to airport • Costs for passenger and cargo shipping may decrease	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2
Net change to subsistence access during airport and access road operation	• No change to current subsistence access	• 628 acres net gain in subsistence access	• 1,318 acres net gain in subsistence access	• 796 acres net gain in subsistence access	• 1,082 acres net gain in subsistence access	• 96 acres net decrease in subsistence access
Changes in commercial land use	• No change to current land use	• 4 acres of commercial land converted to airport use	• 9 acres of commercial land converted to airport use	• 4 acres of commercial land converted to airport use	• 9 acres of commercial land converted to airport use	• 193 acres of commercial land converted to airport use

Resident and business relocation: Airport 12a with Access 12a is the only alternative that would require residential property acquisition for road and airport construction. None of the alternatives would require business relocation.

Traffic patterns: All action alternatives would increase average daily traffic by approximately 2% during airport and road operation, and average daily traffic would increase by 12% during construction. During construction, Airport 4 with Access 3 would result in the greatest temporary increase in daily truck traffic. None of the action alternatives would result in a substantial change in level of service.

Tax base: All action alternatives would result in a short term increase in sales tax revenue for Angoon during construction. Airport 4 with Access 3 would provide the greatest increase in sales tax revenue during construction because the alternative would require a longer construction period and more construction staff, and would therefore result in more spending and tax revenue.

Business activity and economic revenue: Airport 4 with Access 3 would generate the most employment and revenue during construction, whereas Airport 12a with Access 12a would generate the fewest jobs and least amount of revenue for Angoon residents during construction. All action alternatives would generate less than two full-time jobs related to airport and access road maintenance and operations.

Population movement and growth: All action alternatives could result in a long-term decrease in outmigration and/or population increase from new primary or second homeownership.

Public service demand: All action alternatives would increase demand for public services during construction.

Transportation costs: All action alternatives would require 1.0 gallon of fuel or less for a round-trip drive to the airport, which costs approximately $5.00 as of January 2012. All action alternatives could reduce airfare and shipping costs through improved flight availability and competition among carriers.

Subsistence: Airport 3a and Airport 4 would each yield a net gain in improved and new access to subsistence use areas whereas Airport 12a with Access 12a would result in a loss of access to subsistence use areas. For more information on effects to subsistence resources and uses, including how improved and new subsistence use areas were determined and calculated, see section 4.13.3 Subsistence Resources and Uses.

Commercial land use: Airport 12a with Access 12a would convert the most acres of available commercial land in the long term.

4.12.3.5. Would any effects be irreversible or irretrievable?

Construction of any action alternative would result in irreversible and irretrievable effects to socioeconomic conditions. Specifically, the land for the airport and access road would be unavailable for other socioeconomic purposes during ongoing operation and maintenance.

4.12.3.6. Would any of the alternatives have a significant effect on socioeconomic conditions?

As addressed in section 4.12.3.3, direct effects related to business relocation, traffic patterns, and tax base would not be significant because they would fall under the FAA's significance thresholds (see section 4.12.3.2). Airport 12a with Access 12a would require long-term property acquisition for 37 parcels, but these effects would not be significant because of 1) the low number of affected parcels, 2) the availability of vacant homes in the town core, and 3) the FAA's adherence to the Uniform Relocation Assistance and Real Property Acquisition Act of 1970. The law was enacted to ensure fair and equitable treatment as well as moving assistance to all people whose property would be acquired.

For indirect effects, construction of the proposed airport and access road would result in short-term positive economic and employment effects for the Angoon community but these effects would not be significant. All other indirect effects—including changes in transportation costs, public service demand, subsistence, and population movement and growth—would also not be significant.

4.12.3.7. How could the effects described above be avoided, minimized, or mitigated?

Because no significant effects are anticipated for socioeconomic resources, no additional mitigation measures beyond those discussed in Chapter 7: Mitigation would be implemented under any action alternative. Chapter 7 describes best management practices that would be implemented during construction. Best management practices are relatively common activities in construction and are intended to prevent pollution, minimize environmental harm, and assure that appropriate response action is taken if unacceptable environmental effects occur. Through the use of these best management practices, effects are reduced during construction. The best management practices described in Chapter 7 were considered during effects analysis for this resource.

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4.13. Subsistence Resources and Uses

This section addresses the existing conditions of subsistence resources and uses in the Angoon area as well as potential changes to those conditions from the airport and access alternatives.

4.13.1. Background information

4.13.1.1. What do the terms "subsistence uses" and "subsistence resources" mean?

The term "subsistence uses" is defined in Section 803 of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 (Public Law [PL] 96-487) as

> the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of ***non-edible byproducts*** [emphasis added] of fish and wildlife resources taken for personal or family consumption; for ***barter*** [emphasis added], or sharing for personal or family consumption; and for ***customary trade*** [emphasis added].

The definition of "subsistence resources" is derived from the definition of "subsistence uses" above as being the plants, fish, and wildlife, in other words, "wild, renewable resources" that are used for subsistence by rural Alaska residents. See the sidebar titled "Subsistence and ANILCA" below for more information.

What is discussed in this section?

Terms to know

Barter: Used here, the exchange of subsistence items for goods or services other than money.

Customary trade: Used here, the exchange of subsistence items for money.

Non-edible byproducts: Parts of an animal such as the hide or antlers of a deer that typically are not consumed as food.

4.13.1.2. What laws, policies, regulations, or guidelines directed examinations of subsistence resources and uses?

If a project would affect federal public lands in Alaska, Section 810 of ANILCA requires the lead federal agency, in this case, the Federal Aviation Administration (FAA), to evaluate the effects to subsistence resources and uses when determining whether to withdraw, reserve, lease, or permit the use, occupancy, or ***disposition*** of those federal lands. In this case, two airport and access alternatives are located on federal public lands managed by the U.S. Forest Service. Section 810 of ANILCA is only intended to document effects to subsistence resources on federal public lands and does not document project effects on lands of other ownership, such as state, local, or private lands. A Section 810 subsistence evaluation (SWCA 2014e) that documents effects to subsistence resources and uses on federal public lands is found in this environmental impact statement (EIS) in Appendix N.

To meet the requirements of the National Environmental Policy Act in disclosing effects to the human environment, this EIS section addresses existing conditions and project effects to subsistence resources and uses on all lands in the area, regardless of landownership. This allows for a comparison of project effects to subsistence resources and uses between alternatives regardless of whether they are located on federal or non-federal lands. Neither the FAA nor the U.S. Forest Service has specific guidance on documenting effects to subsistence resources and uses other than what is outlined in Section 810 of ANILCA (see the sidebar titled "Subsistence and ANILCA" at right for more information). Therefore, this EIS section uses the guidelines set out in ANILCA Section 810 and subsequent case law to assist in evaluating subsistence resources and uses effects on all lands. In particular, U.S. District Court case *Kunaknana v. Clark*, 742 F.2d 1145 (9th Cir. 1984), established a precedent for analyzing effects on subsistence resources and uses based on four types of change:

- Reduction in abundance and availability of subsistence resources
- Reduction in access to subsistence resources
- Increase in competition for subsistence resources

Terms to know

Disposition: Used here, the transfer of property to the care or management of another individual or agency.

Subsistence and ANILCA

As described in Chapter 5: Requirements of the Alaska National Interest Lands Conservation Act (ANILCA), the act resulted in the designation of more than 100 million acres of federal lands into conservation system units (for example, parks, refuges, and monuments). In developing the act, Congress also acknowledged the importance of the traditional subsistence lifestyle of rural Alaskans.

Title VIII of ANILCA was enacted to protect customary and traditional subsistence uses. In Title VIII, Congress prioritized the continuation of opportunities for subsistence uses by rural residents, and recognized that "in most cases, no practical alternative means are available to replace food supplies and other items gathered from fish and wildlife which supply rural residents dependent on subsistence uses" (ANILCA 801.2).

One way Congress intended to protect opportunities for subsistence is through ANILCA Section 810. Section 810 requires federal agencies to evaluate the possible effects to subsistence resources and uses for projects occurring on federal public land in Alaska.

This court case's implications for subsistence resource analysis are discussed further in sections 4.13.3.1 and 4.13.3.2. Other policies that federal agencies must consider when examining subsistence resources and uses are Executive Order 13175: Consultation and Coordination with Indian Tribal Governments (November 6, 2000) and Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations (February 11, 1994). These orders are discussed in Chapter 9: Consultation and Coordination and section 4.18 Environmental Justice and Children's Health and Safety, respectively.

4.13.1.3. What is the importance of subsistence resources to Angoon residents? What kind of resources do people in Angoon obtain through subsistence activities?

Subsistence is extremely important to Angoon residents. Given the difficult access to and from the community and the limited availability and high cost of food and materials, subsistence resources are an effective and relatively inexpensive way of getting not only food but also fuel (for heating homes and drying meats), building materials, handicrafts, and materials for ceremonial clothing.

A 1996 study by the Alaska Department of Fish and Game (2009) shows that approximately 97% of Angoon households use subsistence resources (whether or not they harvested that resource themselves), and 93% of households did their own harvesting of some type of subsistence resource.

Many different plant and animal species make up the subsistence resources harvested by Angoon area residents. These plant and animal species fall into different resource categories, as shown in Figure SU1, and occupy various habitats in the Angoon area. Subsistence users in Angoon utilize many of these resources in a number of different ways. Subsistence resources and their use by Angoon residents in the study area (see section 4.13.2.1 and Figure SU2) are described below.

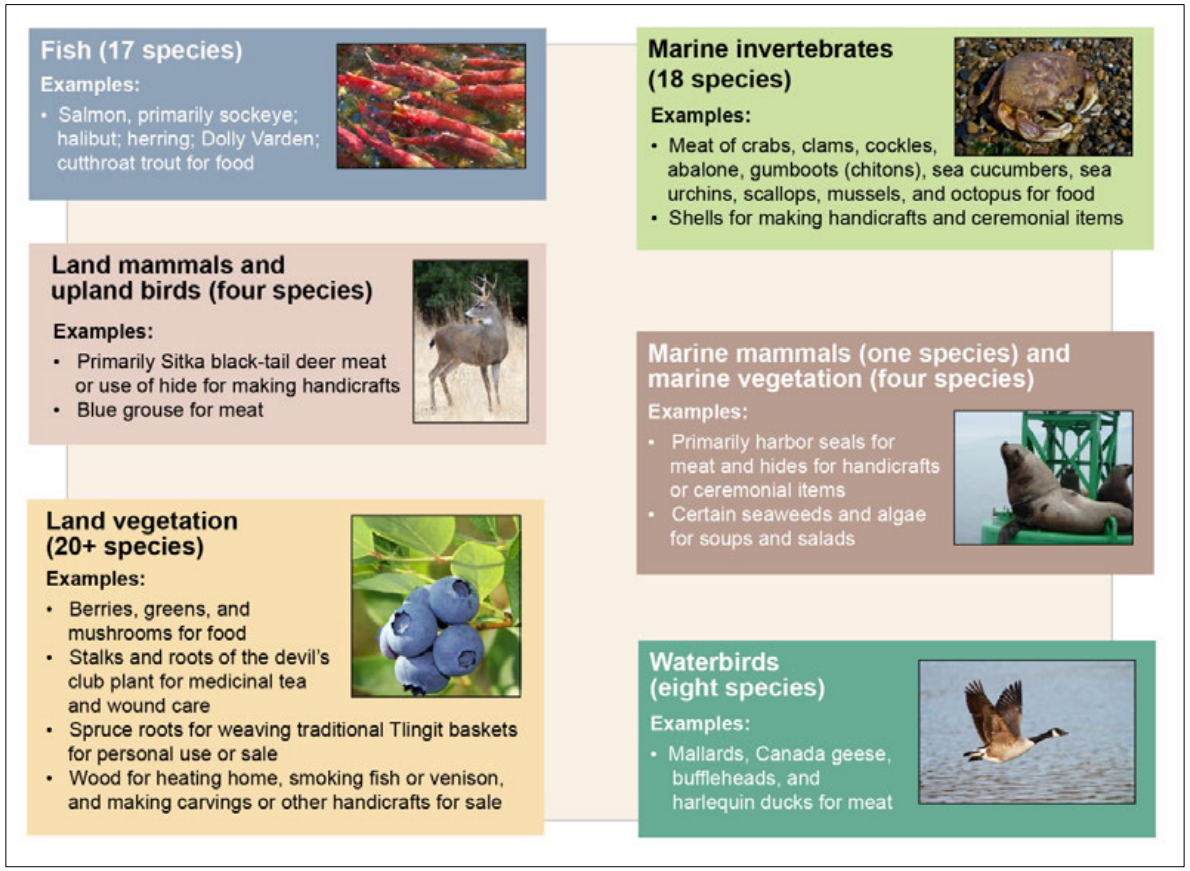

Figure SU1. Resource categories and examples of uses. (Appendix O contains a complete list of species in each resource category.)

Subsistence resources found in the study area are grouped according to use areas based on habitat; these groups are fish, land mammals, ***upland birds***, marine mammals, ***marine invertebrates***, waterbirds, and land and marine vegetation. For more information on the habitats where subsistence resources occur, see section 4.5 Biological Resources.

Table SU1 shows the percentage of residents who use a given resource. All subsistence resources are found in the nearby area, but not all of the resources shown in Table SU1 were necessarily harvested in the nearby area. Subsistence resources are often harvested from a broad area, shared among family members or neighbors, or traded, as described further below.

Terms to know

Marine invertebrates: Animals without a backbone that live in ocean habitats (for example, crabs and shrimp).

Upland birds: Birds that use land habitats.

Table SU1. Percentage of Angoon residents using resources*

Resource category	Percentage of Angoon residents using resource
Marine invertebrates (crabs, clams)	89.2%
Non-salmon fish (for example, halibut and Dolly Varden char)	82.4%
Salmon	79.7%
Large land mammals (primarily deer)	74.3%
Land and marine vegetation (berries, wood, devil's club, seaweed, and kelp)	66.2%
Marine mammals	32.4%
Birds (upland birds and waterbirds, primarily blue grouse)	5.4%
Small land mammals (river otter, other fur-bearing mammals)	2.4%

*ADF&G 2009

4.13.1.4. What role do nonlocal people play in the use of subsistence resources?

As discussed above, subsistence resources play an important role as a food and materials source for Angoon residents. ***Nonlocal people*** also use these subsistence resources for food and recreation purposes, however, albeit to a much lesser extent. Four tourist lodges in Angoon provide freshwater and marine recreational fishing and crab harvest opportunities for nonlocals (see the blue sidebar titled "Tourism in Angoon" at right). No visitor use studies have been conducted in Angoon, but informal guest counts by the Whaler's Cove Lodge (the largest of the lodges in Angoon) indicated that the island supported at least 500 guests during each summer year from 2011 to 2012 (Powers 2012). Other uses of subsistence resources by nonlocals are limited, however. Hunting for land mammals by nonresidents in the Angoon area is uncommon. Currently and in the recent past, most visiting hunters to Admiralty Island go to the remote lakes around the island via seaplane directly from Juneau, and few hunt near Angoon unless they are hunting with a local resident who has boat access to the east side of Favorite Bay. Only local, coastal Alaska Natives can hunt marine mammals. In addition, during interviews for this EIS, Angoon residents indicated that visitors do not hunt for upland birds and waterbirds, or collect land and marine vegetation.

Terms to know

Nonlocal people: People who are not residents of Angoon.

Tourism in Angoon

Angoon maintained four recreational-fishing operations in 2011—Whaler's Cove Lodge, Kootznahoo Inlet Lodge, Favorite Bay Lodge, and Favorite Bay Inn—and most of the tourist activity centers around these businesses. These operations provide charter fishing excursions as well as kayaking and other sorts of tours.

4.13.2. Existing conditions

What is discussed in this section?

4.13.2.1. How did the FAA determine which subsistence resources and uses could be affected, and their existing condition?

4.13.2.2. What subsistence resources are harvested in the Angoon area, and where do these uses occur?

Desired resources are plentiful near Angoon and are reasonably easy to access at a low cost. Information gathered from subsistence users and agencies suggests that subsistence use is generally more frequent in the study area (see Figure SU2) than it is outside of this area. Exceptions are noted below if appropriate for the resource category.

4.13.2.1. How did the FAA determine which subsistence resources and uses could be affected, and their existing condition?

Existing subsistence resources and uses are reported in detail in the *Subsistence Resources Existing Conditions Technical Report for Angoon Airport Environmental Impact Statement* (SWCA 2011d), included as Appendix O. These resources and uses were identified through a combination of the following methods:

- Review of previous studies, including existing harvest data and subsistence use reports.
- Agency consultation, including discussions with the U.S. Forest Service and the Alaska Department of Fish and Game.
- Field studies in the Angoon area.
- Interviews, including on-site field visits, with Angoon-based subsistence users. With assistance from the Angoon Community Association (the federally recognized tribe in Angoon), the FAA's EIS team conducted interviews in August 2008 with 18 subsistence users from Angoon. Interviewees represented a cross-section of the Angoon community and included individuals ranging in age from 18 to 75 years old. To protect the privacy and specific subsistence use areas of individual interviewees, interviewee names and exact locations of resource gathering are not identified in this EIS or in Appendix O.

The study area used in this EIS is based on the extent of the map shown to Angoon residents during the interviews. Angoon residents used the map to identify places they go for subsistence resources. Those places, hereafter referred to as "subsistence use areas" or simply "use areas," combined, form the area analyzed for effects in this section of the EIS, as shown in Figure SU2. Angoon residents occasionally use a broader area for harvest of certain species, and this is described where applicable in section 4.13.3.

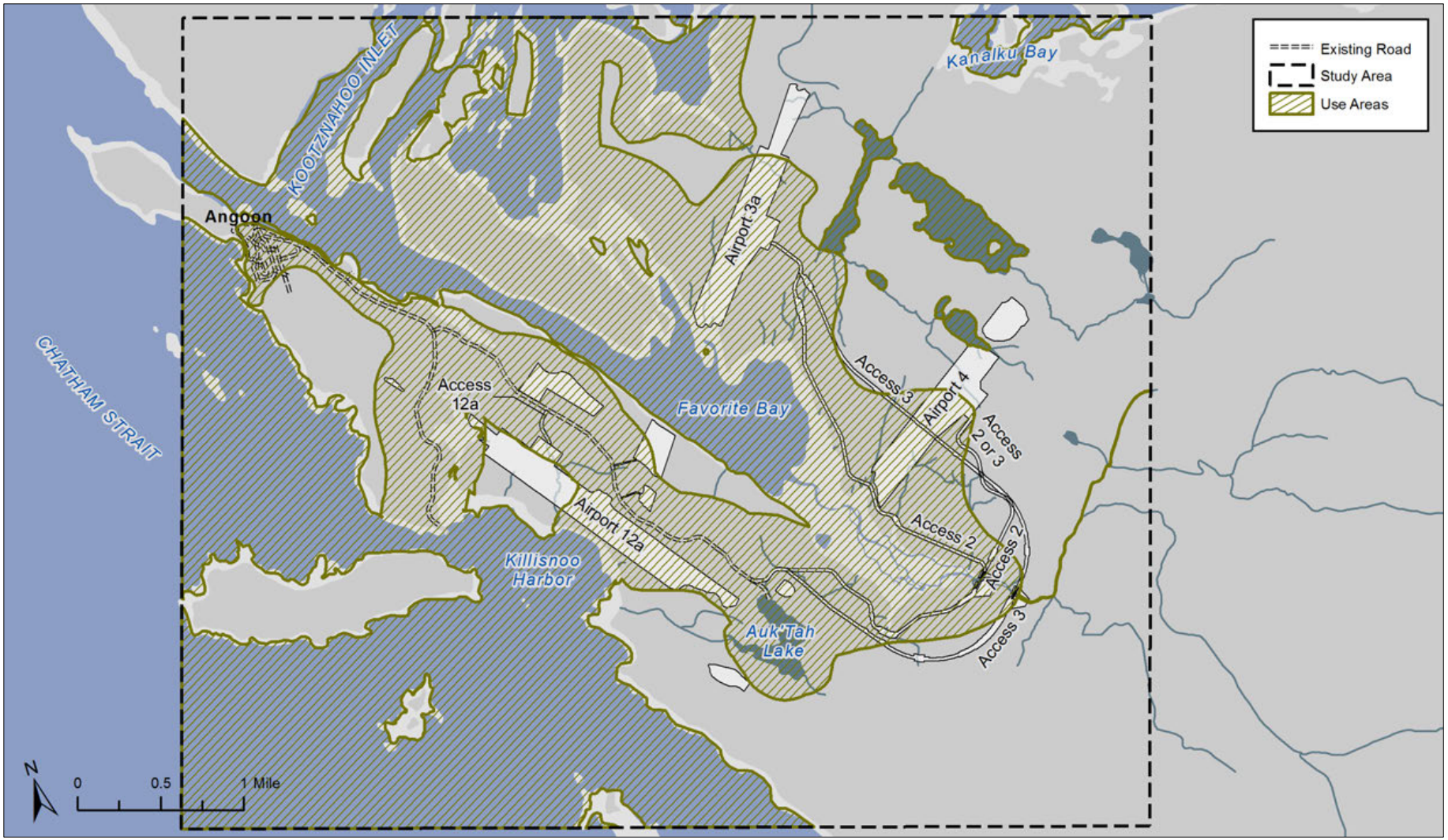

Figure SU2. Study area initially assessed for subsistence resources and uses, and the combined use areas Angoon residents use.

4.13.2.2. What subsistence resources are harvested in the Angoon area, and where do these uses occur?

4.13.2.2.1. Fish

Figure SU3 shows the subsistence use areas inside the study area for all fish, which total 5,834 acres. Freshwater harvest of salmon in the fish use area is limited to Favorite Creek, which has adult pink and coho salmon. Five species of Pacific salmon (Chinook, coho, sockeye, chum, and pink) found in Alaska are also harvested in marine waters surrounding Angoon. Of these five species, sockeye salmon is by far the most harvested by Angoon residents. Angoon residents interviewed for the EIS indicated they prefer sockeye for the taste and for the quality of the flesh, as well as for their abundance compared to other salmon species. Unlike other salmon species, however, sockeye do not spawn in the study area. Instead, many Angoon residents travel to the head of Kanalku Bay to harvest sockeye, particularly when bad weather precludes traveling to and fishing in other areas along Chatham Strait.

Most non-salmon fish such as halibut and rockfish are harvested in the study area in saltwater areas adjacent to Angoon. Occasionally, residents harvest Dolly Varden char and cutthroat trout in Favorite Creek and many of the freshwater lakes between Favorite and Kanalku Bays, or outside the study area.

Statewide harvest survey results for the saltwater shoreline of Admiralty Island near the community of Angoon indicate that during at least 1 year during the 2001–2013 period, sport fishing survey respondents reported catching or harvesting hardshell clams, Dungeness crab, Dolly Varden char, cutthroat trout, chum salmon, pink salmon and coho salmon (Alaska Department of Fish and Game 2013a).

4.13.2.2.2. Land mammals and upland birds

Figure SU3 shows use areas for land mammals and upland birds in the study area, which total 4,073 acres. The only large land mammal harvested is the Sitka black-tailed deer. These deer are found in many locations, but because topography and dense vegetation make access difficult, Angoon residents tend to hunt along roads and informal trails, in open areas such as wetlands or alpine locales, and along beaches. Harvest of deer also sometimes occurs outside the study area, mostly in late fall and early winter when deer are pushed into open beach areas of Mitchell Bay by snow in the higher elevations. Angoon residents access these areas for deer hunting mostly by motorboat.

Under state regulations, the Angoon area is part of the Mitchell Bay Closed Area, which is closed to harvest of brown bears (Alaska Department of Fish and Game 2013c). This area includes Kootznahoo Inlet, Mitchell Bay, Kanalku Bay, Favorite Bay, and all land within 660 feet of mean high tide in those areas. Federal subsistence regulations for brown bear defer to state registration permits to hunt brown bears on Admiralty Island.

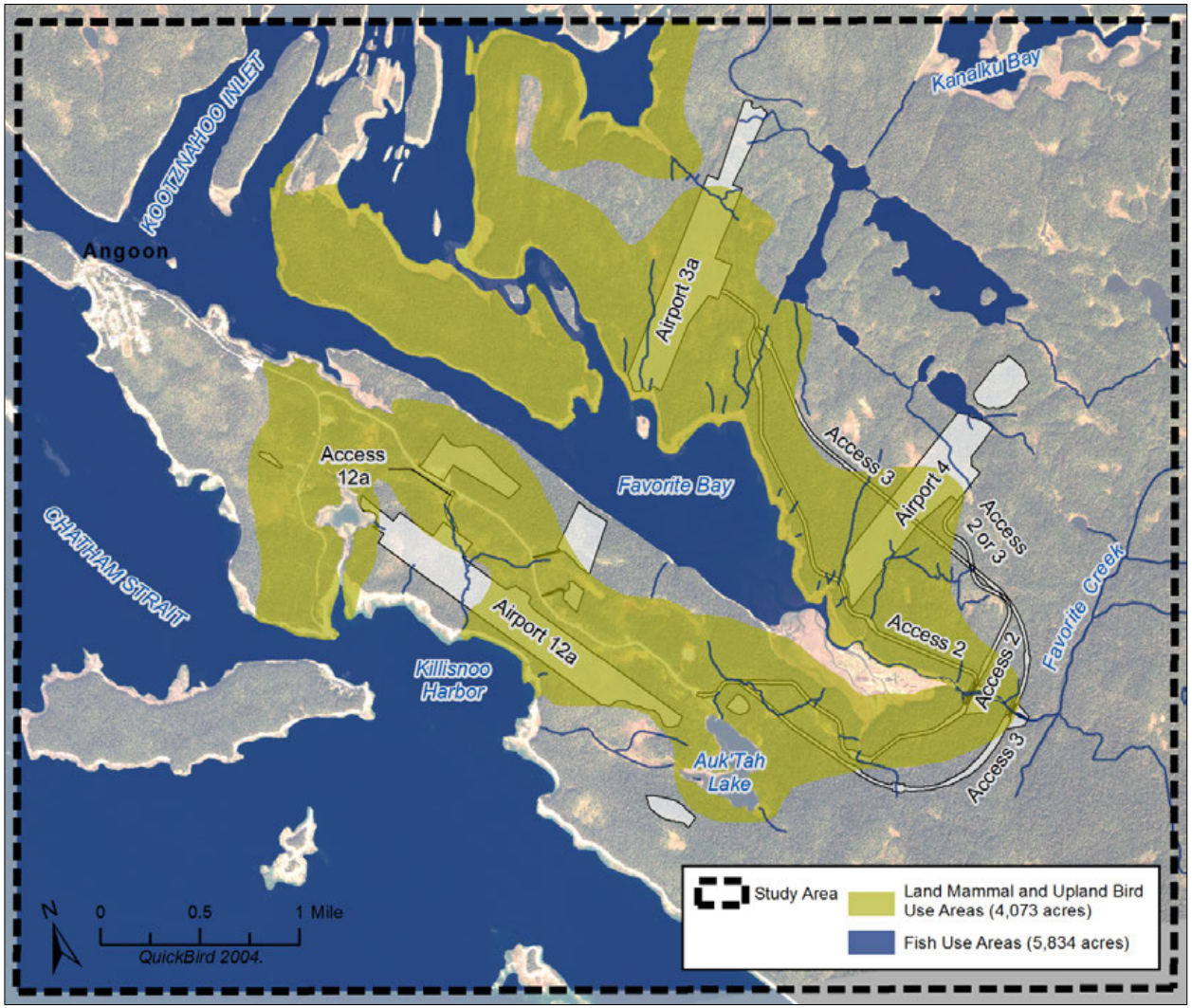

Figure SU3. Land mammal and upland bird use areas and fish use areas commonly used by Angoon residents.

Very few residents hunt for small wildlife; land (river) otters are the only documented small wildlife harvested in the study area (Alaska Department of Fish and Game 2009). During interviews for the EIS, local residents did not identify areas of harvest for river otter. However, fieldwork for wildlife resources identified locations throughout Favorite Bay where river otter sign was found.

Upland birds, specifically blue grouse, are harvested along roads and informal foot trails in the study area.

4.13.2.2.3. Land vegetation, marine mammals, and marine vegetation

Figure SU4 shows use areas in the study area for land vegetation, marine mammals, and marine vegetation. The land vegetation use areas total 1,947 acres, and the marine mammal and marine vegetation use areas total 5,379 acres. Land vegetation such as berries, greens, and wood is found in upland areas. However, as with harvest of the Sitka black-tailed deer, the topography and the density of the vegetation reduce access to vegetation resources in many locations.

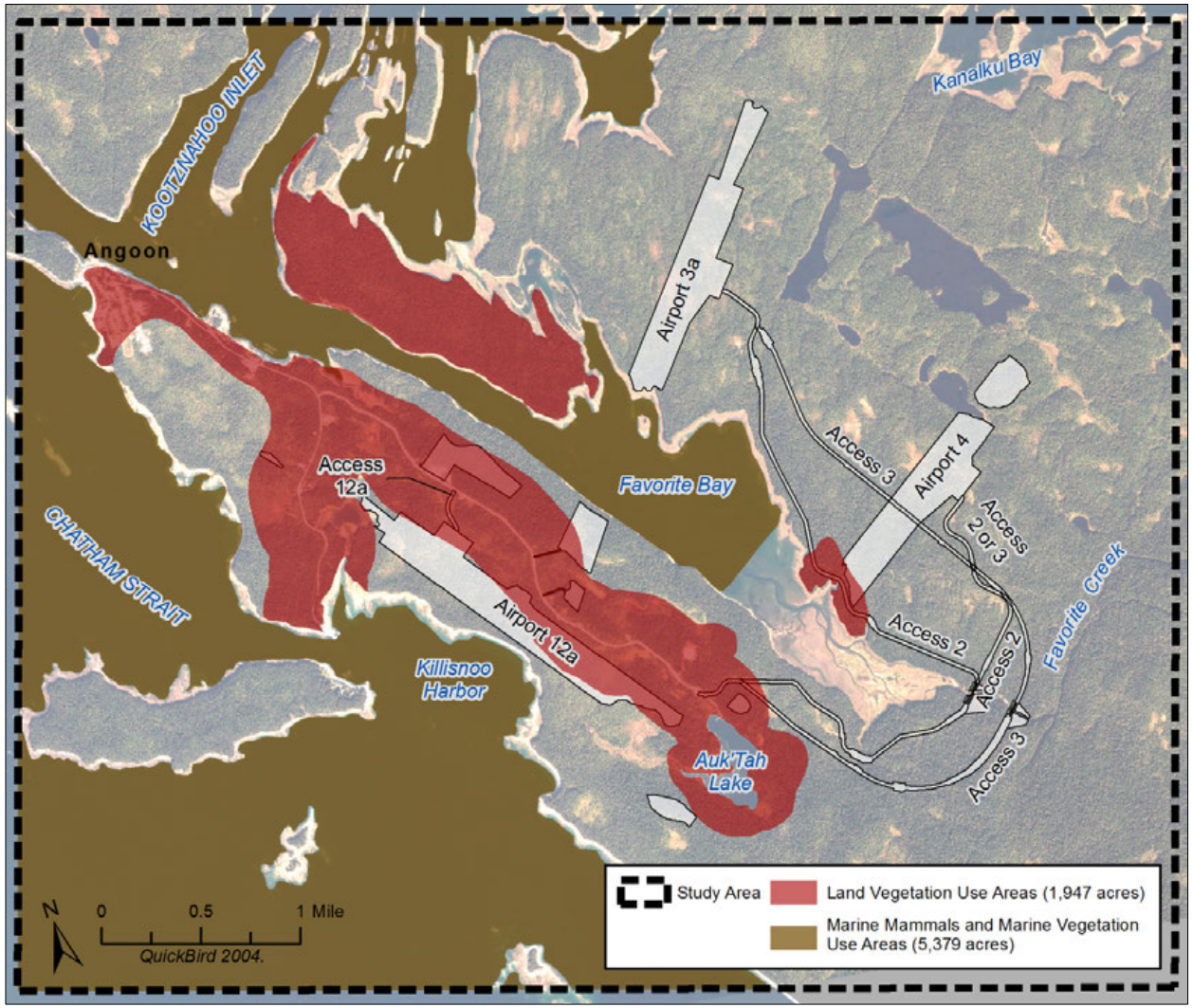

Figure SU4. Land vegetation, marine mammal, and marine vegetation use areas commonly used by Angoon residents.

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Consequently, most land vegetation is harvested along the Angoon road system, in accessible wetland areas, and along beaches.

The Marine Mammal Protection Act of 1972 (16 United States Code [USC] 31) forbids the harvest of marine mammals except by Native Americans for subsistence purposes. All marine mammals harvested in the study area are harbor seals. Seal harvest by Alaska Natives who are Angoon residents occurs in marine areas around Angoon, but most occurs in areas protected from currents, wind, and waves like Favorite Bay.

Marine vegetation such as kelp and seaweed is also found in most saltwater areas around Angoon, but residents often prefer marine vegetation in rocky areas where tides provide a constant exchange of oxygen-rich water.

4.13.2.2.4. Marine invertebrates and waterbirds

Figure SU5 shows use areas for marine invertebrates and waterbirds. The marine invertebrate use areas in the study area total 1,359 acres, and the waterbird use areas in the study area total 557 acres. Deeper water marine invertebrates such as crab and shrimp

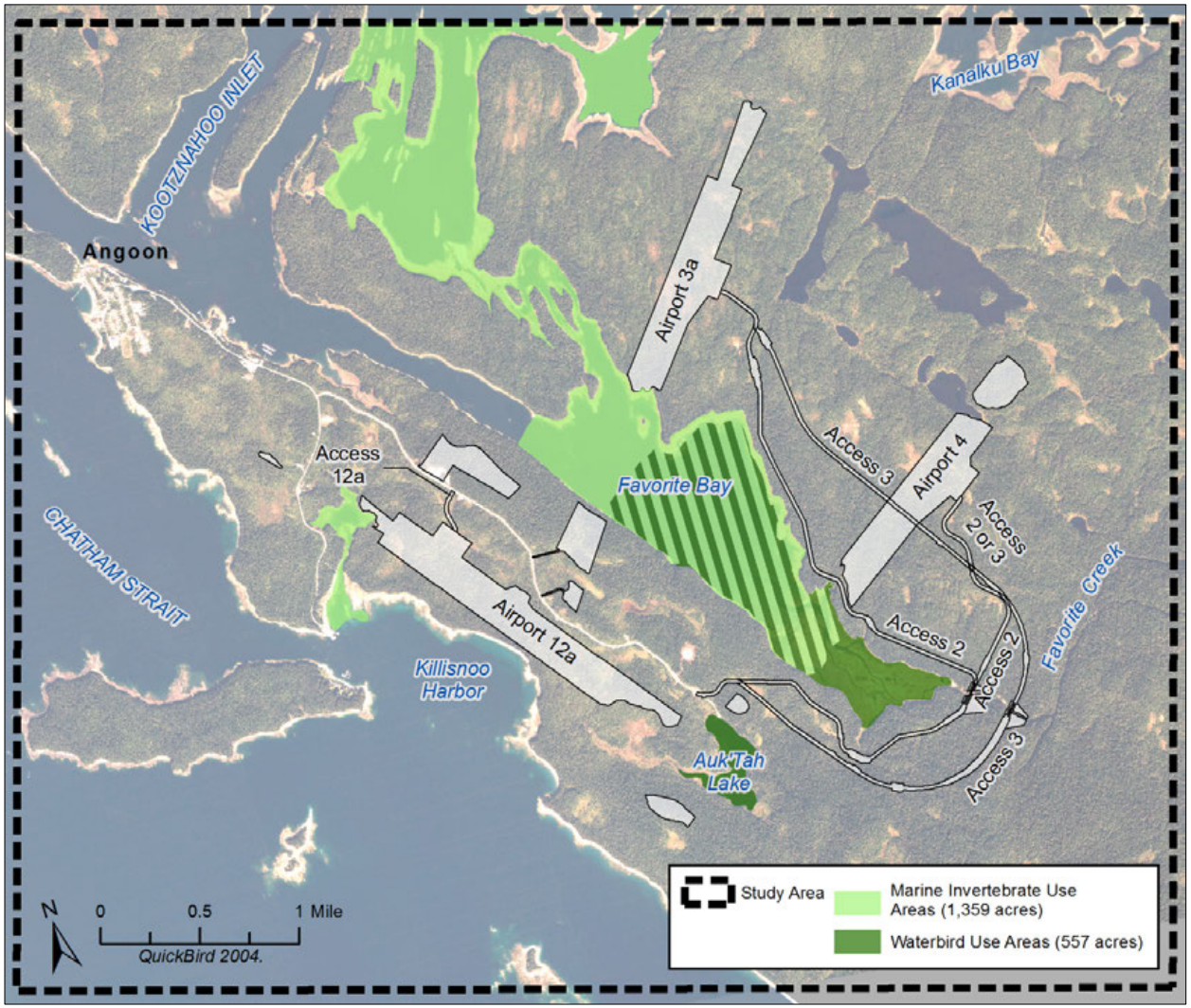

Figure SU5. Marine invertebrate and waterbird use areas commonly used by Angoon residents.

are harvested in saltwater locations. Marine invertebrates that occur in shallower areas, such as clams and chitons, are harvested by Angoon residents along rocky and muddy beaches where tides exchange large amounts of oxygen and nutrient-rich water. Waterbirds are generally harvested in intertidal areas at the head of Favorite Bay and Auk'Tah Lake, which holds the community water supply at the end of the Angoon road system.

4.13.3. Project effects

For all action alternatives, construction, operation, and maintenance of an airport and access road would affect subsistence resources and uses. Although the nature of the effects would be the same for all action alternatives, the magnitude and extent of effects would differ per alternative.

The sections below describe the actions causing the effect, the nature of the effects, the methods for analyzing effects, any assumptions used in the analysis, and the magnitude and extent of effects for each alternative.

4.13.3.1. How did the FAA determine the effects of the alternatives on subsistence resources and uses?

Although *Kunaknana v. Clark* established a precedent for considering effects on subsistence resources in terms of reduction, this approach does not incorporate potential benefits to subsistence users from project-related subsistence resource improvements. Therefore, for the purposes of this EIS, the FAA has chosen to consider reductions or increases to subsistence resources for the following four types of change:

- Changes in abundance and availability of subsistence resources: Reductions or increases in the amount of habitat for plant and animal resources, in redistributions of the resources, and, by extension, in the numbers of plants and animals that are used for subsistence.
- Changes in access to subsistence resources: Variations in the ability to get to subsistence use areas. Access consists of two categories: physical access (a person can reach the locations by walking, driving, boating, or flying) and legal access (it is legal to go to the location [regardless of the ease or method of physical access] or to use resources at that location).
- Changes in competition for subsistence resources: Reductions or increases in the use of subsistence use areas by both local subsistence users and nonlocal users.

What is discussed in this section?

As described in section 4.1, the actions for construction and operation of the airport and access road would involve vegetation removal (as part of grading the ground surface or for enhanced visibility along the runway, road, and ***avigation easements***); grading and recontouring the ground surface through cut and fill to create flat surfaces for road and runway; paving the road and runway; and potentially extracting construction materials such as gravel, soil, and rock from an on-island materials source. Four of the five action alternatives require bridge construction across Favorite Creek. Operation and maintenance of the airport and access road would involve an airport perimeter fence; continual vegetation maintenance along the runway, road, and avigation easements; road and runway maintenance; and scheduled air service to Angoon.

Terms to know

Avigation easement: A right-of-way tool used in airport planning to grant certain rights to the holder of the easement. For this EIS, avigation easements outside airport property would provide the DOT&PF with the right to access areas to clear them of obstructions and maintain that clearance.

The actions are listed below along with the kind of change—or effect—that each action would cause.

- Vegetation clearing and paving: Clearing of vegetation and the ongoing maintenance of cleared areas would cause long-term direct effects to abundance and availability of all subsistence resources by removing vegetation used for subsistence, and by altering habitat, which would encourage wildlife movement to other areas. Paving would permanently remove this habitat.
- Airport perimeter fence: The fence would cause a long-term direct effect to access because people would be kept out of the fenced area, causing a reduction in available use areas.
- Bridge construction: Construction of a bridge over Favorite Creek would cause a temporary decrease in access to that area of the creek, but access would resume when construction ended.
- The new road and cleared airport areas: Construction of the road and airport would cause the following:
  - Direct temporary effects to abundance and availability because animals would avoid the area during construction but would return when construction ended
  - Direct temporary effects to access because subsistence users would be unable to go into these areas during construction but could return when construction ended
  - Direct long-term effects to access because some areas would be easier and more convenient to reach
  - Indirect effects to abundance and availability because of easier and more convenient access to subsistence resources

  - Indirect effects to competition from the new road because improved access to the eastern side of Favorite Bay would permit easier harvest while overall use of other subsistence use areas around Angoon could decrease because subsistence users spread out into more areas.

- Scheduled air service to Angoon: A new land-based airport would provide nonlocal visitors, particularly recreational fishers, with more access to the Angoon area than currently provided by the existing seaplane or ferry service. It is anticipated that this could increase competition for fish species and marine invertebrates such as Dungeness crab.

Table SU2 explains the ways these changes are measured and any assumptions used in analyzing project effects to subsistence resources and uses.

Table SU2. Indicators and assumptions used in analysis of changes in subsistence resources and uses

Type of change	Effect	Measurement of change	Assumptions
Change in abundance and availability	Direct	Acres of land affected by construction of road and airport	No assumptions made.
		Acres of a given use area altered by vegetation clearing, relative to acres of that use area currently available	Vegetation use areas lost through vegetation clearing and paving correspond to a proportional change in abundance and availability for vegetation resources. For example, a 5% reduction in vegetation in the use area equals a 5% reduction in the abundance and availability of it.
			Acres of habitat altered through vegetation clearing may result in negative or positive effects to wildlife resources, depending on the habits of particular species. For instance, deer prefer newly cleared edges to dense forest (Turek et al. 1998), so vegetation clearing could result in more availability of deer in newly cleared areas.
			Other than barging, no actions related to airport and access road construction and operation would affect marine resources. Although unlikely, marine mammal collisions with barges hauling construction materials could occur. The potential for ship strikes on marine mammals would be minimized or avoided by adhering to a general marine mammal "code of conduct" such as vigilantly scanning the water's surface and remaining at least 100 yards from marine mammals (Neilson et al. 2012). Given this, the effects of ship strikes to marine mammals as a result of the airport project would be very low, and would likely not affect marine mammal abundance and availability.
		Acres of a given use area altered from bridge construction relative to acres of that use area currently available	Bridge construction would have a negligible effect on fish abundance and availability because fish passage would be maintained, water quality best management practices would be implemented, and the relative acreage of effect would be small compared to available freshwater streams for fishing.

Table SU2. Indicators and assumptions used in analysis of changes in subsistence resources and uses

Type of change	Effect	Measurement of change	Assumptions
	Indirect	Percent change in subsistence use areas from existing conditions, which is directly related to potential subsistence harvest.	Improved access would result in an initial increase in per capita harvest immediately after road construction. Over time, however, per capita harvest would return to existing levels. This effect was documented in a study of new roads and their effect on deer harvest on Prince of Wales Island in Southeast Alaska (Turek et al. 1998). This study found that new roads and the resulting new edges along vegetated habitats created beneficial habitat for deer and increased harvest immediately after construction. Several years after construction, however, the pounds harvested per capita dropped to preconstruction levels because thicker vegetation re-established along roads, making less-than-ideal habitat for deer; populations declined from increased harvest; and deer avoided the road corridor because of increased human presence and use.
			Improved access from construction of an access road could result in increased harvest of fish, waterbirds, and intertidal marine invertebrates and vegetation.
			As a conservative approach, project-related terrestrial wildlife subsistence use area changes are assumed to directly correlate to changes in total subsistence harvest; in this EIS, the background comparison is for a representative terrestrial species—deer—which has fluctuated annually by an average of 16% in total harvest from 2004 to 2010 (Alaska Department of Fish and Game 2013d).
Change in access	Direct	Acres of land where access has been improved or made easier relative to existing methods of access (change in physical access)	Areas of "improved access" are considered any lands that subsistence users currently use and to which access would be improved through the presence of a new road. If access to an area were improved, subsistence and non-subsistence users would use the area more than they currently do.
			This EIS considers "new" areas to be any lands that are not currently reported as in use or are experiencing very limited use because they are difficult to access, but which residents could use if access were easier. This new area assumes that subsistence users would travel by foot up to 0.5 mile in any direction from a new access road or airport to acquire subsistence resources. This distance is based on the difficult terrain and vegetation conditions.
		Acres of use areas where access has been eliminated only for the duration of airport and access road construction (change in physical access)	Subsistence users would have temporarily reduced access to use areas during airport and access road construction.
		Acres of use areas where access has been eliminated only for the duration of bridge construction (change in physical access)	Subsistence users would have temporarily reduced access to fish use areas during bridge construction.
		Reduction in acres of use areas where fenced exclosure makes harvest impossible (change in physical and legal access)	No assumptions made.
	Indirect	No indirect effects for access	Not applicable.

Table SU2. Indicators and assumptions used in analysis of changes in subsistence resources and uses

Type of change	Effect	Measurement of change	Assumptions
Change in competition	Direct	No direct effects for competition	Not applicable.
	Indirect	Estimated severity of changes in local subsistence use patterns, measured by a qualitative change in use areas by local residents	In general, people would use areas for subsistence harvest if access to those areas improved.
		Estimated severity of changes in nonlocal subsistence use patterns, measured qualitatively by the estimated change in use of subsistence resources by nonlocals	A land-based airport could increase visitation to the Angoon area for recreational fishing and marine invertebrates. Given the small amount of lodging space in the Angoon area, the current capacity for increased recreational fishing by nonlocal visitors is limited. Additional visitation could result from further tourism development in Angoon, however.
			A land-based airport would not increase nonlocal deer hunting in the Angoon area because hunting is generally dependent on available methods to transport harvested wildlife to the hunter's home location. Current modes of access for visiting hunters do not limit the hunters' ability to hunt on public lands immediately surrounding Angoon, yet visiting hunters have been rare in these areas. A land-based airport is not anticipated to encourage more deer hunting in known subsistence use areas immediately surrounding Angoon.
			There would be no change in competition for marine mammals, land or marine vegetation, upland birds, and waterbirds; nonlocals do not hunt for these resources.
			All nonlocal people would also be nonrural residents.

4.13.3.2. How did the FAA determine the significance of the anticipated effects from the alternatives?

The FAA does not have established significance threshold criteria for subsistence, and does not set established thresholds in this EIS. However, ANILCA Title VIII (810(a)) requires a determination whether withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands would significantly restrict subsistence uses. The U.S. Forest Service commonly uses the thresholds of significance established for ANILCA Section 810 evaluations in the *Kunaknana v. Clark* case. For subsistence resources and uses, significance is discussed in terms of restrictions; the *Kunaknana v. Clark* decision describes significant restrictions as follows:

> [R]estrictions for subsistence uses would be significant if there were large reductions in abundance or major redistribution of these resources, substantial interference with harvestable access to active subsistence sites, or major increases in nonrural resident hunting [or fishing].

This description of significant restrictions is therefore used as the basis for evaluating subsistence effects in this EIS. The *Kunaknana v. Clark* decision does not provide a definition or interpretation of what constitutes a "large reduction," "major redistribution," "substantial interference," or "major increase." For the purpose of this EIS, and taking into consideration the nature of subsistence use and local environmental conditions in the Angoon area, the FAA is using these terms as follows:

- Large reductions in abundance or a major redistribution of the resources: Noticeable and recognizable declines in subsistence resource populations or distributions (in other words, the "availability" of the resource) and, subsequently, reductions in subsistence resource harvests caused by project actions. A reduction of more than 16% in the total harvest of a resource would be considered large, because it would be greater than the average annual variability in total harvest for a representative terrestrial species—deer—established for this EIS (see Table SU2).
- Substantial interference with access to subsistence use areas: Local subsistence users' access to active subsistence harvesting locations becomes illegal or so inconvenient that a substantial portion of the users shift to alternate locations.
- Major increases in use by ***nonrural persons***: Increases in nonrural use beyond existing levels that would cause local subsistence users to either quit using certain subsistence use areas or find alternate locations.

Terms to know

Nonrural person: A person who does not qualify for subsistence harvest under the federal subsistence program because they live outside of Alaska or in an urban area in Alaska.

4.13.3.3. How would each alternative affect abundance and availability of subsistence resources?

Project effects to subsistence resource abundance and availability for all alternatives are discussed in the subsections below. Areas of effect are shown on Figure SU6, and a summary of effects can be found in Table SU3.

4.13.3.3.1. No action alternative: Effects to abundance and availability

There would be no new construction for an airport or access road. Effects to abundance and availability would be of the type and extent currently occurring.

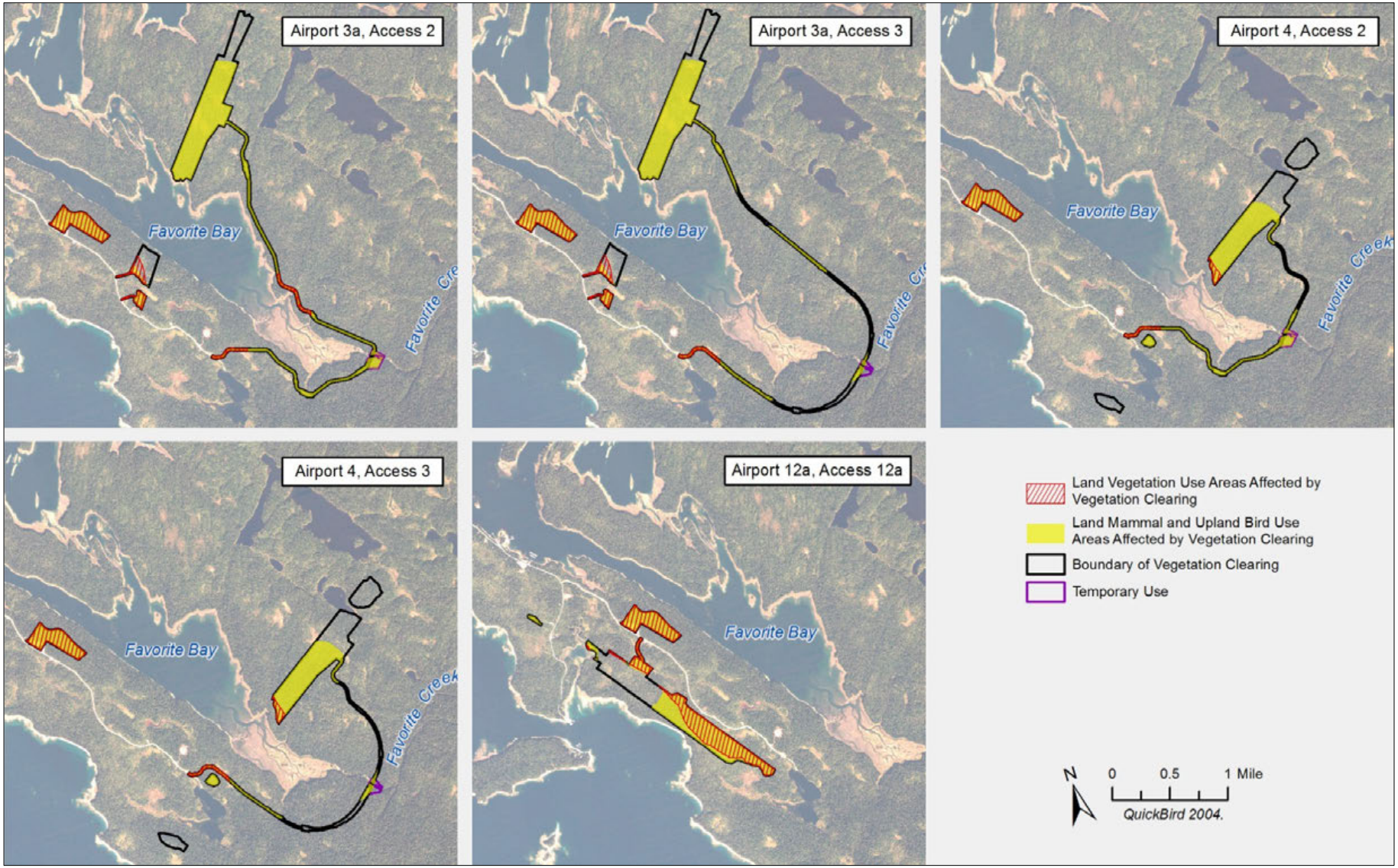

Figure SU6. Effects to abundance and availability from all action alternatives.

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4.13.3.3.2. Airport 3a with Access 2 (proposed action): Effects to abundance and availability

As detailed in Table SU3, long-term direct effects to abundance and availability of land-based use areas for Airport 3a with Access 2 would come from vegetation clearing. Approximately 4% of land vegetation use areas would be removed, resulting in a proportional loss of 4% of vegetation resources available for subsistence use for the length of the airport's operation.

Direct effects would also occur temporarily from the presence of vehicles and workers during construction and in the long term from wildlife habitat alteration associated with vegetation clearing. Animals would likely avoid the 321-acre construction zone while vehicles and workers were present for the length of the construction period (up to three construction seasons). Approximately 7% of land mammal and upland bird use areas would also be eliminated as a result of vegetation clearing activities for the new road, avigation easements, the potential on-island material site, and airport construction. For deer, this would cause a short-term increase in abundance and availability because previous research has shown that deer prefer cleared edges along dense forest (Turek et al. 1998). For upland bird species and other land mammals, this habitat loss could slightly reduce long-term abundance and availability as some animals move to more suitable habitat for breeding, forage, and cover. The combined affected acreage would be relatively small when compared to total use areas in the study area.

There would be no direct effects to abundance and availability of marine invertebrates, mammals, and vegetation or waterbirds because other than barging, which has a slight chance of affecting marine mammals (but would be mitigated through boating speed limitations), all construction and vegetation clearing actions related to the airport and access road would only occur on land and in Favorite Creek.

Less than 0.01% of fish use areas would be affected by bridge construction along Favorite Creek. Additionally, fish passage would be maintained throughout the construction period (up to three construction seasons) and best management practices would be implemented to protect water quality. Consequently, bridge construction direct effects to fish abundance and availability would be negligible.

Indirect effects to subsistence resources would come from changes in harvest as a result of reductions in or displacement of subsistence resources by improved access for subsistence users. Abundance and availability for most land-based resources, particularly on the southern and eastern side of Favorite Bay where current access is limited, could decrease slightly over time through declines in population numbers or changes in distribution patterns from increased access and harvest by local residents. Based on the estimated 7% loss of land mammal and upland bird use areas, as compared to current conditions, this EIS assumes that total annual harvest of terrestrial resources could also decrease by as much as 7%. This change would be

within the annual harvest variability for a representative terrestrial species—deer—that has fluctuated by an average of 16% in total harvest from 2004 to 2010 (Alaska Department of Fish and Game 2013d).

Improved and new human access to areas around the proposed location of Access 2 and construction of a bridge across Favorite Creek could also indirectly result in long-term increased fishing in Favorite Creek, particularly for pink and coho salmon, as well as increased harvest of waterbirds and marine invertebrates and vegetation (seaweed and kelp) (see Table SU3). Because new and improved access would rarely exceed 0.5 mile in any direction from a new access road or airport due to difficult terrain and vegetation, however, this increase in harvest would result in minimal effects to abundance and availability of marine and fish species. Additional discussion of aquatic effects from the proposed project is covered in section 4.5.2 Aquatic Habitats and Associated Species.

4.13.3.3.3. Airport 3a with Access 3: Effects to abundance and availability

Airport 3a with Access 3 would result in long-term and temporary direct effects to abundance and availability of wildlife and plant species from construction, vegetation clearing, and paving. Under this alternative, animals would likely avoid the 349-acre construction footprint for the construction period (up to three construction seasons), and 4% of land vegetation use areas and 6% of land mammal and upland bird use areas would be eliminated as a result of vegetation clearing activities for the new road, avigation easements, the potential on-island material site, and airport construction (see Figure SU6 and Table SU3). This would yield a proportional loss of 4% of vegetation resources available for subsistence use for the length of the airport's operation, and could change the distribution of local wildlife populations in response to construction traffic and activity and changing habitat. Based on the estimated 6% loss of land mammal and upland bird use areas, total annual harvest of terrestrial resources could also decrease by as much as 6%. This change would be within the annual harvest variability for a representative terrestrial species—deer.

As with Airport 3a with Access 2, there would be no direct effects to abundance and availability of marine invertebrates, mammals, and vegetation, and effects to fish species would be minimized through implementation of best management practices and fish passage maintenance. Improved and new access to areas around the proposed location of Access 3 and Favorite Creek could indirectly increase harvest of land-based resources, fish, waterbirds, and marine invertebrates and vegetation, but this increase in harvest would result in minimal effects to abundance and availability of marine and fish species because access would rarely exceed 0.5 mile in any direction from a new access road or airport due to difficult terrain and vegetation.

4.13.3.3.4. Airport 4 with Access 2: Effects to abundance and availability

Airport 4 with Access 2 would result in long-term and temporary direct effects to abundance and availability of wildlife and plant species from construction, vegetation clearing, and paving. Under this alternative, animals would likely avoid the 290-acre construction footprint for the construction period (up to three construction seasons), and 3% of land vegetation use areas and 5% of land mammal and upland bird use areas would be eliminated as a result of vegetation clearing activities for the new road, avigation easements, the potential on-island material site, and airport construction (see Figure SU6 and Table SU3). This would yield a proportional loss of 3% of vegetation species available for subsistence use for the length of the airport's operation, and could change the distribution of local wildlife populations in response to construction traffic and activity and changing habitat. Based on the estimated 5% loss of land mammal and upland bird use areas, total annual harvest of terrestrial resources could also decrease by as much as 5%. This change would be within the annual harvest variability for a representative terrestrial species—deer.

As with Airport 3a with Access 2, there would be no direct effects to abundance and availability of marine invertebrates, mammals, and vegetation, and effects to fish species would be minimized through implementation of best management practices and fish passage maintenance. Improved and new access to areas around the proposed location of Access 2 and Favorite Creek could indirectly increase harvest of land-based resources, fish, waterbirds, and marine invertebrates and vegetation, but this increase in harvest would result in minimal effects to abundance and availability of marine and fish species because access would rarely exceed 0.5 mile in any direction from a new access road or airport due to difficult terrain and vegetation.

4.13.3.3.5. Airport 4 with Access 3: Effects to abundance and availability

Airport 4 with Access 3 would result in long-term and temporary direct effects to abundance and availability of wildlife and plant species from construction, vegetation clearing, and paving. Under this alternative, animals would likely avoid the 295-acre construction footprint for the construction period (up to three construction seasons) and 3% of land vegetation use areas and 5% of land mammal and upland bird use areas would be eliminated as a result of vegetation clearing activities for the new road, avigation easements, the potential on-island material site, and airport construction (see Figure SU6 and Table SU3). This would yield a proportional loss of 3% of vegetation species available for subsistence use for the length of the airport's operation, and could change the distribution of local wildlife populations in response to construction traffic and activity and changing habitat. Based on the estimated 5% loss of land mammal and upland bird use areas, total annual harvest of terrestrial resources could also decrease by as much as 5%. This change would be within the annual harvest variability for a representative terrestrial species—deer.

As with Airport 3a with Access 2, there would be no direct effects to abundance and availability of marine invertebrates, mammals, and vegetation, and effects to fish species would be minimized through implementation of best management practices and fish passage maintenance. Improved and new access to areas around the proposed location of Access 3 and Favorite Creek could indirectly increase harvest of land-based resources, fish, waterbirds, and marine invertebrates and vegetation, but this increase in harvest would result in minimal effects to abundance and availability of marine and fish species because access would rarely exceed 0.5 mile in any direction from a new access road or airport due to difficult terrain and vegetation.

4.13.3.3.6. Airport 12a with Access 12a (preferred alternative): Effects to abundance and availability

Airport 12a with Access 12a would result in long-term and temporary direct effects to abundance and availability of wildlife and plant species from construction, vegetation clearing, and paving. Under this alternative, animals would likely avoid the 258-acre construction footprint for the construction period (up to two construction seasons), and 8% of land vegetation use areas and 5% of land mammal and upland bird use areas would be eliminated as a result of vegetation clearing activities for the new road, avigation easements, the potential on-island material site, and airport construction (see Table SU3). This would yield a proportional loss of 8% of vegetation species available for subsistence use for the length of the airport's operation, and could change the distribution of local wildlife populations in response to construction traffic and activity and changing habitat. Based on the estimated 5% loss of land mammal and upland bird use areas, total annual harvest of terrestrial resources could also decrease by as much as 5%. This change would be within the annual harvest variability for a representative terrestrial species—deer.

As with Airport 3a with Access 2, there would be no direct effects to abundance and availability of marine invertebrates, mammals, and vegetation; however, no fish use areas would be affected under Airport 12a with Access 12a because bridge construction would not be required. There would also be no indirect effects to abundance and availability of subsistence resources because this alternative would not improve access or create new access to subsistence resources.

4.13.3.3.7. Summary of effects to abundance and availability

A summary of project effects to subsistence resource abundance and availability for all alternatives is provided in Figure SU6 above and Table SU3 below.

Table SU3. Summary of effects to abundance and availability

	No action alternative	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Acres of land affected by construction	0 acre (0%)	321 acres	349 acres	290 acres	295 acres	258 acre
Acres of use areas affected by vegetation clearing and paving (percentage of the use area for this resource)						
Land mammals and upland birds	0 acre (0%)	262 acres (7%)	246 acres (6%)	189 acres (5%)	170 acres (5%)	184 acre (5%)
Land vegetation	0 acre (0%)	68 acres (4%)	65 acres (4%)	58 acres (3%)	59 acres (3%)	138 acre (8%)
Marine resources (mammals, vegetation, and invertebrates) and fish	0 acre (0%)	0 acre (0%)	0 acre (0%)	0 acre (0%)	0 acre (0%)	0 acre (0%)
Acres of use areas affected by bridge construction (percentage of the use area for this resource)						
Fish	0 acre (0%)	0.6 acre (<0.01%)	0.3 acre (<0.01%)	0.6 acre (<0.01%)	0.3 acre (<0.01%)	0 acre (0.0%)

4.13.3.4. How would each alternative affect access to subsistence resources?

Project effects to access for all alternatives are discussed in the subsections below. An effects summary is provided in Table SU4.

4.13.3.4.1. No action alternative: Effects to access

There would be no new construction for an airport or access road. Access effects would be of the type and extent currently occurring.

4.13.3.4.2. Airport 3a with Access 2 (proposed action): Effects to access

As shown on Figure SU7 and detailed in Table SU4, direct effects to human access would come from the convenience provided by a new road and from the loss of use areas caused by airport, bridge, and road construction, as well as the airport perimeter fence. Construction activity and vehicle traffic for the airport, access road, and bridge would temporarily reduce subsistence users' access to 321 acres of land during the construction period (up to three construction seasons). Following construction, the airport perimeter fence would exclude 98 acres from public access for the length of airport and access road operation. As a result of road and bridge construction, however, this alternative would improve long-term access to 2,021 acres (+11%) of current use areas. Use areas for waterbirds and for land mammals and upland birds would experience the greatest increase in improved access, at 46% and 32%, respectively, whereas use areas for marine vegetation and for fish would experience the lowest increase in improved access at 1% and 3%, respectively. This alternative would also create 726 acres of new access to subsistence use areas north of Favorite Bay compared to the no action alternative, resulting in a net access increase of 628 acres during airport and access road operation (+4%).

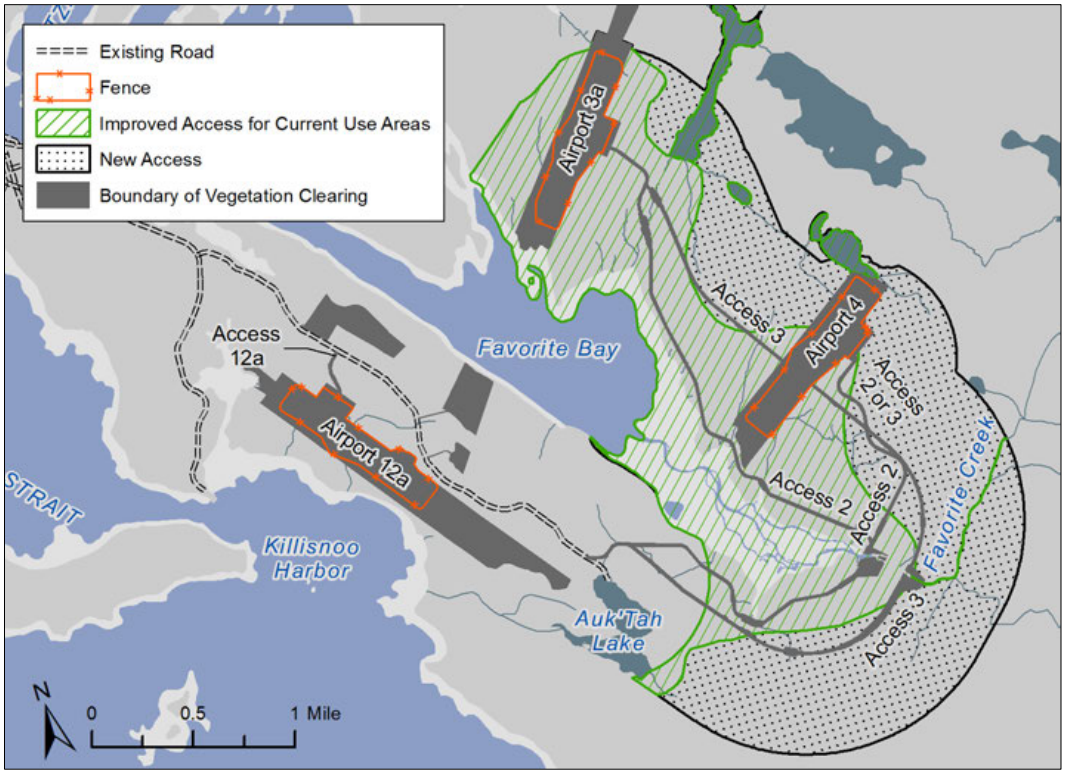

Figure SU7. Changes to subsistence access from action alternatives.

There would be no indirect effects to access from this alternative.

4.13.3.4.3. Airport 3a with Access 3: Effects to access

Access to subsistence use locations would be reduced temporarily by 349 acres during construction because of increased vehicle traffic and construction activity, and by 98 acres during airport and access road operation due to perimeter fencing (see Table SU4). However, Access 3 would improve long-term access to 2,116 acres (+12%) of current use areas, and would also provide the greatest increase (1,416 acres) in new access to use areas during airport and access road operation compared to the no action alternative; this would result in a net 1,318-acre (+7%) increase in access during operation. Use areas for waterbirds and for land mammals and upland birds would experience the greatest increase in improved access, whereas use areas for intertidal marine vegetation and for fish would experience the lowest increase in improvement.

There would be no indirect effects to access from this alternative.

4.13.3.4.4. Airport 4 with Access 2: Effects to access

Access to subsistence use locations would be temporarily reduced by 290 acres during construction because of increased vehicle traffic and construction activity, and by 100 acres during operation due to perimeter fencing (see Table SU4). However, Airport 4 with Access 2 would also improve long-term access to 1,425 acres (+8%) of current use areas compared to the no action alternative, and generate 896 acres of new access; this would result in a net 796-acre (+5%) increase in access during operation. For Airport 4 with Access 2, 18% of land mammal and upland bird use areas would become more accessible through improved access.

There would be no indirect effects to access from this alternative.

4.13.3.4.5. Airport 4 with Access 3: Effects to access

Access to subsistence use areas would be reduced temporarily by 295 acres during construction. Access would also be reduced by 100 acres during operation due to perimeter fencing (see Table SU4). However, Airport 4 with Access 3 would improve long-term access to 1,442 acres (+8%) of current use areas, as well as provide an increase of 1,182 acres in new access compared to the no action alternative; this would result in a net 1,082-acre (+6%) increase in access during airport and access road operation. Similar to Airport 4 with Access 2, 18% of land mammal and upland bird use areas would become more accessible through improved access.

There would be no indirect effects to access from this alternative.

4.13.3.4.6. Airport 12a with Access 12a (preferred alternative): Effects to access

During construction, access to subsistence use locations for Airport 12a with Access 12 would be temporarily reduced by 258 acres (Table SU4). Of all the action alternatives, Airport 12a would have the smallest loss of access (96 acres), but would not increase long-term access to subsistence resource and use areas during operation because there is currently access to adjacent resources and use areas from the existing road system. Consequently, this alternative would result in a 0.5% decrease in access to subsistence use areas.

There would be no indirect effects to access from this alternative.

4.13.3.4.7. Summary of effects to access

A summary of project effects to access for all alternatives is provided in Table SU4.

Table SU4. Summary of effects to access from all alternatives

	No action alternative	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Acres of temporarily reduced access during airport and access road construction	0 acre	321 acres	349 acres	290 acres	295 acres	258 acres
Acres of long-term reduced access from perimeter fence	0 acre	98 acres	98 acres	100 acres	100 acres	96 acres
Acres of long-term improved access by use area (percentage of the use area for this resource)						
Land mammals and upland birds	0 acre (0%)	1,272 acres (32%)	1,355 acres (34%)	706 acres (18%)	717 acres (18%)	0 acre (0%)
Land vegetation	0 acre (0%)	62 acres (4%)	72 acres (4%)	65 acres (4%)	72 acres 4%)	0 acre (0%)
Fish	0 acre (0%)	175 acres (3%)	Same as Airport 3a with Access 2	143 acres (3%)	Same as Airport 4 with Access 2	0 acre (0%)
Marine invertebrates	0 acre (0%)	227 acres (17%)	Same as Airport 3a with Access 2	225 acres (17%)	Same as Airport 4 with Access 2	0 acre (0%)
Marine vegetation	0 acre (0%)	37 acres (1%)	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	0 acre (0%)
Waterbirds	0 acre (0%)	252 acres (46%)	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	0 acre (0%)
Acres of long-term new access						
New access	0 acres	726 acres	1,416 acres	896 acres	1,182 acres	0 acre
Net effect to access during airport and access road operation (percent change from current use areas)						
All use areas	0 acre (0%)	+628 acres (+4%)	+1,318 acres (+7%)	+796 acres (+5%)	+1,082 acres (+6%)	−96 acres (−0.5%)

4.13.3.5. How would each alternative affect competition for subsistence resources?

Terms to know

Salmonids: Members of the scientific family of fish, Salmonidae, which contains species such as trout, salmon, and Dolly Varden char.

Project effects to human competition for all alternatives are discussed in the subsections below. A summary can be found in Table SU5.

4.13.3.5.1. No action alternative: Effects to competition

There would be no new construction for an airport or access road. Effects to competition would be of the type and extent currently occurring.

4.13.3.5.2. Airport 3a with Access 2 (proposed action): Effects to competition

As detailed in Table SU5, project effects to competition would come from changes in patterns of subsistence use by locals and nonlocals. There would be no direct effects to competition from Airport 3a with Access 2, but this alternative could indirectly effect competition among local subsistence users through changes in access to use areas in the study area.

Although some use areas would be temporarily lost as a result of airport and access road construction activities, with long-term improved access residents would be able to harvest resources in previously inaccessible areas. This change could result in decreased competition for subsistence use areas around Angoon as subsistence users spread out into more areas. However, increased access along the eastern side of Favorite Bay could result in localized increases in competition based on the desirability of resources in that location.

Airport 3a with Access 2 would not increase competition between locals and nonlocals for collection of land and marine vegetation or hunted wildlife, but could increase competition for fish and marine invertebrates. Visiting hunters are rare, and access to subsistence lands for hunting by locals and nonlocals is currently sufficient to meet demand. Therefore, a land-based airport would not be anticipated to encourage more deer hunting in known subsistence use areas immediately surrounding Angoon. No other land-based resources or marine vegetation would be likely to be collected or harvested by nonlocals, per local interviews. However, increased air service could expand the existing recreational-fishing industry in Angoon, bringing in more outside tourists and thereby increasing competition for fish—in particular non-sockeye ***salmonids***, halibut, and marine invertebrates—throughout the area. Reported visitor levels have been relatively low over the past several years, however. Assuming visitor projections increase at the same rate as anticipated annual growth for enplanement by 2029, as discussed in section 2.5.2 in Chapter 2: Purpose of and Need for a Land-Based Airport at

Angoon, this would represent a 10.5% increase in nonlocal visitors over current levels by 2029 (0.55% per year) or approximately 50 new nonlocal recreational fishers in total based on 2011 to 2012 visitation numbers for Whaler's Cove Lodge (Powers 2012). To minimize conflicts with local subsistence users, charter fishing operators already avoid taking recreational fishers to Kanalku Bay, an important subsistence fishing area (Powers 2013).

4.13.3.5.3. Airport 3a with Access 3: Effects to competition

Project effects to human competition for subsistence resources under Airport 3a with Access 3 would be the same as Airport 3a with Access 2 (Table SU5). There would be no direct effects to competition, but access changes could result in decreased long-term overall competition for subsistence use areas around Angoon while increasing competition along the eastern side of Favorite Bay. As with Airport 3a with Access 2, this alternative would not increase competition between locals and nonlocals for collection of land and marine vegetation or hunted wildlife, but could increase competition for fish and marine invertebrates. However, it is anticipated that visitor levels would remain low in Angoon, increasing up to an additional 50 nonlocal recreational fishers by 2029.

4.13.3.5.4. Airport 4 with Access 2: Effects to competition

Project effects to human competition for subsistence resources under Airport 4 with Access 2 would be the same as Airport 3a with Access 2 (see Table SU5). There would be no direct effects to competition, but access changes could result in decreased long-term overall competition for subsistence use areas around Angoon while increasing competition along the eastern side of Favorite Bay. As with Airport 3a with Access 2, this alternative would not increase competition between locals and nonlocals for collection of land and marine vegetation or hunted wildlife, but could increase competition for fish and marine invertebrates. However, it is anticipated that visitor levels would remain low in Angoon, increasing up to an additional 50 nonlocal recreational fishers by 2029.

4.13.3.5.5. Airport 4 with Access 3: Effects to competition

Project effects to human competition for subsistence resources under Airport 4 with Access 3 would be the same as Airport 3a with Access 2 (see Table SU5). There would be no direct effects to competition, but access changes could result in decreased long-term overall competition for subsistence use areas around Angoon, while increasing competition along the eastern side of Favorite Bay. As with Airport 3a with Access 2, this alternative would not increase competition between locals and nonlocals for collection of land and marine vegetation or hunted wildlife, but could increase competition for fish and marine invertebrates. However, it is anticipated that visitor levels would remain low in Angoon, increasing up to an additional 50 nonlocal recreational fishers by 2029.

4.13.3.5.6. Airport 12a with Access 12a (preferred alternative): Effects to competition

Airport 12a with Access 12a would not substantially improve access to the general area and would decrease long-term access to subsistence use areas because of airport perimeter fencing. As a result, this alternative would displace subsistence users from the immediate area surrounding the airport during construction and operation, as compared to the no action alternative, which would increase local competition in other areas along the Angoon road system for subsistence resources.

However, as with Airport 3a with Access 2, Airport 12a with Access 12a would not increase competition between locals and nonlocals for collection of land and marine vegetation or hunted wildlife, but could increase competition for fish and marine invertebrates. It is anticipated that visitor levels would remain low in Angoon, increasing up to an additional 50 nonlocal recreational fishers by 2029.

4.13.3.5.7. Summary of effects to competition

A summary of project effects to human competition for subsistence resources for all action alternatives is provided in Table SU5.

Table SU5. Summary of effects to competition

	No action alternative	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Qualitative change in local subsistence use patterns	No change	Overall decrease in competition for use areas; some localized increased competition along Favorite Bay	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Increase in competition due to decrease in access to use areas
Qualitative change in nonlocal recreation use	No change	No anticipated change in hunting or other land-based subsistence use; slight increase in fishing and marine invertebrate harvest	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2	Same as Airport 3a with Access 2

4.13.3.6. How do all the effects to subsistence resources compare?

Abundance and availability: For direct effects to abundance and availability, the primary differences between the alternatives consist of variations in acres of vegetation clearing and paving. Although Airport 3a with Access 3 would have the largest construction footprint that would remove vegetation and potentially displace wildlife during construction, Airport 3a with Access 2 would generate the largest loss of land mammal and upland bird use areas and the largest potential decrease in harvest of terrestrial subsistence resources during operation.

Access: During construction, access to subsistence use areas for all airport and access road alternatives would be temporarily reduced because of increased heavy equipment traffic and human use in the area. During operation, Airport 12a with Access 12a is the only alternative that would reduce overall access to existing subsistence use areas during construction and operation of the airport and access road. All four of the other action alternatives would provide easier long-term access to areas that are currently unavailable or difficult to access for Angoon residents who do not own a boat or who cannot traverse difficult terrain. Airport 3a with Access 3 would have the greatest improvement in long-term access to subsistence resources and use areas with an increase in access of 7% compared to the no action alternative.

Airport 4 with either access alternative would have the greatest long-term loss of access from perimeter fencing, and Airport 12a with Access 12a would have the smallest loss of access from perimeter fencing. However, this loss of access from Airport 12a with Access 12a would be more widely felt by Angoon residents, because this alternative would not improve access to use areas.

Competition: For competition, there would be indirect effects but no direct effects. Changes to competition under the Airport 3a alternatives and under the Airport 4 alternatives would be identical, regardless of which access road would be used. The changes in competition from these four alternatives would differ from the changes to competition caused by Airport 12a. This is because a new road to either Airport 3a or Airport 4 would improve long-term access to areas that were formerly more difficult to reach, potentially causing more competition in some locations while overall dispersing subsistence users within the newly expanded access area. In contrast, access to Airport 12a would not substantially improve access to the general area it would occupy. Combined with the decreased long-term access to use areas caused by perimeter fencing around Airport 12a, the increase in competition for land-based subsistence resources near the proposed location of Airport 12a would be more pronounced.

4.13.3.7. Would any effects be irreversible or irretrievable?

Irreversible project effects could include lost subsistence use areas caused by ground disturbance and human avoidance, as well as changes in access to and competition for subsistence resources during construction and operation of the airport and access road. All alternatives except Airport 12a with Access 12a would increase access and decrease competition during the construction and operation of the airport and access road. Airport 12a would decrease access and increase competition during the construction and operation of the airport and access road. Each of the action alternatives would have an irretrievable project effect because of lost opportunities for hunting or gathering along subsistence use areas near the airport and access road during project construction and the airport during operation.

4.13.3.8. Would any of the alternatives have a significant effect on subsistence resources and uses?

None of the airport and access road alternatives would significantly affect subsistence uses in the Angoon area. There would be no major reductions in abundance or availability of subsistence resources because less than 8% of land mammal and upland bird use areas would be affected by any airport and access road combination, which is assumed to directly correlate to less than an 8% reduction in total harvest for terrestrial species. Based on the significance criteria outlined in this EIS, a significant effect to abundance and availability would only occur if project-related effects resulted in a reduction of more than 16% in the total harvest of a resource. In addition, there would be no substantial interference in access of subsistence use sites, and, in the cases of the access roads to Airport 3a or Airport 4, access to surrounding use areas would increase. Finally, although there would be some increase in nonlocal use of the Angoon area, predominantly for recreational fishing and marine invertebrate harvest, reported visitor levels are low and are not likely to substantially increase above existing nonlocal use levels.

4.13.3.9. How could the effects be avoided, minimized, or mitigated?

Because no significant effects are anticipated for subsistence resources, no additional mitigation measures beyond those discussed in Chapter 7: Mitigation would be implemented under any action alternative. Chapter 7 describes best management practices that would be implemented during construction. Best management practices are relatively common activities in construction and are intended to prevent pollution, minimize environmental harm, and assure that appropriate response action is taken if unacceptable environmental effects occur. Through the use of these best management practices, effects are reduced during construction. The best management practices described in Chapter 7 were considered during effects analysis for this resource.

4.14. Water Quality

This section describes the existing ***surface water*** quality conditions—both freshwater and marine water—in the area of the airport and access road alternatives. It also identifies the potential changes to those conditions from construction and operation of the proposed land-based airport and associated access road. The baseline water resources information contained in this section is summarized from the *Angoon Airport Environmental Impact Statement Water Resources Technical Memorandum* (Vigil-Agrimis 2011), which is included as Appendix J, and from supporting documents from the Alaska Department of Environmental Conservation (DEC) (DEC 2010a, 2010b, 2012c).

4.14.1. Background information

4.14.1.1. What does the term "water quality" mean?

Water quality is a measure of the condition of water and its suitability to meet environmental needs (for example, supporting a healthy fishery) or to meet human needs (as drinking water, for example). Water quality is measured by its physical characteristics (for example, ***turbidity***), its chemical characteristics (for example, the concentrations of metals and salts), and its biological characteristics (for instance, the diversity of its ***macroinvertebrate*** community). In discussions of water quality, the terms "waters" and "water bodies" are used interchangeably to mean a particular body of water, such as a lake, stream, or bay.

What is discussed in this section?

Terms to know

Macroinvertebrate: Animals such as snails, beetles, and mayflies that do not have a backbone (invertebrate) and that are large enough to be seen without the use of a microscope (macro). Different types of macroinvertebrates are sensitive to different water quality conditions. For this reason, the size and diversity of macroinvertebrate populations are often used as indicators of overall water quality.

Surface waters: Water bodies such as streams, rivers, lakes, bays, and oceans that exist on the earth's surface.

Turbidity: Lack of clarity in water as a result of suspended sediments.

4.14.1.2. What laws, regulations, or policies determined how water quality was evaluated?

The Clean Water Act of 1970, as amended (33 United States Code [USC] 1251 et seq.) is the primary federal legislation that protects surface water (which includes freshwater and marine water) in the United States. The following three components of the Clean Water Act were used to evaluate water quality in this environmental impact statement (EIS):

- ***Antidegradation policies***
- ***Beneficial uses***
- ***Water quality standards***

Section 303(d) of the Clean Water Act (Public Law [PL] 107-303) requires that every 2 years each state submit to Congress an overall assessment of water quality and a list of water bodies that do not meet water quality standards (known as impaired waters). The Environmental Protection Agency is responsible for ensuring that Clean Water Act requirements are met, but in Alaska, they delegate this responsibility to the DEC. The DEC enforces Alaska's rules establishing antidegradation policies, beneficial uses, and water quality standards for water bodies; these are found in the DEC's Water Quality Standards (18 Alaska Administrative Code [AAC] 70). The DEC has designated beneficial uses for both freshwater and marine water bodies throughout the state. Projects undertaken in the state must protect the designated beneficial uses and not violate water quality standards set forth by the DEC for specific water bodies.

Any construction project disturbing more than 1 acre requires a Storm Water Construction General Permit (Alaska Pollutant Discharge Elimination System [APDES] permit number AKR100000) (DEC 2011). As part of that process, the Angoon Airport project would require a Storm Water Pollution Prevention Plan to identify best management practices (BMPs), effective control measures, structural design features, and post-project monitoring.

Terms to know

Antidegradation policies: Policies that prohibit deterioration of water quality beyond legal limits.

Beneficial uses: Uses designated to a specific water body based on its historic water quality and natural conditions. In Alaska, beneficial uses include water supply, recreation, and aquatic life and harvest.

Water quality standards: To ensure the suitability of water for beneficial uses, various characteristics of the water are measured against certain standards. For example, all the characteristics in a water body designated as a drinking water supply must meet standards that protect human health.

What about groundwater?

Groundwater is water that exists in soil and rock under the earth's surface, and is the source of water for wells and springs. The quality of the groundwater near the proposed locations of the airport and access alternatives is not known, but it is expected to be high considering the pristine condition of much of the surrounding landscape. Effects to groundwater were not evaluated in the analysis because there is no causal mechanism by which groundwater could be contaminated by the action alternatives. The action alternatives do not require use of any groundwater resources nor any disposal of contaminants on the surface that could infiltrate groundwater. All contaminants associated with the project would be properly contained, and appropriate measures would be taken to protect against accidental spill. For more detail, see section 4.7 Hazardous Materials, Pollution Prevention, and Solid Waste.

4.14.2. Existing conditions

This section describes water quality in and around the Angoon vicinity today, including any existing sources of pollutants.

4.14.2.1. What areas were studied to determine if water resources would be affected by the action alternatives?

The areas used to analyze potential effects to water quality consist of water bodies (streams, lakes, and marine waters) in or downstream of the proposed action alternative locations because water flows downstream and the types of effects possible would not be expected to spread upstream.

The freshwater resources downstream of proposed alternative locations were identified using the ***National Hydrography Dataset***, and verified during fieldwork (see Figure WQ1). They consist of

- the lower portions of Favorite Creek,
- 14 unnamed streams (which, for the purposes of this analysis, have been assigned a number), and
- Auk'Tah Lake and three unnamed lakes.

Other streams in the region also drain into the marine water bodies labeled in Figure WQ1, but none of the action alternatives would be located in those streams' ***watersheds***, and therefore they are not included in the analysis areas.

Marine water bodies that could be affected by the action alternatives are also shown in Figure WQ1, and consist of the following:

- Salt Lagoon
- Favorite Bay
- Killisnoo Harbor
- Kanalku Bay
- An unnamed bay in the southeastern reaches of Mitchell Bay

What is discussed in this section?

Terms to know

National Hydrography Dataset: A mapped dataset compiled by the U.S. Geological Survey that contains information about the location of surface waters in the United States.

Watershed: An area of land from which surface water runoff from rain and melting snow converges, usually at the mouth of a stream. Stream flows tend to increase from a watershed's upper parts (highest elevations) to its lower parts.

The downstream extent of effects was based on a conservative estimate of dilution and geographic boundaries of small bays to larger marine water bodies.

The largest of the marine waters analyzed is Favorite Bay, which receives most of the surface water runoff in the area (from Favorite Creek and eight of the unnamed streams). In addition, the analysis areas include Kanalku Bay, Killisnoo Harbor, and one unnamed bay that receives surface water from unnamed streams and other small drainages where project-related actions would occur.

Water resources are often managed at the watershed scale. The watersheds of potentially affected water bodies are used to provide context in the effects analysis. Several of the shorter coastal streams do not have watershed boundaries for this analysis. These streams are extremely small and drain relatively flat, terraced areas above the intertidal area, making watershed delineation difficult or speculative. In this section, these small streams are included in the analysis of marine water bodies.

Detailed descriptions of stream and watershed characteristics are provided in Appendix J.

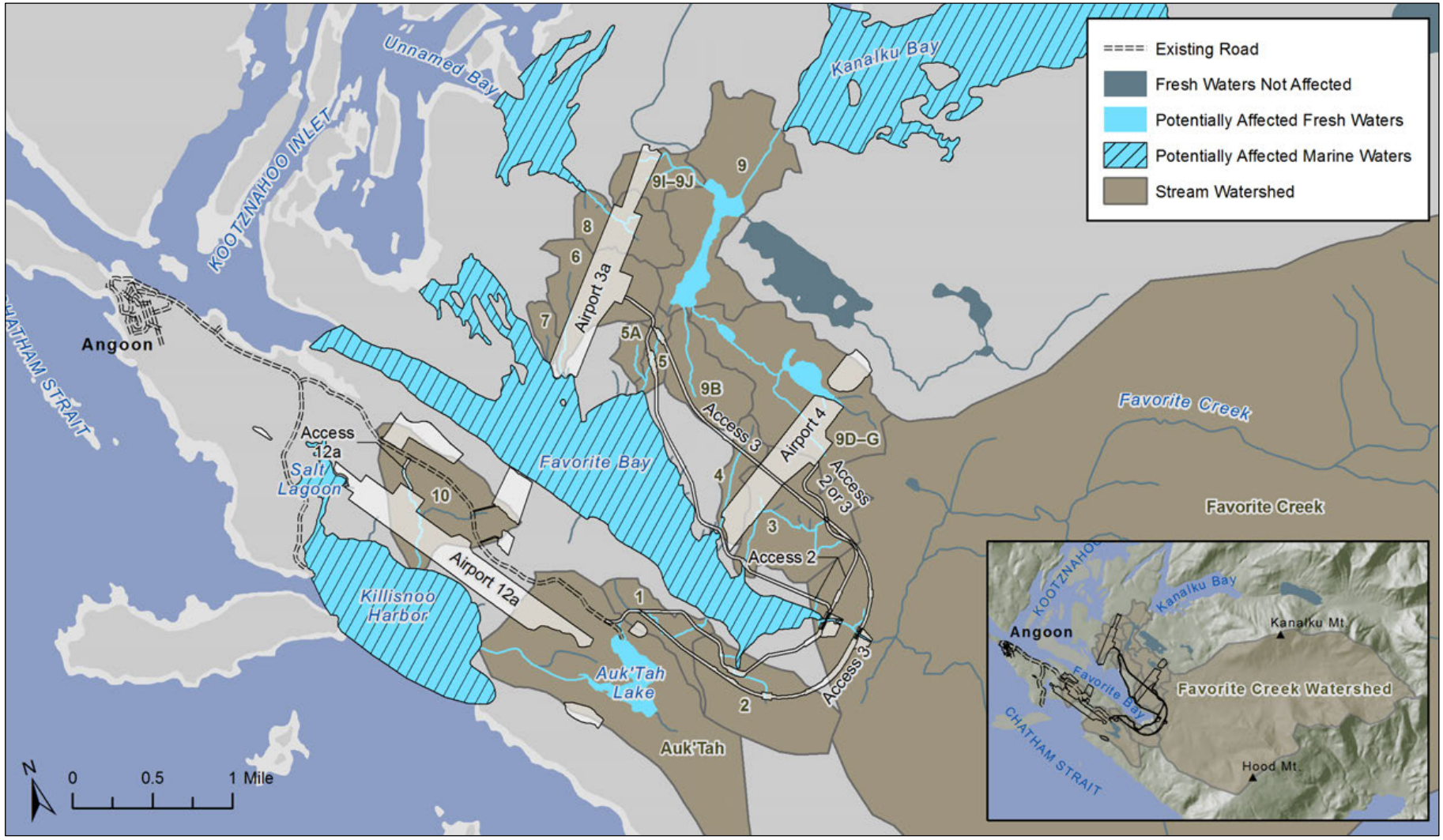

Figure WQ1. Water bodies evaluated for potential effects from action alternatives.

4.14.2.2. What are the beneficial uses and applicable water quality standards for water resources in the Angoon area?

The specific water quality standards applicable to water bodies in the Angoon area are established by their designated beneficial uses. These beneficial uses are 1) water supply, 2) recreation, and 3) aquatic life and harvest. Waters for "water supply use" are protected for drinking (freshwater only), food processing, agriculture (freshwater only), aquaculture (the farming of aquatic organisms such as fish, crustaceans, mollusks, and aquatic plants in a controlled environment), and industry. Waters for "recreation use" are protected for contact recreation like swimming, and noncontact recreation like boating and wading. Waters for "aquatic life and harvest uses" are protected for the support of fish, shellfish, and other aquatic life forms, including those that are harvested for human consumption. Designated waters must maintain applicable water quality standards for their beneficial uses, even if they are not currently being used in that manner. Other resources could be affected by changes to water quality and beneficial uses; for more information on these resources, see section 4.5 Biological Resources, section 4.16 Wilderness Character, and section 4.18 Environmental Justice and Children's Health and Safety.

The principal drinking water source for Angoon is Auk'Tah Lake (the only freshwater in the study area currently used for this purpose). Marine water bodies in the area, including Killisnoo Harbor, Kanalku Bay, Salt Lagoon, Favorite Bay, and an unnamed bay in the southern reaches of Mitchell Bay are all protected for water supply uses, recreation uses, and aquatic life and harvest uses. These areas are variously used for ferry transport, seaplane landing, recreational boating, subsistence fishing, and harvesting of crabs and shellfish.

The water quality characteristics for which standards have been developed are illustrated in Figure WQ2 and defined for specific beneficial uses in Figure WQ3. Additional language and information on Alaska's water quality standards is available in the DEC's Alaska Water Quality Standards (18 AAC 70) as well as Appendix J.

The Environmental Protection Agency also requires that states develop and adopt antidegradation policies to support existing water uses and to maintain and protect high-quality waters (meaning waters that are free of human-related effects). The DEC developed an antidegradation policy from State Regulation 18 AAC 70.015 (DEC 2012c) and is establishing methods for its implementation. In the meantime, the DEC has an interim policy that focuses on proposed effects to the state's surface waters (DEC 2010b).

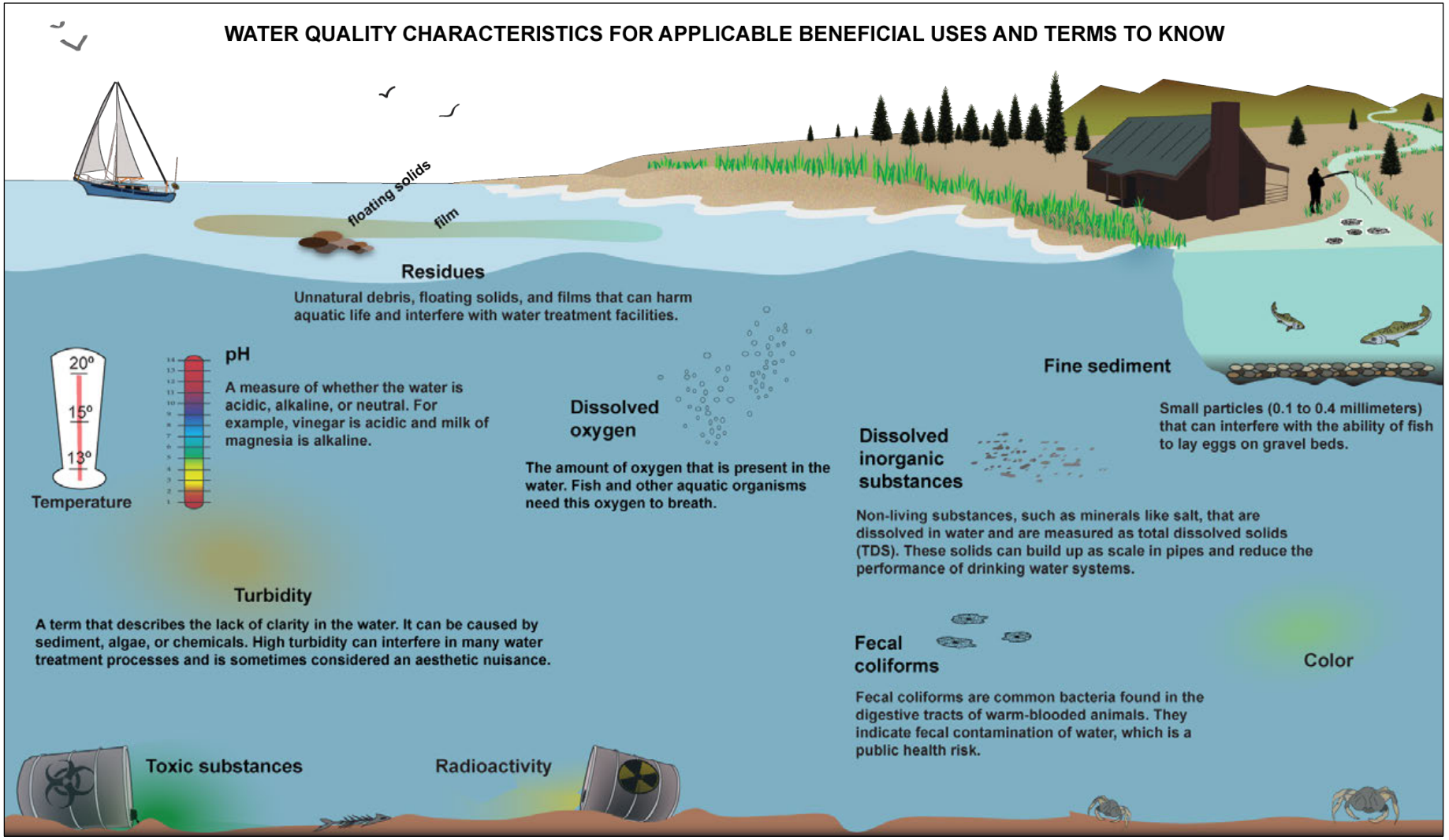

Figure WQ2. Water quality characteristics considered in evaluations of a water body's support of beneficial uses in Alaska.

Water supply use standards:

- Levels of toxins like arsenic, ***residues***, and radioactivity should be safe as defined by the *Alaska Water Quality Criteria Manual.*
- Levels of petroleum hydrocarbons, oils, and grease should be safe for aquaculture (total aqueous hydrocarbons <15 micrograms per liter [ug/l]; total aromatic hydrocarbons <10 ug/l).
- Amounts of ***dissolved inorganic substances*** (salts, minerals) should be kept low (<500 milligrams per liter [mg/l] total dissolved solids and <250 mg/l chlorides or sulfates).
- Water color may not vary much from its natural condition (<15 color units or the natural condition).
- Water clarity or turbidity should remain close to its natural condition; increasing <5 nephelometric turbidity units (NTUs) above natural turbidity, if natural turbidity is less than 50 NTUs.
- Low counts of ***fecal coliforms*** (bacteria). Mean may not exceed 20 fecal coliforms per 100 milliliters of water, and no more than 10% of the samples may exceed 40 fecal coliforms per 100 milliliters of water.

Recreation use standards:

- Low counts of fecal coliforms (bacteria).
- ***pH*** levels that are neither too acidic (>6.5) nor too alkaline (<8.5).
- Water clarity or turbidity should remain close to its natural condition; for contact recreation increasing <5 NTUs and for noncontact recreation increasing <10 NTUs above natural turbidity, if natural turbidity is less than 50 NTUs.

Aquatic life and harvest use standards:

- Appropriate levels of ***dissolved oxygen*** (7 to 17 mg/l for waters used by anadromous or resident fish) and appropriate temperatures (<20° Celsius and lower during fish migration, spawning, and rearing).
- Gravel beds used by fish for spawning should remain adequately free of ***fine sediment*** (less than 30% fine sediment by weight in gravel beds used by anadromous or resident fish for spawning).
- Water color should not vary much from its natural condition (<15 color units or the natural condition).
- Water clarity or turbidity should remain close to its natural condition; increasing <25 NTUs above natural turbidity, if natural turbidity is less than 50 NTUs.

Figure WQ3. Standards for water characteristics necessary for protecting designated beneficial uses. All potentially affected waters are protected for these beneficial uses, even if people do not currently use the water for these purposes. *Note*: The bolded and italicized terms are defined in the previous graphic (Figure WQ2).

4.14.2.3. What is water quality in the Angoon area like?

There are no known water quality sampling data available for waters in the Angoon area. The watersheds in the area are currently largely undeveloped because much of the land is within the Admiralty Island National Monument and Kootznoowoo Wilderness Area (referred to in this environmental impact statement [EIS] as the "Monument–Wilderness Area"). The existing materials source and Bureau of Indian Affairs (BIA) Road to Auk'Tah Lake currently contribute some ***sediment*** to water bodies (Figure WQ4) but not enough to cause impairment. The quality of freshwater and marine water is therefore generally assumed to be very good. In 2010, the DEC submitted its most recent water quality assessment to Congress identifying the state's impaired waters. None of the water bodies in or near the areas potentially affected by the action alternatives are classified as "impaired," meaning that the water quality in the water bodies is protective of their designated beneficial uses (DEC 2010a).

The community of Angoon relies solely on treated surface water for its drinking water supply, and there are no known groundwater wells for drinking water, although there is anecdotal evidence that people withdraw surface water for drinking from streams in the area between the community of Angoon and Auk'Tah Lake (A. Kookesh III 2012c). During a telephone interview on March 3, 2011, the mayor of Angoon confirmed that there have been water quality problems with drinking water provided by Angoon's treatment facility, primarily due to the presence of chemicals that may have formed by the treatment process (Howard 2011). There have also been failures in the treatment facility that resulted in untreated water entering the public supply. At these times, community members were notified to boil their drinking water to eliminate biological health hazards. In August 2010, the treatment facility was retrofitted to correct filtration and disinfection issues (Howard 2011).

Terms to know

Sediment: Material such as sand or silt that can be transported by water to a water body, where it can remain suspended in the water or settle to the bottom.

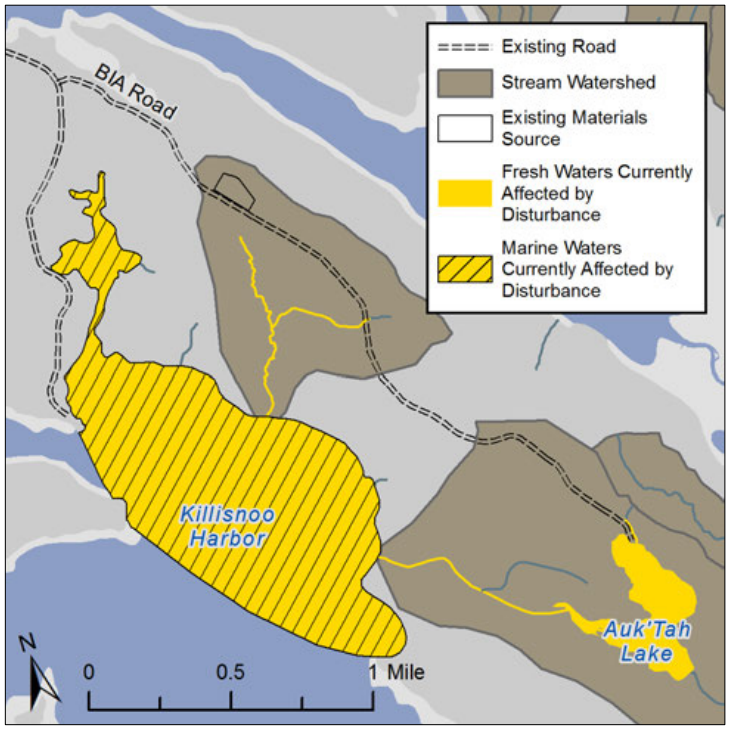

Figure WQ4. Water bodies evaluated for potential effects that are also currently affected by road disturbance.

Based on a review of the DEC Contaminated Sites Database (DEC 2012a), there are currently no contaminated sites in the Angoon vicinity, and cleanup is complete at all previously contaminated sites. This provides further support for the determination that all waters potentially affected by the action alternatives currently meet all water quality standards.

According to the *Mitchell Bay Watershed Landscape Assessment* (U.S. Forest Service 2002), surface runoff of pollutants (contamination) from the landfill has adversely affected water quality in the immediate vicinity. No quantitative information exists to substantiate this statement. However, landfills with improper peripheral containment structures are susceptible to downstream or groundwater contamination. To prevent surface runoff of pollutants, an earthen embankment was constructed around the facility perimeter in late 2009.

Terms to know

Stormwater: Water that runs off of developed areas during a rain or snow storm. Stormwater accumulates quickly in developed areas because paved surfaces prevent water from soaking into the ground. Stormwater flows into nearby surface water bodies in large volume, sometimes carrying with it contaminants from developed areas.

The water quality in the marine study area is assumed to be good because none of the areas are listed as impaired by the State of Alaska despite some potential sources of pollution to some bays. These sources include ***stormwater*** runoff and discharge; wastewater discharge; and contamination associated with ferries, seaplanes, and other water vessels. The community of Angoon does not currently have a Stormwater Management Plan, and stormwater is not treated. Piped sewage is processed at a secondary treatment plant in Angoon before the wastewater is released into Chatham Strait. This discharge is regulated by the Alaska Department of Environmental Conservation under permit number 0212DB002 (DEC 2004). In addition, the Favorite Bay Lodge Wastewater Treatment Facility discharges to Favorite Bay under APDES permit number AKG 572018 (DEC 2012d) and the Whaler's Cove Lodge Wastewater Treatment Facility discharges to Killisnoo Harbor under APDES permit number AKG 572065 (DEC 2012e). The discharge locations for these facilities are situated to allow sufficient mixing with receiving waters such that no violations of water quality standards occur.

The ferry terminal may contribute small quantities of contaminants from its operation to Killisnoo Harbor. Kootznahoo Inlet and Favorite Bay also likely receive contamination from the seaplane base, the community boat harbor and fuel dock, and derelict vessels (including a military transport vessel) along the shoreline near the Angoon community and the lower part of Favorite Bay. But these sources of contamination are minor compared to the large volume and circulation of the waters to which they discharge. Although they could have a more substantial effect on water quality and aquatic habitat near the discharge sources, there have not been any known water quality violations in receiving waters.

4.14.3. Project effects

The action alternatives could directly affect water quality during construction and long-term operation and maintenance of an airport and access road through the following actions:

- Soil disturbance, which, for the purposes of this analysis, represents the combined actions of terrain disturbance and vegetation removal
- Paving and use of roads, runways, and parking lots
- ***Culverting***, rerouting, filling, or installation of a bridge in streams

These actions could affect water quality via ***surface erosion*** and increased sediment load in streams; increased runoff from paving roads and other facilities and making them ***impervious*** to water infiltration; increased concentrations of contaminants in runoff from paved surfaces; and in-stream bank and channel erosion via construction of bridges and culverts. These mechanisms are described in section 4.14.3.1, below, with the exception of increased runoff, which is described under landscape modification in section 4.6.3.1 of Floodplains, Stream Geomorphology, and Hydrology.

What is discussed in this section?

Terms to know

Culverting: The creation of a drain or pipe that allows water to flow under a road, runway, or similar structure.

Impervious: The quality of not allowing water to pass through a surface. Instead, water collects and can create runoff.

Surface erosion: The process by which sediment detaches from the earth's surface and is transported by surface water or wind. Sediment itself can be of concern for water quality, and can also aid in the transport of bacteria and other contaminants into water bodies.

4.14.3.1. What are the mechanisms by which the alternatives could affect water quality?

Terms to know

Primary productivity: The process of using or releasing oxygen in a water body through the breakdown of organic matter or photosynthesis by aquatic plants.

4.14.3.1.1. Soil disturbance and surface erosion resulting in increased sediment load

Soil disturbance could lead to surface erosion and increased sediment load, which is the amount of sediment that enters the water when rain or snowmelt runs downhill, carrying soil along with it. Roots from vegetation stabilize stream banks and hillsides, limiting the sediment load. When vegetation is removed, there is a higher likelihood of sediment entering the water from erosion. Surface erosion and sediment load affect several water quality characteristics, especially temperature, dissolved oxygen, turbidity and color, fine sediment, and dissolved inorganic substances. (See Figure WQ2 for details about each characteristic.)

Of these water quality characteristics, turbidity is the primary characteristic that would potentially be affected by the Angoon Airport project. Sediment in water decreases the ability of light to pass through the water, which reduces its clarity; this reduction of water clarity is known as turbidity. Turbidity can interfere with water treatment processes, decrease ***primary productivity***, affect aquatic organisms' ability to find food, and be considered an aesthetic nuisance.

It is assumed that all areas disturbed by the action alternatives, other than paved areas, would be revegetated at a rate typical of reclamation in Southeast Alaska. Therefore, increases in sediment load and turbidity would be a direct short-term effect on water quality that would end when new vegetation is established.

4.14.3.1.2. Paved surfaces resulting in contaminant runoff

The introduction of paved surfaces increases runoff that can carry contaminants into adjacent water bodies. The main long-term direct effects to water quality associated with increased runoff are as follows:

- pH: Rainwater is naturally acidic (low pH) and often becomes less acidic (increased pH) as it flows over the earth's surface. An increase in the speed of runoff reduces the ground's ability to raise the pH, and therefore the runoff enters a downstream water body with a lower pH and decreases the overall pH of that water body. Extremely acidic or alkaline waters can be problematic to fisheries and directly toxic to aquatic life. Changes in pH also affect the toxicity and availability of dissolved compounds such as heavy metals.
- Toxic substances and residues: Impervious surfaces often contain at least trace or minor amounts of potentially toxic substances such as petroleum-based products, solvents, and other contaminants. Instead of soaking into the ground and being naturally filtered by soil, these substances can be carried by runoff into downstream surface waters.

4.14.3.1.3. Construction work in streams causing temporary turbidity increases

Construction actions associated with installing any physical structures in the stream channel (for example, bridge support piers or culverts) or rerouting of streams have the potential to alter the water quality of the stream through temporary turbidity increases, which would stop as soon as construction ceases. Construction of the permanent bridge at the Access 2 or Access 3 Favorite Creek crossing would require a temporary use area that would likely involve soil disturbance, construction of a temporary access road, and installation of a temporary bridge with bridge support piers in the stream channel for up to 3 years.

Other effects of in-stream construction are discussed in section 4.5.2.3 in Aquatic Habitats and Associated Species and section 4.6.3 in Floodplains, Stream Geomorphology, and Hydrology.

4.14.3.2. How did the FAA determine the potential effects of the alternatives on water quality?

This section describes the methods the FAA used to evaluate effects to water quality. Baseline water quality information, detailed soil data, and erosion pathway mapping are not available for the Angoon area. Despite the lack of baseline information, increased turbidity is a water quality characteristic that can be quantified in the terms and units used in the

DEC's state regulation for water quality standards at 18 AAC 70 (DEC 2012c). The turbidity water quality standards in the DEC's regulation are linked to beneficial uses. For these reasons, increased turbidity from changes in sediment load is the primary effect analyzed in this section.

When evaluating potential effects to water quality, the FAA recognized that all construction phases of any selected alternative would adhere to the standards of the Alaska Department of Transportation and Public Facilities (DOT&PF) as well as construction management practices regarding control of runoff, sedimentation, fill placement, and revegetation. For stream crossings, culverts designed and built according to DOT&PF standards would be used to maintain natural hydrologic flow dynamics. The DOT&PF would design access roads, bridges, culverts, and stream reroutes to minimize erosion by creating and adhering to an Erosion and Sediment Control Plan during the construction phase. To minimize sediment entering surface waters, BMPs that outline erosion-control procedures would be followed during the construction phase and while areas with cleared vegetation were in re-growth stages. Wherever possible, natural vegetation would be maintained adjacent to the road.

To minimize any long-term effects once the airport were built, the Federal Aviation Administration's (FAA's) pollution control guidelines and other BMPs would be followed for the lifetime of the airport. These include the following:

- FAA pollution control guidelines that include policies for fueling and cleaning airplanes and airport vehicles
- The preservation of natural vegetation on the sides of roads and runways to the greatest extent possible to enhance natural filtration of pollutants contained in runoff
- A Hazardous Waste Management Plan to address any hazardous wastes generated by airport facilities and operations

4.14.3.2.1. How did the FAA analyze turbidity?

Freshwater bodies

The FAA took two steps to analyze potential increases in turbidity for freshwater bodies. The first was to predict potential increases to turbidity and the second was to estimate a construction BMP effectiveness value. These two steps are discussed further in this section.

Potential increases in turbidity were predicted using a method developed and applied by the DEC in compliance with Section 303(d) of the Clean Water Act for the *Granite Creek Sediment and Turbidity Total Maximum Daily Load* (referred to here as the "Granite Creek TMDL") (Redburn Environmental and Regulatory Services 2002). The method from the Granite Creek TMDL is appropriate for use in this EIS for several reasons:

Terms to know

Nephelometric turbidity units (NTUs): Units of measure for turbidity that represent the degree to which light is scattered in water.

- The water quality standards applied by the State of Alaska under the Clean Water Act are the same standards applied by the FAA for evaluation of effects to water quality.
- The Environmental Protection Agency approved the Granite Creek TMDL and its associated method.
- As a small coastal drainage in the Tongass National Forest, approximately 50 miles from Angoon, the Granite Creek watershed is similar to watersheds in the Angoon area.
- The road-regrading aspects of the Granite Creek project were similar to the types of disturbance that would be caused by the Angoon Airport action alternatives.

The Granite Creek TMDL method calculates increased turbidity in a water body by taking into account the characteristics of the land, the type of soil on the land, and the acreage of land affected. Based on the method used in the Granite Creek TMDL, increases in the average annual turbidity were predicted for each of the Angoon Airport action alternatives during construction.

For the second step, it was necessary to estimate a construction BMP effectiveness value because if the increased turbidity in a water body, measured in ***nephelometric turbidity units*** (NTUs), violates Alaska turbidity standards for fresh waters (18 AAC 70), the effects are considered significant. Because it is illegal to violate water quality standards, the project must implement BMPs to avoid significant effects to water quality.

To estimate a construction BMP effectiveness value, the FAA evaluated the three turbidity standards that apply to the beneficial uses introduced in Figure WQ3 and the limits placed on turbidity increases as follows:

- Water supply and contact recreation uses: Increase may not exceed 5 NTUs
- Noncontact recreation uses: Increase may not exceed 10 NTUs
- Aquatic life and harvest uses: Increase may not exceed 25 NTUs

The standard for the water supply and contact recreation uses (may not exceed 5 NTUs) is the most protective turbidity standard in Alaska. For this reason, when determining a construction BMP effectiveness value, the FAA assumes that turbidity increases cannot exceed 5 NTUs, which would protect the other uses and prevent effects to them, as well.

It should be noted that prior to construction of the airport and access road, a Storm Water Pollution Prevention Plan would be developed, identifying the BMPs, erosion control measures, structural design features, and post-project monitoring that would be required for this project.

Marine areas

Turbidity in marine areas (designated for recreation and aquatic life and harvest uses) would be considered significant if it represents a "*measurable* increase in concentration of settleable solids above natural conditions" (DEC 2012c:21). The BMPs required to ensure that turbidity increases did not exceed 5 NTUs in freshwater bodies would also eliminate the possibility of measurable effects to marine areas. No further discussion of effects to marine areas is included in this section.

4.14.3.2.2. How did the FAA analyze contaminant runoff?

Effects from contaminant runoff (changes in pH or introduction of toxic substances in water bodies) are evaluated across alternatives by comparing the percentage of each watershed that would be paved and the number of streams that would receive runoff from paved surfaces.

4.14.3.2.3. How did the FAA analyze temporary turbidity increases from construction work in streams?

Construction actions to install bridge piers and culverts and to reroute streams could cause brief or sporadic sediment pulses, and it is not possible to quantify the temporary turbidity increase associated with these pulses. This effect is evaluated across alternatives by comparing the number of streams affected by bridge support piers, culverts, or rerouting (which is the same number of streams affected by paved surfaces). In Favorite Creek, specifically, the number of temporary bridge support piers is also used to indicate this effect.

4.14.3.3. How would the alternatives result in changes to water quality?

4.14.3.3.1. Turbidity increases and effectiveness of construction BMPs

As described in section 4.14.3.2.1, turbidity increases were predicted by taking into account the characteristics of the land, the type of soil on the land, and the amount of land affected. Figure WQ5 shows the locations of water bodies potentially affected by soil disturbance. Figure WQ6 shows the change in turbidity for each water body.

Under the no action alternative, the existing materials source and BIA Road to Auk'Tah Lake (see Figure WQ4) would continue to contribute some sediment to nearby streams. The existing road is estimated to increase turbidity in Stream 10 and in Auk'Tah Lake by 2–4 NTUs, increases that still meet all water quality standards. (*Note*: Because turbidity increases for a stream cannot exceed the 5-NTU threshold—regardless of the source—the existing turbidity levels in Stream 10 and Auk'Tah Lake are included in the calculations for each alternative.)

For the action alternatives, significant effects must be avoided by keeping turbidity increases below 5 NTUs in freshwater bodies. This can be accomplished assuming that the construction BMP effectiveness level estimated for each alternative would be achieved. As shown in Figure WQ5, all the action alternatives involve large acreages of soil disturbance during construction, and all would cause turbidity increases. To determine the needed BMP effectiveness level, the FAA used the streams with the highest turbidity increases and determined the percent effectiveness to keep streams from exceeding 5 NTUs.

- Airport 3a with either access would affect 13 streams (and, to a lesser degree, two lakes downstream) and require an 86% BMP effectiveness value to keep turbidity in Stream 6 from exceeding 5 NTUs. This is the highest BMP effectiveness value of all action alternatives.
- Airport 4 with either access would affect eight streams (and, to a lesser degree, three lakes downstream) and require a 74% BMP effectiveness value to keep turbidity in Stream 4 from exceeding 5 NTUs. This is the lowest BMP effectiveness value of all action alternatives.
- Airport 12a with Access 12a would affect two streams (and, to a lesser degree, one lake downstream) and require an 80% BMP effectiveness value to keep turbidity in Stream 10 from exceeding 5 NTUs.

With the implementation of construction BMPs at the estimated effectiveness levels, none of the action alternatives would cause significant water quality effects. The potential for these short-term effects would end when areas with soil disturbance were allowed to revegetate. The effects to Favorite Creek and Auk'Tah Lake would be especially minimal under all of the alternatives because the proportions of their watersheds that would be disturbed are very small. Though all the freshwater bodies are protected for water supply, only Auk'Tah Lake is currently used for water supply. The no action alternative includes activity in the Auk'Tah Lake and Stream 10 watersheds. The effects to the Auk'Tah Lake watershed would be minimal and not significant under any of the alternatives. The Airport 3a and Airport 4 alternatives would have additional disturbance in the Auk'Tah Lake watershed from the access road occupying less than 0.2% of the watershed area, which would not result in significant water quality effects to Auk'Tah Lake. Further, the drinking water treatment plant could accommodate any small change in turbidity such that drinking water quality would not be affected. Therefore, none of the action alternatives would result in significant effects to the current drinking water supply.

Through the implementation of construction BMPs at the effectiveness levels discussed above, turbidity increases would not exceed 5 NTUs and no significant effects to the beneficial uses designated to coastal streams would occur under any alternative. It is unlikely that the action alternatives would cause violations of other water quality standards; however, these standards could not be evaluated quantitatively.

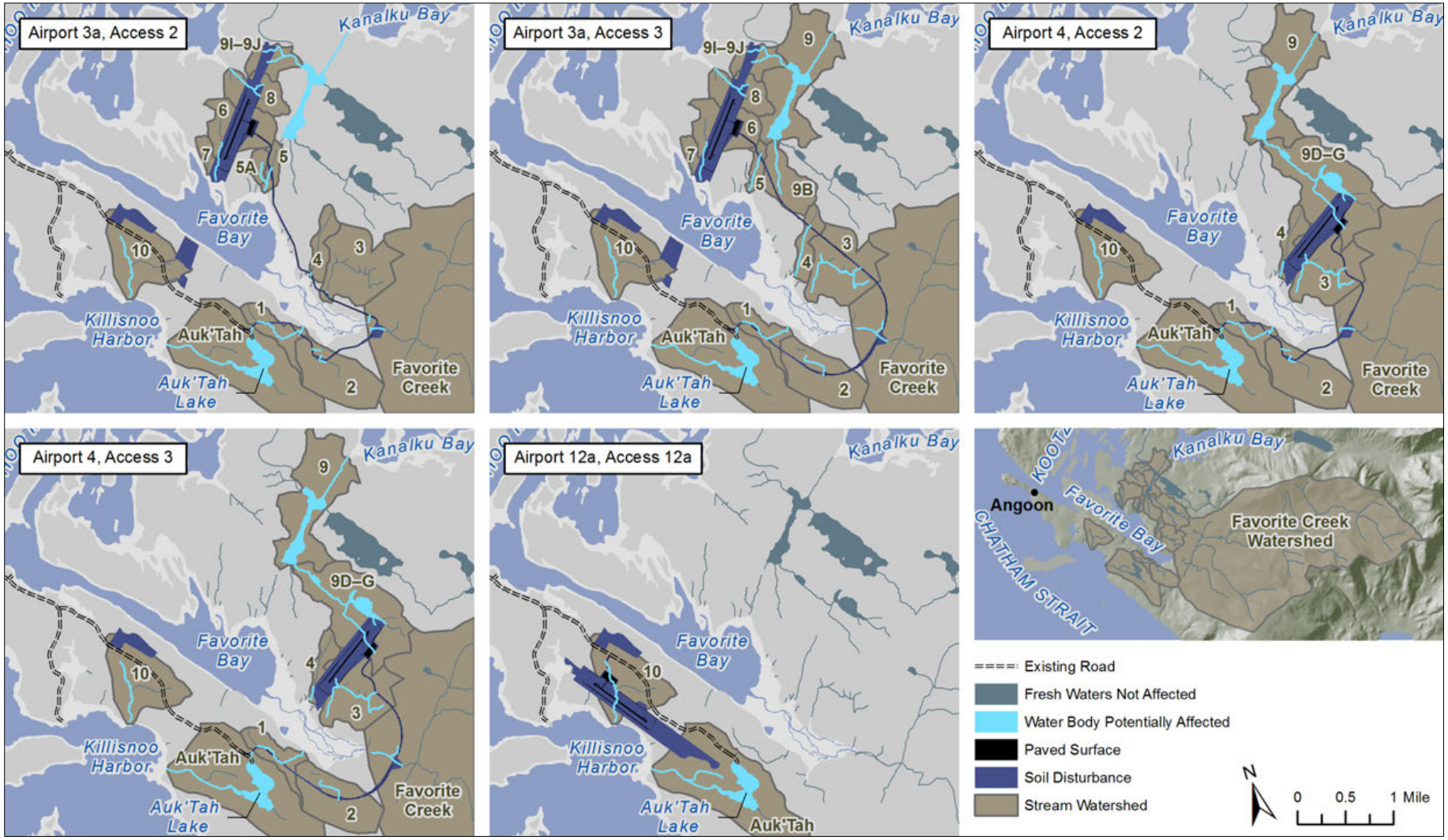

Figure WQ5. Locations of water bodies potentially affected by soil disturbance and paved surfaces.

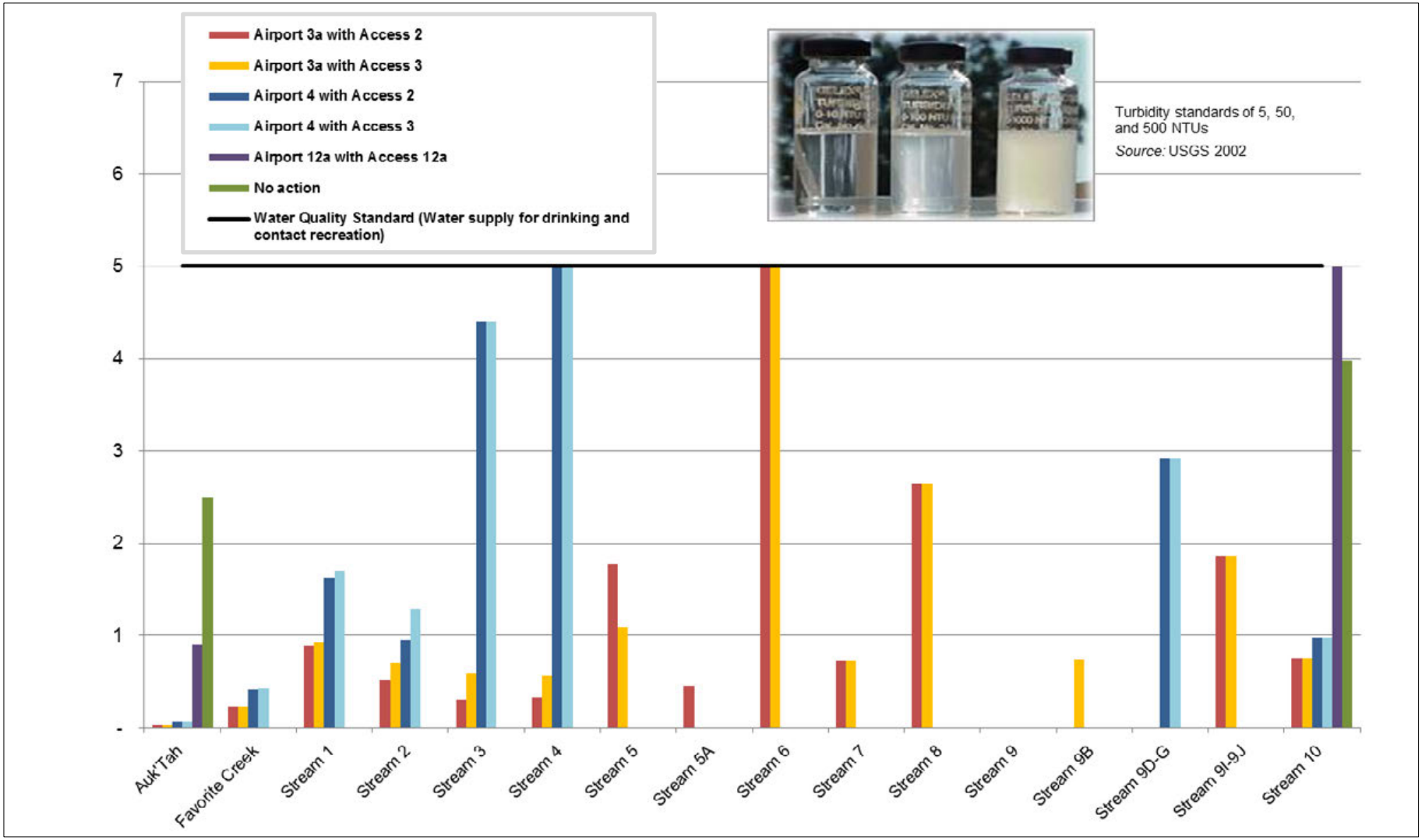

Figure WQ6. Change in turbidity in NTUs for each freshwater body per action alternative. *Note*: See section 4.14.3.2.1 for a discussion of NTUs as a measure of turbidity increase.

4.14.3.3.2. Contaminant runoff

The percentage of a watershed that is paved and the number of streams that receive runoff from paved surfaces indicate the potential long-term effects from change in pH or introduction of toxic substances (see Figure WQ5 for locations of paved surfaces). However, it is anticipated that changes in pH would not be measureable because the majority of each watershed would remain unpaved.

- For Airport 3a with Access 2, paved surfaces would affect 15 streams. The most paving (7%) would occur in Watershed 6.
- For Airport 3a with Access 3, paved surfaces would affect eight streams. As with Airport 3a with Access 2, the most paving (7%) would occur in Watershed 6.
- For Airport 4 with Access 2, paved surfaces would affect nine streams. The most paving would occur in Watershed 3 (3%) and Watershed 9D–G (2%).
- For Airport 4 with Access 3, paved surfaces would affect seven streams. As with Airport 4 with Access 2, the most paving would occur in Watershed 3 (3%) and Watershed 9D–G (2%).
- For Airport 12a with Access 12a, paved surfaces would affect one stream and 5% of Watershed 10.

Runoff of toxic substances would be minor under all action alternatives because there would be no significant sources of contaminants that could spill onto the pavement—all contaminants would be properly contained, and appropriate measures would be taken to prevent accidental spills (see section 4.7 Hazardous Materials, Pollution Prevention, and Solid Waste). The DOT&PF does not intend to use deicing agents for aircraft, airports, or access roads. The small amount of toxic substances that would run off paved surfaces would be similar across alternatives.

4.14.3.3.3. Temporary increases in turbidity from in-stream construction

Temporary increases in turbidity would result during the installation of bridge support piers and culverts and during stream rerouting. The same number of streams would be affected by this activity as would be affected by paved surfaces (see Table WQ1).

There would be additional in-stream construction related to the Access 2 and 3 temporary bridge support piers. During installation and removal of these support piers, sediment pulses could occur in Favorite Creek and downstream. The Access 2 temporary bridge would have the greatest potential temporary effects, with an estimated three to 10 support piers, whereas the Access 3 temporary bridge would likely have two to five support piers. Because Airport 12a with Access 12a would not require a Favorite Creek bridge crossing, these temporary effects would not occur under this alternative.

Other effects of in-stream construction are discussed in section 4.5.2.3 of Aquatic Habitats and Associated Species and section 4.6.3 of Floodplains, Stream Geomorphology, and Hydrology.

4.14.3.3.4. Summary of effects to water quality

During construction, all of the action alternatives would increase turbidity by up to 5 NTUs for some freshwater bodies. Airport 3a with either access alternative would require the most construction because it has the longest access road; for this reason Airport 3a with either access would also have the greatest and most widespread effects to water quality. The types, extent, and location of effects under Airport 4 with Access 2 and Airport 4 with Access 3 would be almost identical, although Airport 4 with Access 3 would have fewer streams affected by paved surfaces and fewer temporary Favorite Creek bridge support piers during construction. Airport 12a with Access 12a would affect the fewest freshwater bodies but would still require that construction BMPs be 80% effective (Table WQ1). Because turbidity increases would not exceed 5 NTUs, these construction effects would not be significant and would cease once areas with soil disturbance were allowed to revegetate. No long-term effects from paved surfaces are anticipated because of the large areas of those streams and watersheds that would remain unpaved, and because spill prevention measures would be used.

Table WQ1. Summary of potential effects to water quality

Alternative	Turbidity increases and effectiveness of BMPs		Contaminant runoff		Temporary increases in turbidity from in-stream construction
	Number of streams with turbidity increases	BMP effectiveness value required to avoid significant effects	Largest percentage of watershed paved	Number of streams affected by paved surfaces and in-stream construction	Number of temporary bridge support piers in Favorite Creek during construction
No action	2*	N/A	0%	0	0
Airport 3a with Access 2	13	86%	7%	15	3–10
Airport 3a with Access 3	13	86%	7%	8	2–5
Airport 4 with Access 2	8	74%	3%	9	3–10
Airport 4 with Access 3	8	74%	3%	7	2–5
Airport 12a with Access 12a	2	80%	5%	1	0

*The existing materials source and BIA Road to Auk'Tah Lake (see Figure WQ4) currently contributes some sediment to nearby streams.

4.14.3.4. Would any effects be irreversible or irretrievable?

The effects related to all action alternatives would be irretrievable during construction.

4.14.3.5. How did the FAA determine the significance of the anticipated effects from the alternatives?

Two FAA Orders—*Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impact* (FAA 2006a) and *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b)—identify the thresholds for significant effects on water quality as 1) the potential to exceed state water quality standards (in this case established by the Alaska Department of Environmental Conservation), meaning changes in physical, chemical, or biological characteristics would go beyond acceptable levels for the designated beneficial uses; 2) water quality problems that cannot be avoided or satisfactorily mitigated; or 3) the potential difficulty in obtaining a water quality permit or authorization. In determining significance, the FAA also considers whether the action would threaten a public drinking water supply, sole source aquifer, or waters of national significance.

Some of these factors are not applicable to the airport and access road alternatives. For example, there is no designated sole source aquifer in the area. Although some of the streams potentially affected by airport and access road construction or operation are fed by surface water coming from a wilderness area and national monument, these waters have not been deemed of national significance. Finally, no difficulty is expected in obtaining a permit for the construction work if an airport and access alternative are approved. The road and facilities would be based on designs used for other locations, and the construction techniques, BMPs, and erosion control measures would be typical of those required for Southeast Alaska.

The significance of water quality effects is therefore based primarily on the standards and beneficial uses of the surface water affected. As stated in section 4.14.3.1.1, turbidity is the primary characteristic potentially affected by the proposed Angoon Airport, and, as stated in section 4.14.3.2.1, the effect to water supply is the most protective. For these two reasons, avoiding turbidity increases in excess of 5 NTUs would also avoid effects to all beneficial uses. As with other natural resources analyses, though, agencies with special expertise and jurisdiction (such as the Environmental Protection Agency, U.S. Army Corps of Engineers, DEC, and U.S. Forest Service) were consulted during preparation and review of this EIS concerning effects to water quality.

4.14.3.6. Would any of the alternatives have a significant effect on water quality?

The BMPs required by the DEC and incorporated into the Storm Water Pollution Prevention Plan would be designed to prevent violations of state water quality standards, as discussed in section 4.14.3.2.1 As a result, there would be no significant effects to water quality associated with any of the action alternatives.

None of the alternatives would threaten a public drinking water supply, sole source aquifer, or waters of national significance, and no difficulty is expected in obtaining a Storm Water Construction General Permit if an action alternative is selected. In this EIS, the significance of water quality effects is therefore based on the State of Alaska's standards and beneficial uses of the surface water affected. As described in section 4.14.3.2.1, construction BMPs would be implemented to avoid turbidity increases in excess of 5 NTUs, thereby protecting beneficial uses. Through proper application of BMPs and spill prevention measures during construction and operation, there would be no significant effects to water quality from any alternatives.

4.14.3.7. How could the effects be avoided, minimized, or mitigated?

Significant effects to water quality would be avoided via implementation of specific BMPs that will be identified in the Storm Water Pollution Prevention Plan to be developed for the selected alternative. Chapter 7: Mitigation generally describes BMPs that would be implemented during construction. BMPs are relatively common activities in construction, and are intended to prevent pollution, minimize environmental harm, and assure that appropriate response action is taken if unacceptable environmental effects occur. Through the use of these BMPs, effects are reduced during construction. The BMPs described in Chapter 7 were considered during effects analysis for this resource. The analysis presented throughout section 4.14.3.3 and summarized here assumes that mitigation through the use of BMPs would prevent violation of all water quality standards.

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4.15. Wetlands

This section addresses the existing conditions of wetlands in the area of the airport and access alternatives, and the potential changes to wetlands from those alternatives.

The information contained in this section is summarized from the *Vegetation, Wetlands, and Wildlife Resources Existing Conditions Technical Report for Angoon Airport Environmental Impact Statement Angoon, Alaska* (SWCA 2011a), included as Appendix H and from the *Wetland and Waters Delineation Preliminary Jurisdictional Determination Report, Angoon Airport Environmental Impact Statement* (SWCA 2014f), included as Appendix S.

What is discussed in this section?

Terms to know

Hydric: Characterized by an abundance of moisture.

Hydrophytic: Adapted for growth in water or in saturated soils.

4.15.1. Background information

4.15.1.1. What does the term "wetlands" mean?

Wetlands are "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (40 Code of Federal Regulations [CFR] 230.3(t)).

Practically speaking, what defines a wetland is the presence of three characteristics—a predominance of ***hydrophytic*** plants, the presence of ***hydric*** soils, and enough water to support the two (Figure WT1).

Three components of wetlands

Hydrophytic plants | Water | Hydric soil

Figure WT1. Wetlands components.

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Wetlands are characterized as "special aquatic sites" under Section 404(b)(1) of the Clean Water Act (33 United States Code [USC] 1251 et seq.), which means they contribute to productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. For this reason, wetlands are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region by providing beneficial functions and services for fish and wildlife and for people. These functions and services include protecting and improving water quality, providing fish and wildlife habitats, storing floodwaters, controlling erosion, and maintaining surface water flow during dry periods. Studies of wetlands, therefore, involve assessments of their functions and services.

Terms to know

Non-wetland: Used here, other waters of the U.S. that lack the three wetland characteristics of water, hydrophytic plant predominance, and hydric soils.

Wetlands are a subset of water bodies that the U.S. Army Corps of Engineers calls "waters of the U.S." The term waters of the U.S. covers

> all waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide. These include...lakes, rivers, streams, mudflats, [and] sandflats, wetlands…, the use, degradation, or destruction of which could affect interstate or foreign commerce…. (33 CFR 328.3)

In the Angoon area, the presence of commercial and recreational fishing—which are considered part of interstate commerce by regulation—means that most water bodies are considered waters of the U.S. In this environmental impact statement (EIS), wetlands are discussed separately from other waters of the U.S. Discussion of ***non-wetland*** waters of the U.S.—streams and lakes, for example—is found in section 4.5.2 Aquatic Habitats and Associated Species, because that section contains the evaluations of effects to all water bodies other than wetlands.

4.15.1.2. How are wetlands and their functions and services studied?

Terms to know

Uplands: An area that is elevated above surface water or groundwater. In wetlands studies, uplands are areas that lack one or more of the three wetland characteristics, and that are seldom or infrequently flooded with water.

Wetlands are categorized in various ways. This EIS uses the classification system established by Cowardin et al. (1979), which has five main categories of wetlands: marine, estuarine, riverine, lacustrine, and palustrine. All wetlands identified near the action alternatives' proposed locations were categorized as palustrine or estuarine. Examples and attributes of palustrine and estuarine wetlands are listed in Figure WT2. The palustrine wetland types mapped near the action alternatives' proposed locations consist of bog woodland, fen, and bog forest habitats. The estuarine wetland type mapped near the action alternatives' proposed locations consist of salt marsh habitat. All wetland habitat types are mapped in Figure WT4.

Wetlands are discussed in terms of their functions and services. Wetland functions are ways wetlands contribute to an ecosystem. Figure WT3 provides examples of wetland functions. Wetland services are the benefits that humans receive from wetland functions.

Wetland functions and services are generally assessed based on the location of a wetland on the landscape and on examinations of human-caused disturbance in the wetland and the surrounding ***uplands***. For example, a new road could alter the flow of surface water and groundwater that enters or leaves a wetland, resulting in diminished flood storage functions or reduced fish spawning habitat. Vegetation removal at the edges of lakes or estuaries can reduce shoreline stability functions. The loss of root systems can result in greater rates of erosion from wave action.

Estuarine class: Salt marsh habitat

- Are semi-enclosed by land but also linked to the ocean
- Extend seaward to the mouth of a bay or to the limit of trees, shrubs, or emergent plants
- Are influenced by freshwater runoff from the land and by ocean tides
- Consist of shallow wetland estuarine habitats and deep water estuarine habitats
- Examples include lagoons, bays, and tidal rivers

Palustrine class: Fen habitat

- Characterized by mineral-rich surface water flow or groundwater flow
- Vegetation is typically dominated by perennial grass-like plants and other herbaceous plants
- Vegetation is present for most of the growing season

Palustrine class: Bog forest habitat

- Occurs in flat or ponded areas between spruce-hemlock forest and bog woodlands
- Has stagnant surface or subsurface water
- Vegetation is dominated by woody plants that are 20 feet tall or taller
- Vegetation typically includes an overstory of trees and an understory of young trees or shrubs

Palustrine class: Bog woodland habitat

- Occurs in flat or ponded areas between bog forest and fen habitats
- Has stagnant surface or subsurface water
- Vegetation is dominated by woody plants that are less than 20 feet tall
- Vegetation includes shrubs, young trees, and trees and shrubs that are small or stunted because of environmental conditions

Figure WT2. Characteristics of estuarine and palustrine Cowardin class wetlands.

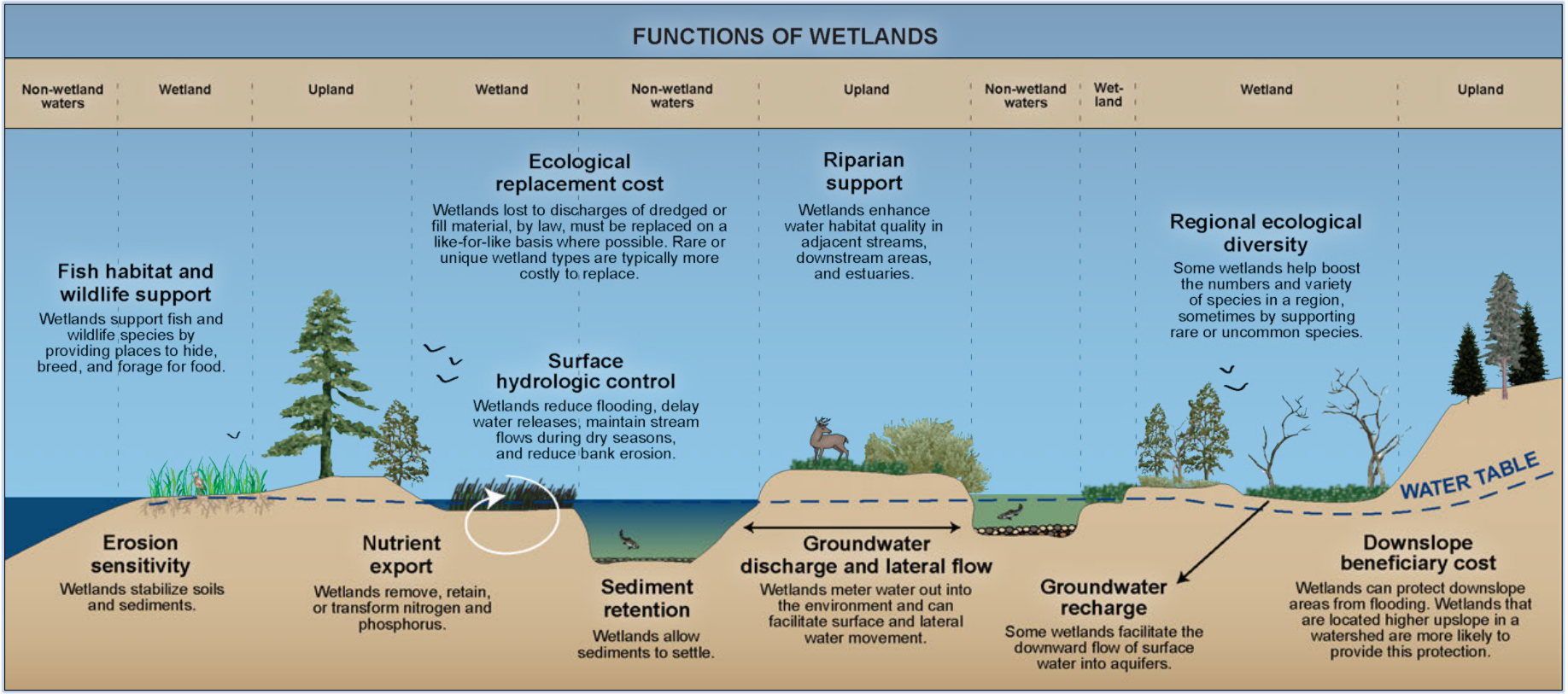


Figure WT3. Examples of wetland functions.

4.15.2. Existing conditions

The mapping and classification conducted for this EIS revealed only palustrine wetlands (bog forest, bog woodland, and fen) and estuarine wetlands (salt marsh) near the proposed locations of the action alternatives. Figure WT4 shows the distributions of wetlands in the area analyzed for effects.

What is discussed in this section?

4.15.2.1. How did the FAA determine which wetlands could be affected by the alternatives and their existing condition?

4.15.2.2. What are wetlands in the Angoon area like?

Terms to know

Delineation: A process developed by the U.S. Army Corps of Engineers that is used to determine if a given area is a wetland.

National Wetlands Inventory: A collection of data and maps showing the extent and status of the nation's wetlands. It is primarily maintained by the U.S. Fish and Wildlife Service to evaluate the status of wetlands at the national level.

4.15.2.1. How did the FAA determine which wetlands could be affected by the alternatives and their existing condition?

Wetland and vegetation fieldwork was conducted in 2009 and 2013. The fieldwork conducted in June and August 2009 focused on identifying dominant vegetation communities to determine whether an area was wetland or non-wetland. Wetland mapping reported in the *Vegetation, Wetlands, and Wildlife Resources Existing Conditions Technical Report* (included as Appendix H) modified baseline wetland mapping obtained from the ***National Wetlands Inventory*** with satellite imagery and the results of fieldwork. For these initial field studies, a study area was defined as a 500-meter buffer around the proposed locations of the action alternatives (see Appendix H). This study area measured approximately 5,276 acres. Defining this study area allowed field studies to begin while engineering designs for the action alternatives were being further refined.

Following identification of Airport 12a with Access 12a as the preferred alternative, a wetland ***delineation*** was completed in August and September 2013 using the U.S. Army Corps of Engineers method, which relies on three wetland indicators: vegetation, soils, and hydrology. Based on the results of this delineation, it was determined that where site-specific information—in other words, a delineation—is not available, the original National Wetland Inventory mapping is more accurate for purposes of analyzing potential effects to wetlands. Therefore, effects analysis in this section is based on the delineation results for Airport 12a with Access 12a, and on the National Wetland Inventory for all other locations outside the delineation area.

For this EIS analysis, the area analyzed for effects to wetlands has been refined to cover only those wetlands that would receive direct or indirect effects from the alternatives.

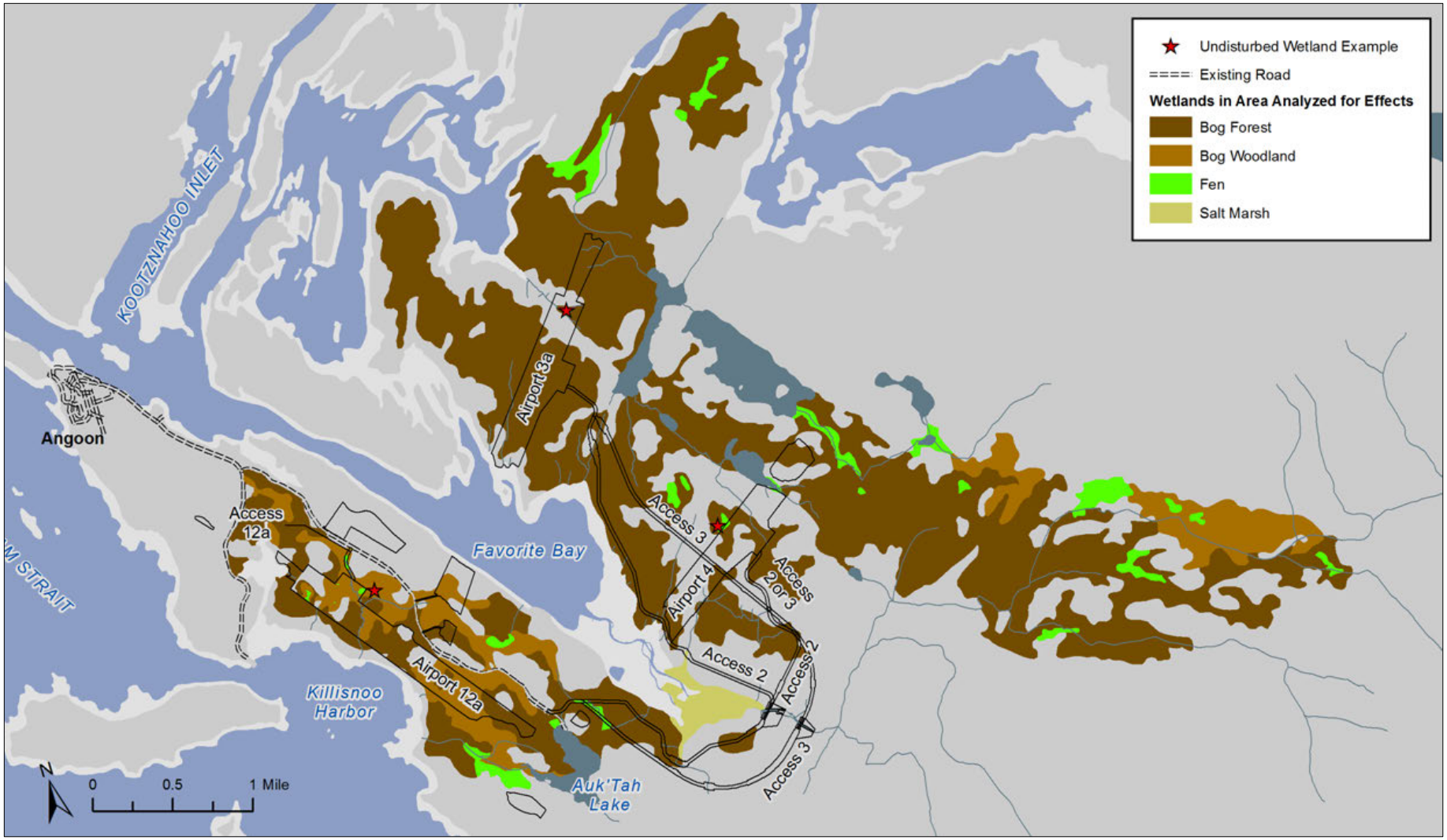


Figure WT4. Wetlands in the area analyzed for effects.

4.15.2.2. What are wetlands in the Angoon area like?

Terms to know

Substrate: The material on the bottom of a water body, such as sediment or bedrock underlying wetlands and stream channels.

Figure WT4 shows the distributions of wetland habitats in the area analyzed for effects. A preliminary assessment of wetland functions was conducted using a modified Wetland Evaluation Technique so that potential effects among the action alternatives could be compared. Using this technique, the wetland functions (listed and explained in Figure WT3) were evaluated with site-specific information. This information, collected during the original fieldwork and reported in Appendix H, consists of a given wetland's hydrology, ***substrate***, vegetation cover, proximity to a stream, and landscape position.

The Wetland Evaluation Technique determined that wetlands in the area analyzed for effects represent a wide range of functions, and this range of function is similar across all alternatives. The wetlands are highly likely to serve the groundwater recharge, groundwater discharge/lateral flow, riparian support, and regional ecological diversity functions, and less likely to serve the surface hydrologic control, sediment retention, and fish habitat functions. They were determined to be sensitive to erosion and to have moderate to high ecological replacement costs.

The wetlands in the Angoon area provide four services that contribute to human use or well-being, as follows:

- Provisioning: Humans use or rely on wetlands for things like food, water, and energy.
- Regulating: Wetlands provide water storage, water purification, and water temperature control.
- Habitat: Wetlands function as habitats that support plants and wildlife that, in turn, benefit humans in various ways.
- Public use and recognition: Wetlands contribute to human life when they are used for such activities as hiking, nature photography, education, and research.

A more detailed wetland functions and services assessment will be conducted in accordance with the recently adopted *Manual for Wetland Ecosystem Services Protocol for Southeast Alaska* (Adamus 2013, 2014) for the preferred alternative during the U.S. Army Corps of Engineers wetland permitting process.

Angoon residents commonly use wetlands as part of ***subsistence use*** (which is the provisioning service of wetlands). However, the area originally studied for wetlands, including the proposed location for Airport 12a with Access 12a, which is closest to the Angoon population center and the existing road, is mostly undisturbed and difficult for humans to access. Field studies conducted for this EIS confirm that the wetlands that would be affected by Airport 12a with Access 12a are in the same undisturbed, high-quality condition as the wetlands that would be affected by Airports 3a and 4 and their associated access roads. Some of the wetlands around Airport 12a's proposed location are easier to access because of an existing road, but Angoon residents use the wetlands around the proposed locations of Airport 3a and Airport 4, as well. During the field inventory, the only evidence of disturbance near Airport 12a's proposed location was a trail through the upland area in the southern portion of the runway and vegetation clearing related to the existing road's right-of-way. Figure WT5 shows undisturbed, high-quality wetlands in the proposed vicinities of all airport alternatives; the locations of these wetlands are shown on Figure WT4. Numerous informal foot trails related to subsistence use cross through and around the proposed locations of Airport 3a and Airport 4 and their associated access roads.

Terms to know

Subsistence use: According to Section 803 of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 (Public Law [PL] 96-487),subsistence use comprises "customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade." See section 4.13 Subsistence Resources and Uses for more information.

Figure WT5. Examples of undisturbed wetland condition near all airport alternatives. See Figure WT4 for the locations of these wetlands.

4.15.3. Project effects

Based on the resource mapping and field surveys conducted for this EIS, all action alternatives would affect wetlands. Other non-wetland waters of the U.S. (such as intermittent and perennial streams) would also be affected by all action alternatives, and these effects are evaluated in section 4.5.2.3.3 of Aquatic Habitats and Associated Species.

4.15.3.1. How did the FAA determine the effects of the alternatives on wetlands?

As described in section 4.1, the introduction to Chapter 4, construction actions for all action alternatives would involve vegetation removal related to the airport, road, and ***avigation easements*** (clearing of all vegetation for construction, line of sight, and open areas for flight approach and takeoff); terrain disturbance (grading and recontouring the ground surface through cut and fill to create flat surfaces for the road and runway); paving the runway and road, creating ***impervious*** surfaces; and potential extraction of construction materials such as gravel, soil, and rock from an on-island materials source. Four of the five action alternatives require bridge construction across Favorite Creek.

Actions related to the operation and maintenance of an airport and access road consist of continual vegetation maintenance along the runway, road, and avigation easements; maintenance of road and runway pavement; and improved or new human access as a result of an expansion to the existing roads.

See Table WT1 for the effects, the actions causing them, and the way they are measured or described. Descriptions of the effects to wetlands, including which functions and services are affected, follow the table.

What is discussed in this section?

Terms to know

Avigation easement: A right-of-way tool used in airport planning to grant certain rights to the holder of the easement. For this EIS, avigation easements outside airport property would provide the Alaska Department of Transportation and Public Facilities the right to access areas to clear them of obstructions and maintain that clearance.

Impervious: The quality of not allowing water to pass through a surface. Instead, water collects and can create runoff.

Table WT1. Effects and analysis methods

Effect	Action causing the effect	Direct (D) or indirect (I)	Temporary (T) or long term (L)	Measure of effect and assumptions
Wetland fill	• Terrain disturbance related to the airport and road	D	L	• Acres where terrain disturbance would overlap wetlands.
Wetland alteration	• Vegetation removal related to the airport, road, and avigation easements	D	L	• Acres where vegetation removal would occur in wetlands.
Changes to wetland hydrology	• Terrain disturbance and the resulting fragmentation of the remaining or adjacent wetlands	I	L	• Description of hydrology changes to fragmented wetlands and adjacent wetlands.
Disturbance to wetlands from human use	• Expansion of the road system, improving human access to previously remote areas and increasing the potential for subsistence use in wetlands	I	L	• Description of potential for increased access and use.
Sedimentation in and contamination of wetlands	• Creation of new impervious surface and the possibility of increased sedimentation and contaminant runoff	I	L	• As discussed throughout section 4.14.3 of Water Quality, it is assumed that best management practices would make these effects in any water body negligible, so these effects are not analyzed in this section.

4.15.3.1.1. Wetland fill

Terrain disturbance would result in the discharge of fill material into wetlands, which would convert them into uplands over the long term. All wetlands functions and services would be lost.

4.15.3.1.2. Wetland alteration

Wetlands would be altered in locations where vegetation is cleared for enhanced visibility along the runway and access road right-of-way and in avigation easements. Vegetation clearing alters wetland vegetation communities and therefore changes the wetland's capacity to provide functions and services related to wildlife habitat. Discussion of the effects to the use of wetlands as wildlife habitat is included in section 4.5.1.3.3 of Terrestrial Habitats and Associated Species.

Vegetation clearing would also result in minor soil disturbance outside of terrain disturbance areas, and may result in a reduction in the capacity of altered wetlands to provide sediment retention, nutrient export, and erosion sensitivity functions and services.

4.15.3.1.3. Changes to wetland hydrology

Filling a portion of a wetland could change the hydrology of the remaining and/or adjacent wetlands by severing wetland hydrology and fragmenting formerly connected wetlands, impairing their functions and services. The remaining wetlands are diminished in size and/or disconnected from one another. The construction of a road through a wetland modifies or impairs surface hydrologic control and groundwater discharge/lateral flow.

4.15.3.1.4. Disturbance from human use

As discussed in section 4.13.2.2.2 of Subsistence Resources and Uses, Angoon residents currently use the proposed locations of the action alternatives for wetlands-based provisioning by walking along existing informal trails and gathering or hunting subsistence resources. An expanded road system would provide improved or new access to previously remote areas, and could increase subsistence use in wetlands and therefore increase potential disturbance of them.

4.15.3.2. How would each alternative affect wetlands?

4.15.3.2.1. No action alternative

Under the no action alternative, the airport and access road would not be constructed. Effects to wetlands would be of the type and extent currently occurring. Currently, numerous informal foot trails cross through and around the proposed locations of Airport 3a and Airport 4 and their access roads. Existing effects to wetlands are from the use of these foot trails by residents for subsistence. An informal foot trail and associated minor disturbance also currently exist in the vicinity of Airport 12a. Existing effects to wetlands from subsistence use of that area would continue.

4.15.3.2.2. Airport 3a with Access 2 (proposed action)

Wetlands that would be affected by Airport 3a with Access 2 are highly likely to provide groundwater recharge, groundwater discharge/lateral flow, riparian support, and regional ecological diversity functions; they are less likely to serve surface hydrologic control, sediment retention, and fish habitat functions.

Wetland fill

As described in section 4.15.3.1.1, terrain disturbance results in the discharge of fill material into wetlands, converting them into uplands and eliminating their functions and services. Under Airport 3a with Access 2, 112 acres of primarily bog forest wetlands would be filled, converting parts or all of those wetlands to uplands and resulting in the loss of all functions and services (see Figure WT6 and Table WT2). The construction of Access 2 would involve temporary and permanent bridges over Favorite Creek, but neither bridge would require terrain disturbance in wetlands.

Wetland alteration

As described in section 4.15.3.1.2, vegetation clearing would cause wetland alteration by changing the wetland's vegetation communities and therefore potentially changing its functions and services. Under Airport 3a with Access 2, 86 acres of primarily bog forest and bog woodland wetlands would be altered (see Figure WT6 and Table WT2).

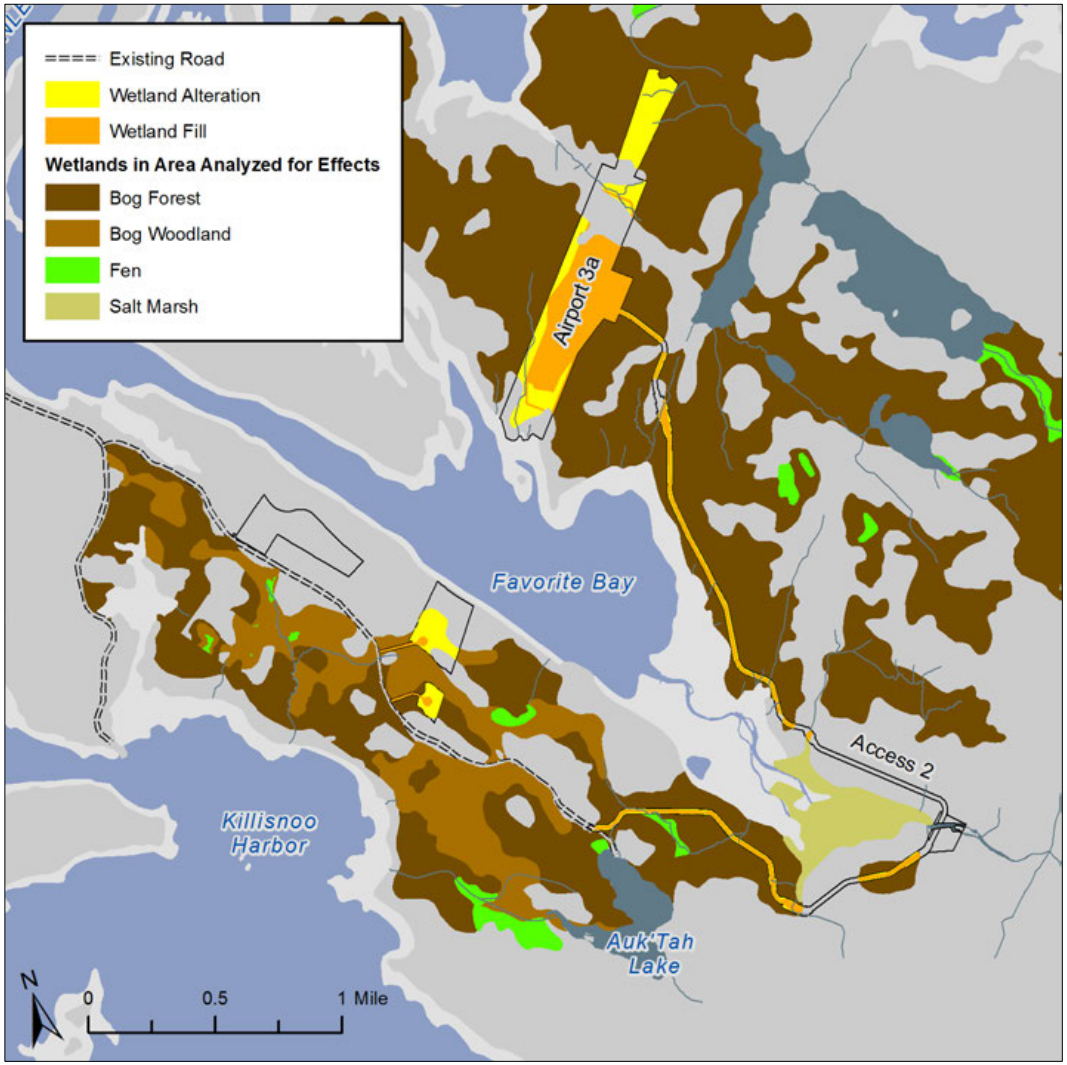


Figure WT6. Locations of wetlands that would be affected by Airport 3a with Access 2.

Table WT2. Direct effects to wetland habitats from Airport 3a with Access 2

	Bog Forest	Bog Woodland	Fen	Salt Marsh
Wetland fill (acres)	108	2	1	1
Wetland alteration (acres)	71	13	1	1

Changes to wetland hydrology

As described in section 4.15.3.1.3, filling a portion of a wetland could change the hydrology of the remaining wetland and/or adjacent wetlands. Under Airport 3a with Access 2, wetlands would be divided, leaving them fragmented (see Figure WT7). This change would impair the functions and services provided by the remaining wetlands or adjacent wetlands, or both.

Disturbance from human use

Angoon residents currently use much of the area around the proposed location of this alternative, including wetlands, for subsistence use. Subsistence users access this area by crossing Favorite Bay in a boat and walking along existing informal trails. This alternative would improve or create new access to areas that are currently remote and difficult to reach. This improved and new access could increase the use of wetlands for subsistence harvest in this area because a new road would make access to the area and transport of harvested materials more convenient. This increased use could result in human disturbance of wetlands.

4.15.3.2.3. Airport 3a with Access 3

Wetlands that would be affected by Airport 3a with Access 3 are highly likely to provide groundwater recharge, groundwater discharge/lateral flow, riparian support, and regional ecological diversity functions; they are less likely to serve surface hydrologic control, sediment retention, and fish habitat functions.

Wetland fill

As described in section 4.15.3.1.1, terrain disturbance results in the discharge of fill material into wetlands, converting them into uplands and eliminating their functions and services. Under Airport 3a with Access 3, 99 acres of primarily bog forest wetlands would be filled, converting parts or all of those wetlands to uplands and resulting in loss of functions and services (see Figure WT7 and Table WT3). The construction of Access 3 would involve temporary and permanent bridges over Favorite Creek, but neither bridge would require terrain disturbance in wetlands.

Wetland alteration

As described in section 4.15.3.1.2, vegetation clearing would cause wetland alteration by changing the wetland's vegetation communities and therefore potentially changing its functions and services. Under Airport 3a with Access 3, 80 acres of primarily bog forest and bog woodland wetlands would be altered and the functions of those wetlands reduced or changed (see Figure WT7 and Table WT3).

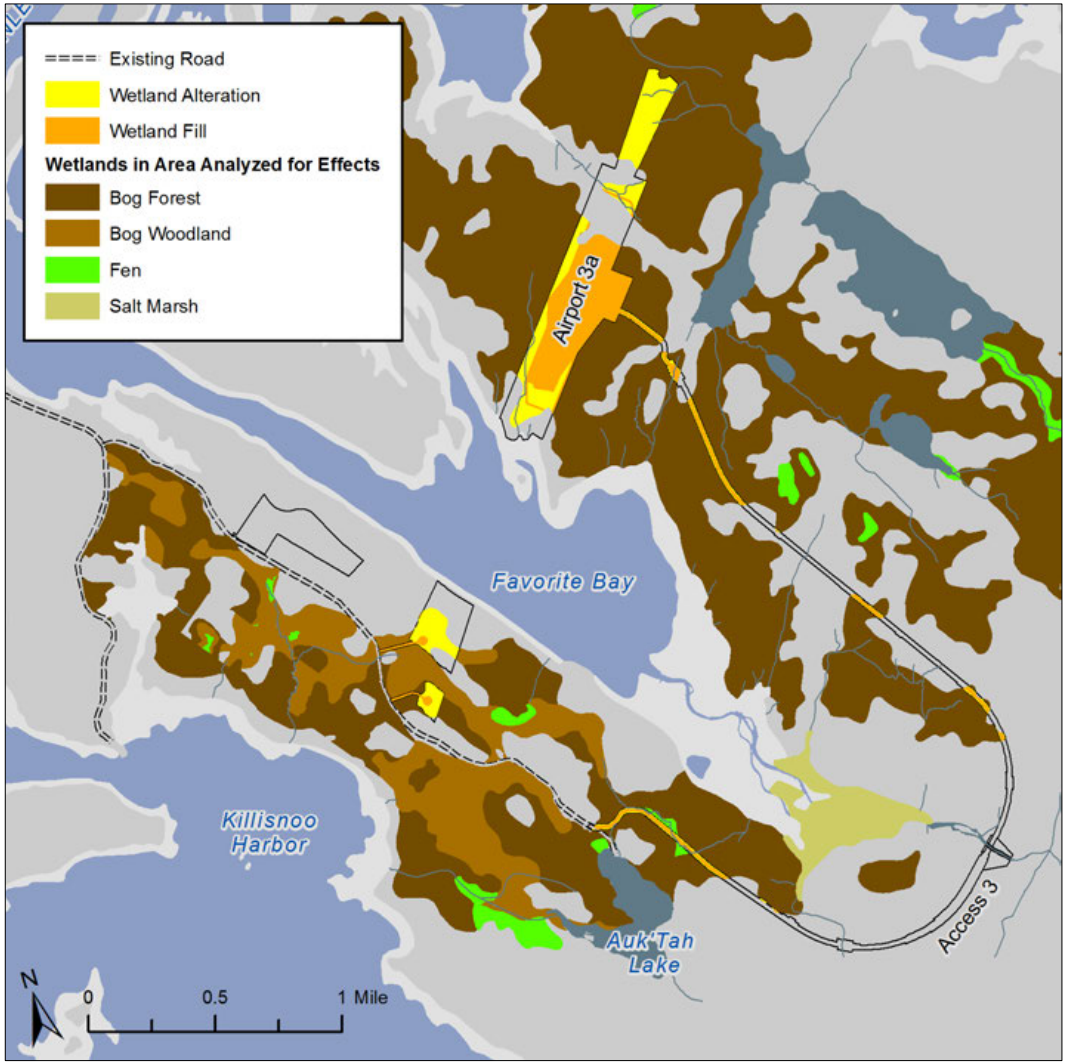


Figure WT7. Locations of wetlands that would be affected by Airport 3a with Access 3.

Table WT3. Direct effects to wetland habitats from Airport 3a with Access 3

	Bog Forest	Bog Woodland	Fen	Salt Marsh
Wetland fill (acres)	95	2	2	0
Wetland alteration (acres)	66	13	1	0

Changes to wetland hydrology

As described in section 4.15.3.1.3, filling a portion of a wetland could change the hydrology of the remaining wetland and/or adjacent wetlands. Under Airport 3a with Access 3, wetlands would be divided, leaving them fragmented (see Figure WT7). This change would impair the functions and services provided by the remaining wetlands or adjacent wetlands, or both.

Disturbance from human use

Although Angoon residents currently access areas north of Favorite Bay by crossing the bay in a boat and walking along existing informal trails, Access 3 would create access to a broader area than would Access 2, expanding access to some areas that are currently farther from the bay than people tend to walk. Access 3 would increase the area available for subsistence use and potentially increase the use of wetlands for subsistence harvest in this area. This increased use could result in human disturbance of wetlands.

4.15.3.2.4. Airport 4 with Access 2

Wetlands that would be affected by Airport 4 with Access 2 are highly likely to provide groundwater recharge, groundwater discharge/lateral flow, riparian support, and regional ecological diversity functions; they are less likely to serve surface hydrologic control, sediment retention, and fish habitat functions.

Wetland fill

As described in section 4.15.3.1.1, terrain disturbance results in the discharge of fill material into wetlands, converting them into uplands and eliminating their functions and services. Under Airport 4 with Access 2, 51 acres of primarily bog forest wetlands would be filled, converting parts or all of those wetlands to uplands and resulting in loss of functions and services (see Figure WT8 and Table WT4). The construction of Access 2 would involve temporary and permanent bridges over Favorite Creek, but neither bridge would require terrain disturbance in wetlands.

Wetland alteration

As described in section 4.15.3.1.2, vegetation clearing would cause wetland alteration by changing the wetland's vegetation communities and therefore potentially changing its functions and services. Under Airport 4 with Access 2, 43 acres of primarily bog forest wetlands would be altered and the functions of those wetlands reduced or changed (see Figure WT8 and Table WT4).

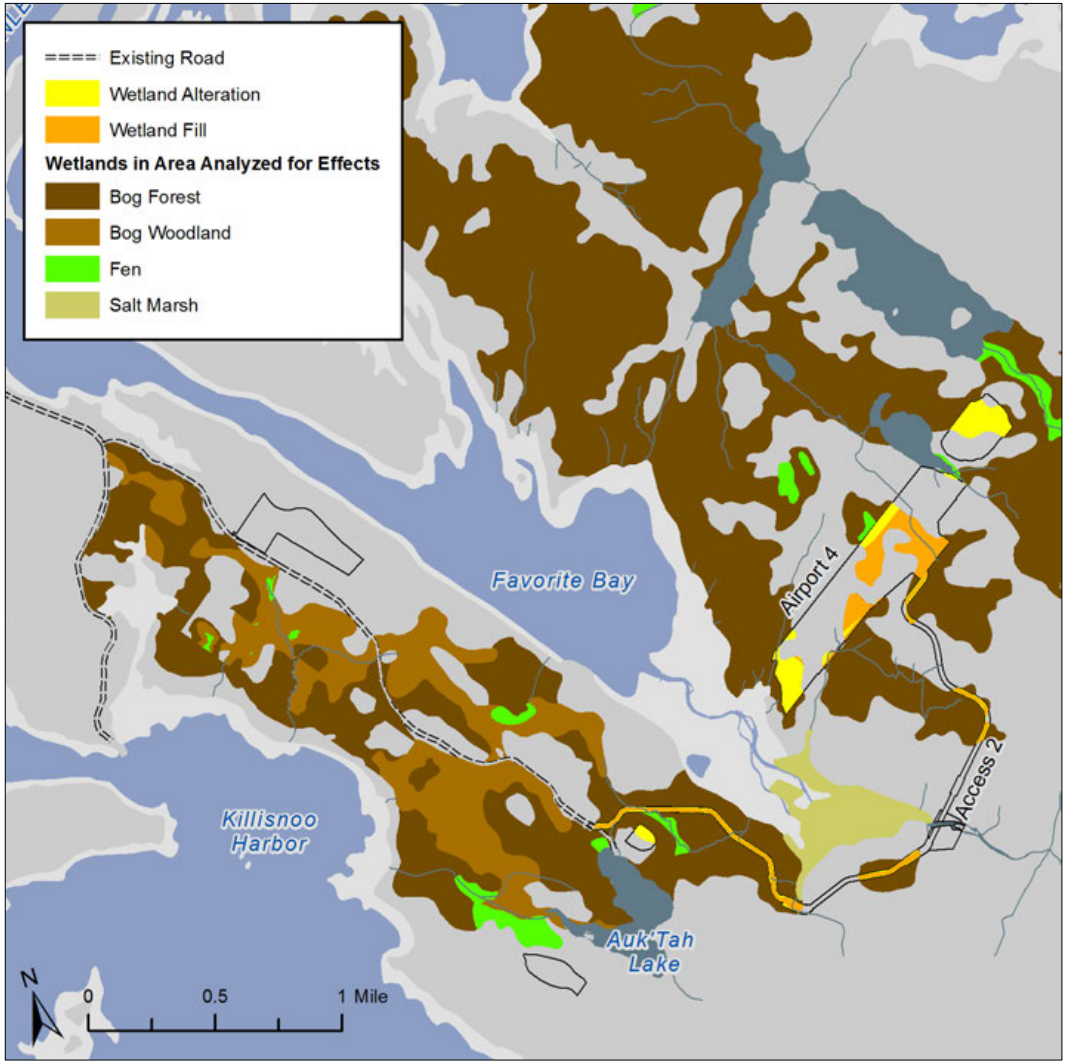


Figure WT8. Locations of wetlands that would be affected by Airport 4 with Access 2.

Table WT4. Direct effects to wetland habitats from Airport 4 with Access 2

	Bog Forest	Bog Woodland	Fen	Salt Marsh
Wetland fill (acres)	50	0	1	0
Wetland alteration (acres)	41	0	2	0

Changes to wetland hydrology

As described in section 4.15.3.1.3, filling a portion of a wetland could change the hydrology of the remaining wetland and/or adjacent wetlands. Under Airport 4 with Access 2, wetlands would be divided, leaving them fragmented (see Figure WT8). This change would impair the functions and services provided by the remaining wetlands or adjacent wetlands, or both.

Disturbance from human use

Angoon residents currently use much of the area around the proposed location of this alternative, including wetlands, for subsistence use. Subsistence users access this area by crossing Favorite Bay in a boat and walking along existing informal trails. This alternative would improve or create new access to areas that are currently remote and difficult to reach. This improved and new access could increase the use of wetlands for subsistence harvest in this area because a new road would make access to the area and transport of harvested materials more convenient. This increased use could result in human disturbance of wetlands.

4.15.3.2.5. Airport 4 with Access 3

Wetlands that would be affected by Airport 4 with Access 3 are highly likely to provide groundwater recharge, groundwater discharge/lateral flow, riparian support, and regional ecological diversity functions; they are less likely to serve surface hydrologic control, sediment retention, and fish habitat functions.

Wetland fill

As described in section 4.15.3.1.1, terrain disturbance results in the discharge of fill material into wetlands, converting them into uplands and eliminating their functions and services. Under Airport 4 with Access 3, 43 acres of primarily bog forest wetlands would be filled, converting parts or all of those wetlands to uplands and resulting in loss of functions and services (see Figure WT9 and Table WT5). The construction of Access 3 would involve temporary and permanent bridges over Favorite Creek, but neither bridge would require terrain disturbance in wetlands.

Wetland alteration

As described in section 4.15.3.1.2, vegetation clearing would cause wetland alteration by changing the wetland's vegetation communities and therefore potentially its functions and services. Under Airport 4 with Access 3, 60 acres of primarily bog forest wetlands would be altered (see Figure WT9 and Table WT5).

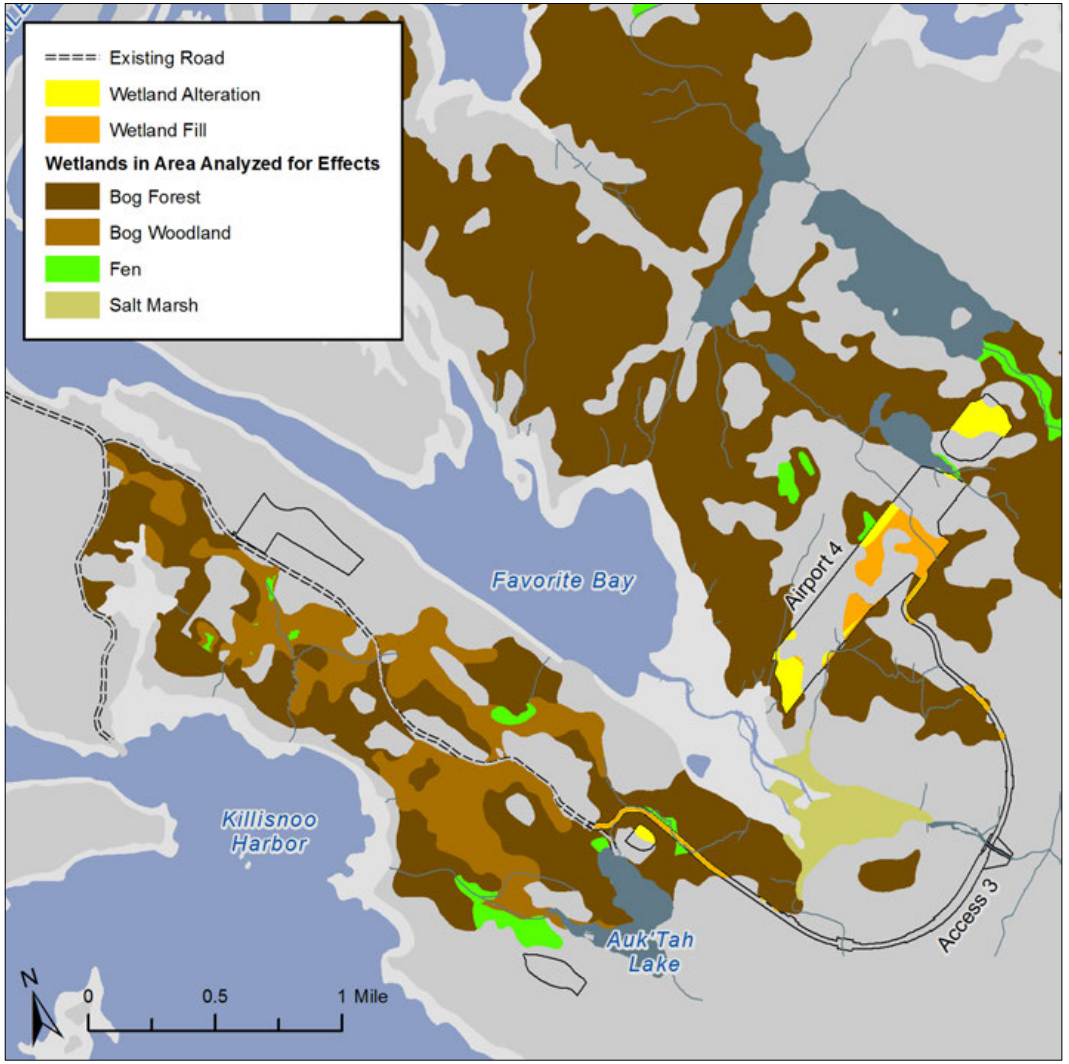


Figure WT9. Locations of wetlands that would be affected by Airport 4 with Access 3.

Table WT5. Direct effects to wetland habitats from Airport 4 with Access 3

	Bog Forest	Bog Woodland	Fen	Salt Marsh
Wetland fill (acres)	41	0	2	0
Wetland alteration (acres)	58	0	2	0

Changes to wetland hydrology

As described in section 4.15.3.1.3, filling a portion of a wetland could change the hydrology of the remaining wetland and/or adjacent wetlands. Under Airport 4 with Access 3, wetlands would be divided, leaving them fragmented (see Figure WT9). This change would impair the functions and services provided by the remaining wetlands or adjacent wetlands, or both.

Disturbance from human use

Although Angoon residents currently access areas north of Favorite Bay by crossing the bay in a boat and walking along existing informal trails, Access 3 would create access to a broader area than would Access 2, expanding access to some areas that are currently farther from the bay than people tend to walk. Access 3 would increase the area available for subsistence use and potentially increase the use of wetlands for subsistence harvest in this area. This increased use could result in human disturbance of wetlands.

4.15.3.2.6. Airport 12a with Access 12a (preferred alternative)

Wetlands that would be affected by Airport 12a with Access 12a are highly likely to provide groundwater recharge, groundwater discharge/lateral flow, riparian support, and regional ecological diversity functions; they are less likely to serve surface hydrologic control, sediment retention, and fish habitat functions.

Wetland fill

As described in section 4.15.3.1.1, terrain disturbance results in the discharge of fill material into wetlands, converting them into uplands and eliminating their functions and services. Under Airport 12a with Access 12a, 78 acres of primarily bog forest and bog woodland wetlands would filled, converting parts or all of those wetlands to uplands and resulting in loss of functions and services (see Figure WT10 and Table WT6).

Wetland alteration

As described in section 4.15.3.1.2, vegetation clearing would cause wetland alteration by changing the wetland's vegetation communities and therefore potentially changing its functions and services. Under Airport 12a with Access 12a, 99 acres of primarily bog forest and bog woodland wetlands would be altered and the functions of those wetlands reduced or changed (see Figure WT10 and Table WT6).

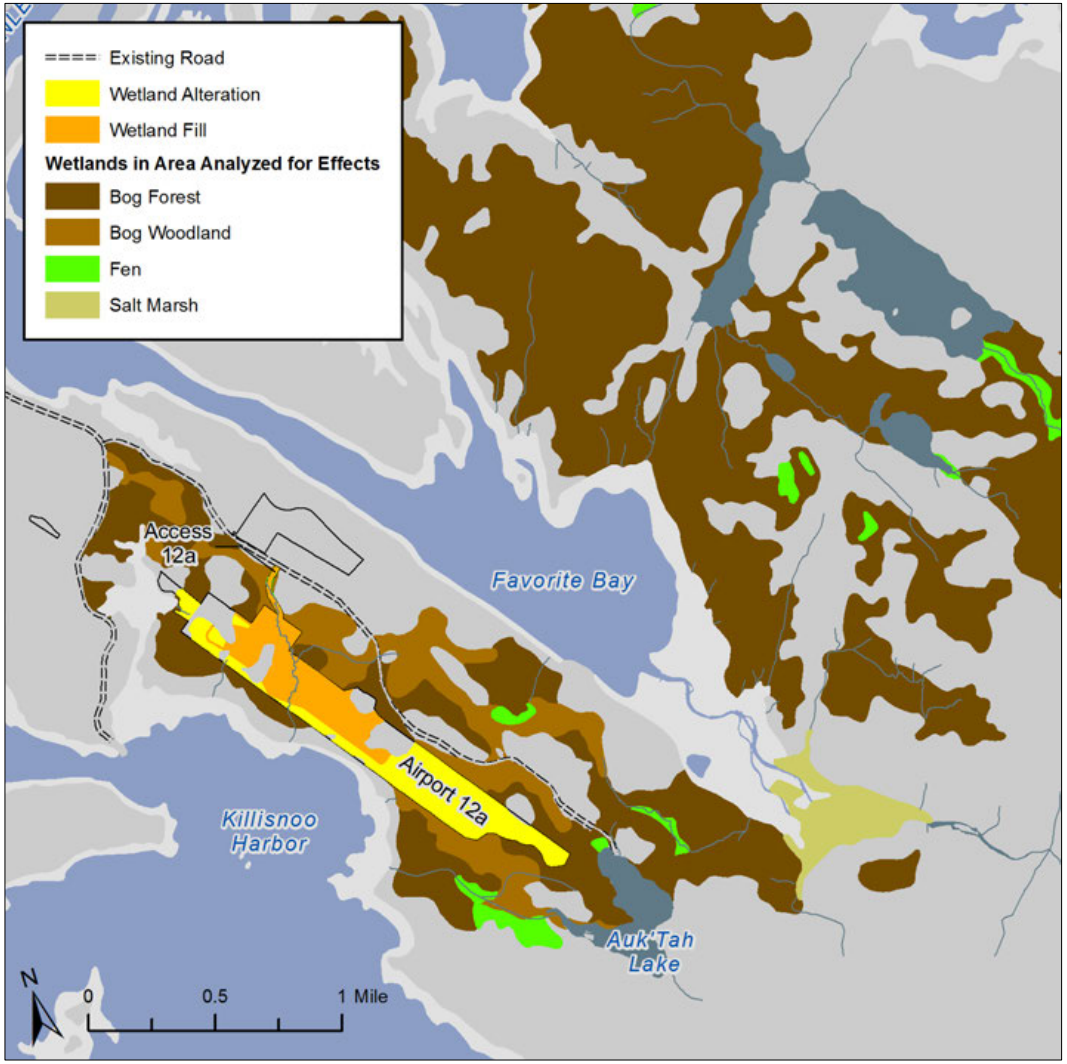


Figure WT10. Locations of wetlands that would be affected by Airport 12a with Access 12a.

Table WT6. Direct effects to wetland habitats from Airport 12a with Access 12a

	Bog Forest	Bog Woodland	Fen	Salt Marsh
Wetland fill (acres)	39	37	2	0
Wetland alteration (acres)	45	53	1	0

Changes to wetland hydrology

As described in section 4.15.3.1.3, filling a portion of a wetland could change the hydrology of the remaining wetland and/or adjacent wetlands. Under Airport 12a with Access 12a, wetlands would be divided, leaving them fragmented (see Figure WT10). This change would impair the functions and services provided by the remaining wetlands or adjacent wetlands, or both.

Disturbance from human use

Angoon residents currently use the area around the proposed location of Airport 12a with Access 12a, including wetlands, for subsistence use. Unlike the Airport 3a and Airport 4 alternatives, this alternative would not increase access to subsistence resources—and therefore human disturbance of wetlands—because there is currently access to these resources from the existing road system.

4.15.3.3. How do the effects to wetlands from the alternatives compare?

Although the nature of effects to wetlands would be the same for all action alternatives, the action alternatives differ in the amount of acres filled or altered. Airport 12a with Access 12a would fill more wetland area than would Airport 4 with Access 2 or Access 3, and it would fill less wetland area than would Airport 3a with Access 2 or Access 3. Airport 12a with Access 12a would alter more wetland area than any of the other action alternatives. Table WT7 summarizes the acres of wetland fill and wetland alteration for each of the action alternatives, and ranks them from least effect to most effect.

Table WT7. Summary of effects by action alternative

Alternative	Wetland fill		Wetland alteration	
	Acres	Rank*	Acres	Rank*
No action alternative	0	1	0	1
Airport 3a with Access 2	112	6	86	5
Airport 3a with Access 3	99	5	80	4
Airport 4 with Access 2	51	3	43	2
Airport 4 with Access 3	43	2	60	3
Airport 12a with Access 12a	78	4	99	6

*1 = least effect; 6 = greatest effect

Table WT8 provides a comparison of the acres of wetland fill per wetland habitat (bog forest, bog woodland, fen, and salt marsh). Airport 12a with Access 12a would fill the smallest area of bog forest wetland. Both Airport 3a and Airport 4 with either access would fill less bog woodland wetland than would Airport 12a with Access 12a. All of the action alternatives would fill between 1 and 2 acres of fen. The only alternative to affect salt marsh wetlands would be Airport 3a with Access 2, which would fill up to 1 acre of salt marsh.

Table WT8. Summary of acres of wetland fill by wetland habitat

Alternative	Bog Forest	Bog Woodland	Fen	Salt Marsh
No action alternative	0	0	0	0
Airport 3a with Access 2	108	2	1	1
Airport 3a with Access 3	95	2	2	0
Airport 4 with Access 2	50	0	1	0
Airport 4 with Access 3	41	0	2	0
Airport 12a with Access 12a	39	37	2	0

4.15.3.4. Would any effects be irreversible or irretrievable?

There would be irreversible and irretrievable effects to wetlands under all action alternatives from the placement of fill in wetlands and the loss of wetland functions and services during airport construction and ongoing operation.

4.15.3.5. How did the FAA determine the significance of the anticipated effects from the alternatives?

Two FAA orders, *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) and *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b) identify the thresholds for significant effects on wetlands. These thresholds would be exceeded if any of the following were to happen (as stated in FAA Order 5050.4B):

1. The action would adversely affect a wetland's function to protect the quality or quantity of a municipal water supply, including sole source aquifers and a potable water aquifer.
2. The action would substantially alter the hydrology needed to sustain the affected wetland's values [described in this section as "services"] and functions or those of a wetland to which it is connected.
3. The action would substantially reduce the affected wetland's ability to retain floodwaters or storm runoff, thereby threatening public health, safety, or welfare. The last term includes cultural, recreational, and scientific public resources or property.

4. The action would adversely affect the maintenance of natural systems supporting wildlife and fish habitat or economically important timber, food, or fiber resources of the affected or surrounding wetlands.
5. The action would promote development that causes any of the above impacts.
6. The action would be inconsistent with applicable State wetland strategies.

The significance of effects on wetlands is assessed in section 4.15.3.6 according to this guidance.

4.15.3.6. Would any of the alternatives have a significant effect on wetlands?

Development of any airport and access alternative would convert wetlands to uplands and result in the loss of all wetland functions in areas where wetlands were filled. Reductions in wetland functions and services would result from wetland alteration due to vegetation clearing and tree felling. Wetland functions and services would be reduced where the loss of a portion of a wetland or adjacent wetlands caused modifications to wetland hydrology. The activities under all action alternatives would be considered significant under NEPA according to the significance criteria described above in section 4.15.3.5.

Because undisturbed, high-quality wetlands are abundant in the landscape surrounding the analysis area, none of the action alternatives are likely to adversely affect the maintenance of natural systems that support fish and wildlife habitat or economically important resources in the indirectly affected or surrounding wetlands.

Regulating services for water storage and water temperature would not be affected because none of the action alternatives would cause flooding or discharge temperature-modified water into populated areas downstream. The water storage and purification services would not be affected because the community of Angoon receives its water from Auk'Tah Lake; the wetlands that exist in the proposed vicinities of all action alternatives have no surface flow into Auk'Tah Lake, nor are they located in a recharge area for the lake.

4.15.3.7. How could the effects be avoided, minimized, or mitigated?

Measures to avoid and minimize wetland effects are discussed in Chapter 7: Mitigation. Long-term direct effects to wetlands would need to be mitigated to satisfy the requirements of Section 404 of the Clean Water Act, which is administered by the U.S. Army Corps of Engineers. Mitigation options to offset impacts to wetlands and waters of the U.S. for Airport 12a with Access 12a are also discussed in Chapter 7 of this final EIS. The plan presented to offset significant impacts to wetlands and waters could also be applied to any other action alternative.

4.16. Wilderness Character

Two of the three airport alternatives—Airport 3a and Airport 4—and large portions of their access road alternatives are located in the federally designated Kootznoowoo Wilderness Area. This section addresses the existing conditions of two key aspects of wilderness—wilderness character and public purposes—in the vicinity of the airport and access alternatives. It also addresses the potential changes to those conditions from construction and operation of the proposed land-based airport.

What is discussed in this section?

4.16.1. Background information

4.16.1.1. What is the Kootznoowoo Wilderness Area?

The Kootznoowoo Wilderness Area was established in 1980 as the Admiralty Island Wilderness Area under Section 703(a)(1) of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 (Public Law [PL] 96-487). The Admiralty Island National Monument Land Management Act of 1990 (PL 101-378) added lands to the wilderness area and renamed it the Kootznoowoo Wilderness Area. The Kootznoowoo Wilderness Area encompasses nearly all of Admiralty Island (see Figure WC1) and is managed by the U.S. Forest Service as part of the Tongass National Forest Admiralty Island National Monument.

4.16.1.2. What is wilderness character, and what qualities contribute to it?

The idea of wilderness character comes from Section 2(c) of the Wilderness Act of 1964 (PL 88-577), which defines a wilderness area as follows:

> A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean…an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of

recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, or historical value.

Based on the Wilderness Act, four specific qualities that make up the overall character of wilderness have been defined:

1. An untrammeled quality: The area is "essentially unhindered and free from the intentional actions of modern human control or manipulation" (Landres et al. 2015:10–11).
2. A natural quality: The area's "ecological systems are substantially free from the effects of modern civilization" (Landres et al. 2015:11).
3. An undeveloped quality: The area "is essentially without permanent improvements or the sights and sounds of modern human occupation" (Landres et al. 2015:11) .
4. Opportunities for solitude and primitive and unconfined recreation: The area "provides outstanding opportunities for recreation in an environment that is relatively free from the encumbrances of modern society, and for the experience of the benefits and inspiration derived from self-reliance, self-discovery, physical and mental challenge, and freedom from societal obligations" (Landres et al. 2015:11–12).

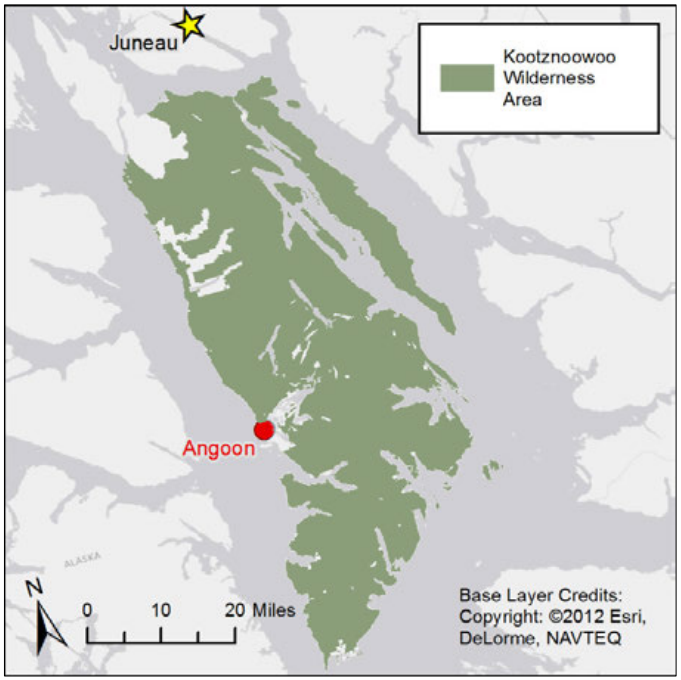


Figure WC1. The Kootznoowoo Wilderness Area covers most of Admiralty Island.

These qualities alone do not constitute wilderness, but they contribute to an area's suitability for designation as a wilderness area. The area must be substantially intact, but it need not possess all the qualities in equal condition to be considered wilderness. Additionally, these qualities need not be perfect to qualify an area for designation as a wilderness area; one or more of the qualities may be somewhat degraded in a portion of a wilderness area. But an area cannot qualify for wilderness designation if all four qualities have been substantially degraded.

These qualities form the basis of land management actions by the agency supervising the wilderness area—in this case, the U.S. Forest Service. Such agencies oversee the day-to-day activities in these areas to ensure that their wilderness qualities are maintained and continue to support the designation of wilderness.

4.16.1.3. What are the public purposes of the Kootznoowoo Wilderness Area?

Terms to know

Resource: A natural, cultural, or social feature that is valued for its role in the human environment, economy, or society. Examples include archaeological sites, vegetation and wildlife, visual resources (how the land appears), and water bodies such as streams and wetlands.

Wilderness areas also serve public purposes in addition to ensuring the preservation of lands that retain the four wilderness qualities discussed above. The Wilderness Act at Section 4(b) describes wilderness areas as being "devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use."

A wilderness area may have additional purposes to which it is devoted, or a specific focus within each purpose, and these are based on the unique characteristics of the individual wilderness area. The Kootznoowoo Wilderness Area was established with a specific focus to protect, preserve, and provide for the study of certain ***resources***. In the *Tongass National Forest Land and Resource Management Plan* (the U.S. Forest Service's land management plan for the Kootznoowoo Wilderness Area, hereafter called the "land management plan"), these resources are described as follows:

> [The Kootznoowoo Wilderness Area was established] to ensure continued opportunities for study of Admiralty Island's ecology and its notable cultural, historical, and wildlife resources within its relatively unspoiled natural ecosystem. Protection and study of Tlingit cultural resources, other historical resources, and brown bear and bald eagle populations are specifically directed. (U.S. Forest Service 2008a:3-7)

The public purposes of the Kootznoowoo Wilderness Area—recreational use, scenic use, scientific use, educational use, conservation use, and historical use—and the resources that contribute to them are listed in Figure WC2. Each resource is addressed in more detail in other resource sections in Chapter 4 (also listed in Figure WC2), and the evaluation of potential project effects on wilderness qualities and public purposes (section 4.16.3) incorporates information from those resource sections.

Resource: Unspoiled natural ecosystem

Public purposes to which the resource contributes

- Recreational use
- Scientific use
- Conservation use
- Educational use

EIS sections for more information

- Section 4.5.1 Terrestrial Habitats and Species
- Section 4.5.2 Aquatic Habitats and Species
- Section 4.5.3 Special Status Species

Resource: Brown bears

Public purposes to which the resource contributes

- Recreational use
- Scientific use
- Conservation use
- Educational use

EIS sections for more information

- Section 4.5.1 Terrestrial Habitats and Species
- Section 4.5.3 Special Status Species

Resource: Bald eagles

Public purposes to which the resource contributes

- Recreational use
- Scientific use
- Conservation use
- Educational use

EIS sections for more information

- Section 4.5.1 Terrestrial Habitats and Species
- Section 4.5.3 Special Status Species

Resource: Cultural resources (Tlingit sites, historical sites)

Tlingit stone-ringed hearth

Public purposes to which the resource contributes

- Recreational use
- Scientific use
- Conservation use
- Educational use
- Historical use

EIS sections for more information

- Section 4.8 Cultural Resources

Resource: Customary and traditional subsistence use

Salmon drying on a rack

Public purposes to which the resource contributes

- Historical use
- Educational use

EIS sections for more information

- Section 4.13 Subsistence Resources and Uses

Resource: Visual resources

Public purposes to which the resource contributes

- Scenic use

EIS sections for more information

- Section 4.9 Light Emissions and Visual Resources

Figure WC2. Resources that contribute to public purposes.

4.16.1.4. What laws, policies, and plans apply to wilderness character?

Several laws, policies, and plans apply to the consideration of development in wilderness areas. Some state how wilderness areas must be managed, and others discuss specific steps that must be taken before a project in a wilderness area can be approved.

The Wilderness Act and ANILCA are particularly relevant to the proposed Angoon Airport. Also applicable are the Federal Aviation Administration (FAA) policies for considering the effects of airport noise on compatible land use, and the U.S. Forest Service's land management plan for the area.

4.16.1.4.1. The Wilderness Act and ANILCA

Across the United States, wilderness areas are administered according to the provisions of the Wilderness Act. These provisions limit the types of development and activities that can occur in a designated wilderness area. At Section 4(c), the Wilderness Act states the following:

> Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this Act, and, except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.

Figure WC3. Foliage in the Kootznoowoo Wilderness Area.

Under this provision, an airport typically would be prohibited in a designated wilderness area. The Wilderness Act does not contain additional information to direct federal agencies in evaluating the effects of such proposed facilities on wilderness character. However, Title XI of ANILCA provides exceptions to the Wilderness Act for wilderness areas in Alaska, and certain ***transportation and utility systems***, like airports, can be sited in wilderness if proper procedures are followed (see Chapter 5: Requirements of the Alaska National Interest Lands Conservation Act [ANILCA] for more information). See Figure WC3 for a photograph taken in the Kootznoowoo Wilderness Area.

Terms to know

Transportation and utility system: As defined in ANILCA Section 1102(4)(A), the term "transportation or utility system" is any system—such as roads, transmission lines, or airports, as defined in ANILCA 1102(4)(B)—where any portion of that system is located in a conservation system unit.

The specific requirements of Title XI as they relate to wilderness character are discussed below. The other procedural requirements of Title XI, as they relate to approvals and disapprovals of applications, coordination requirements, and terms and conditions for approved applications, are discussed in greater detail in Chapter 5.

Section 1104 of ANILCA states that an environmental impact statement (EIS) must be prepared to assess the effects of a proposed transportation system and its alternatives, and it establishes timelines and procedures for coordinating with other agencies and allowing public comment. Section 1104(2)(g)(2) outlines eight specific criteria that should be considered for approval or disapproval of a transportation system in an Alaska wilderness area. Seven of the criteria address a variety of topics not specifically related to wilderness character or wilderness areas but reflecting consideration of the broader array of potential effects from the proposed project. However, one of the eight criteria is identification of any impacts that would affect the purposes for which the Kootznoowoo Wilderness Area was established.

In the case of the Angoon Airport project, this means that the EIS must consider the effects of the proposed action and its alternatives on the purposes for which the Kootznoowoo Wilderness Area was established. Because part of the purpose of establishing the Kootznoowoo Wilderness Area was to preserve and protect the wilderness qualities found on Admiralty Island, the effect of the proposed airport project on these qualities must be evaluated (see section 4.16.1.2 for a discussion of the wilderness qualities). Also, because public purposes were articulated in the establishing legislation for the Kootznoowoo Wilderness Area, the effects on these purposes must also be considered (see section 4.16.1.3 for a discussion of the public purposes).

4.16.1.4.2. Agency policies

Federal Aviation Administration

The FAA's *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* requires an assessment of the compatibility of the FAA's actions with existing land uses and designations (FAA 2006a:A-13 to A-17). This policy does not apply specifically to wilderness areas, but Order 1050.1E's Appendix A, Compatible Land Use does direct the FAA to consider the effects of airport-related noise on nearby lands where noise would interfere with normal activities associated with its use. Wilderness areas are typically considered noise-sensitive areas by the FAA and are therefore subject to evaluation for noise effects. This section of the order details methods for evaluating current noise conditions and future noise effects regarding compatible land use, but it does not direct the way effects to wilderness qualities should be evaluated. Other sections of the order provide direction on the documentation and evaluation of effects to the specific resources that contribute to the public purposes. These purposes are discussed in section 4.16.1.3.

U.S. Forest Service

The U.S. Forest Service, as manager of the Kootznoowoo Wilderness Area, is required by law to manage the land and its uses in ways that preserve the area's wilderness character. The Wilderness Act, at Section 4(b), states the following:

> Except as otherwise provided in this Act, each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character.

To meet this mandate, the U.S. Forest Service has developed management prescriptions for the Kootznoowoo Wilderness Area in their land management plan (U.S. Forest Service 2008a) with the goal of maintaining the four wilderness qualities—the untrammeled quality, the undeveloped quality, the natural quality, and opportunities for solitude and primitive and unconfined recreation. (See Figure WC4 for a photograph of wilderness with all four qualities intact.) The prescriptions also guide how the U.S. Forest Service manages the Kootznoowoo Wilderness Area regarding the purposes for which it was designated. The management prescriptions do not state how effects to wilderness character and public purposes are to be documented or evaluated. Rather, the land management plan establishes the desired conditions for the Kootznoowoo Wilderness Area (see section 4.16.3.5), and any proposed uses of it are considered in that context.

Figure WC4. A portion of the Kootznoowoo Wilderness Area featuring all four qualities of wilderness.

4.16.2. Existing conditions

4.16.2.1. Which airport and access alternatives would be located in the Kootznoowoo Wilderness Area?

What is discussed in this section?

As stated in the introduction, Airport 3a and Airport 4 would be located almost entirely in the Kootznoowoo Wilderness Area (see Figure WC5). The southern part of Airport 3a would overlap the Kootznoowoo Corridor Lands, a strip of land along much of the shoreline of Favorite Bay that is jointly managed by Kootznoowoo, Inc. (the local Alaska Native corporation) and the U.S. Forest Service but that is not considered part of the wilderness area. Access 3 for either airport alternative would be located entirely on wilderness area lands, except for a short length where it would connect to the existing Angoon road system on non-wilderness lands. Portions of Access 2 for either airport alternative also would be located in the Kootznoowoo Wilderness Area, although much of it would occupy Kootznoowoo Corridor Lands. See Figure WC6 for views of the Kootznoowoo Wilderness Area near the proposed locations of Airport 3a and Airport 4 with their access alternatives.

Airport 12a with Access 12a is the only action alternative that would not occupy any portion of the Kootznoowoo Wilderness Area. However, aircraft noise from the Airport 12a area would be audible from portions of the wilderness area.

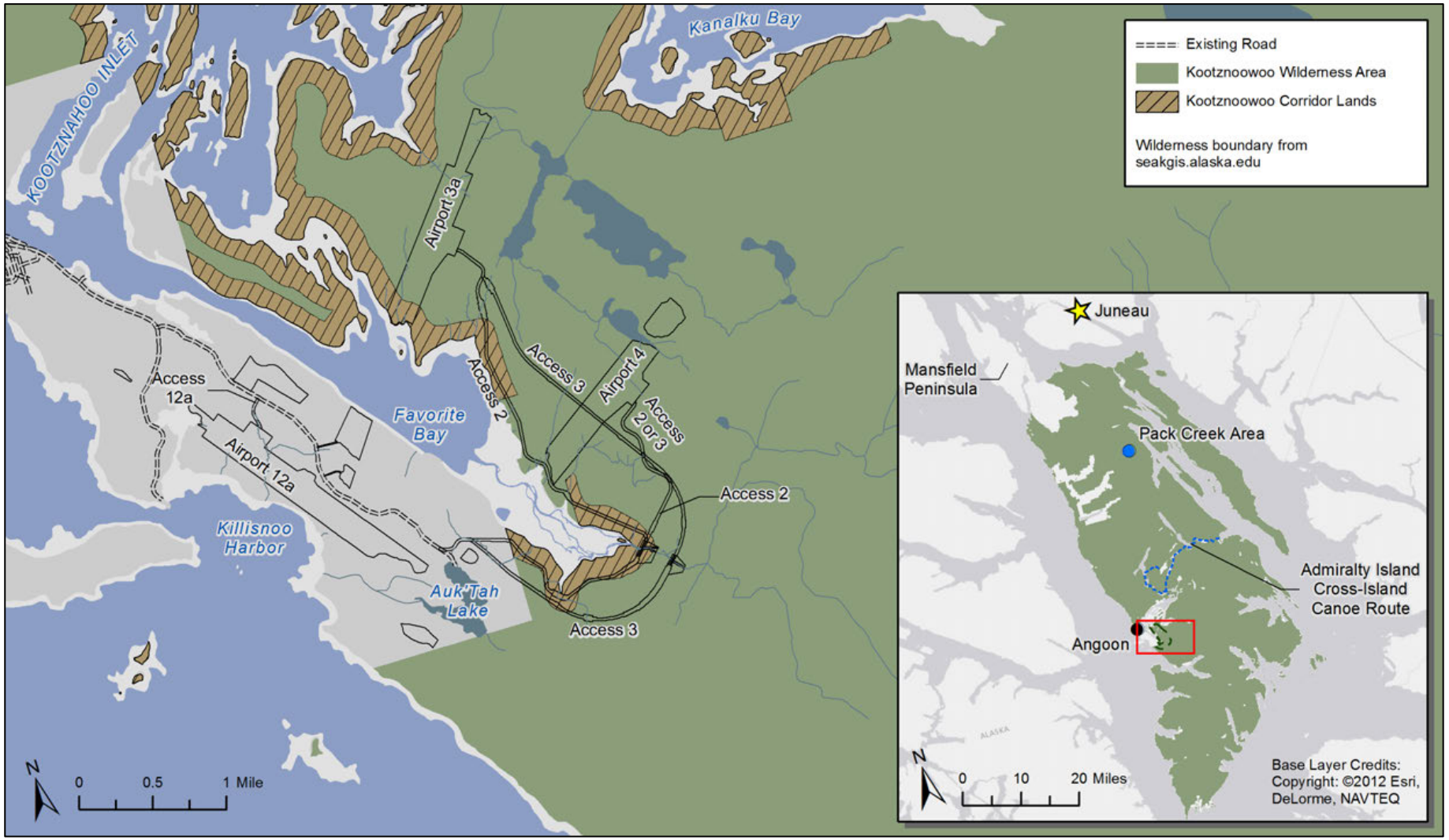
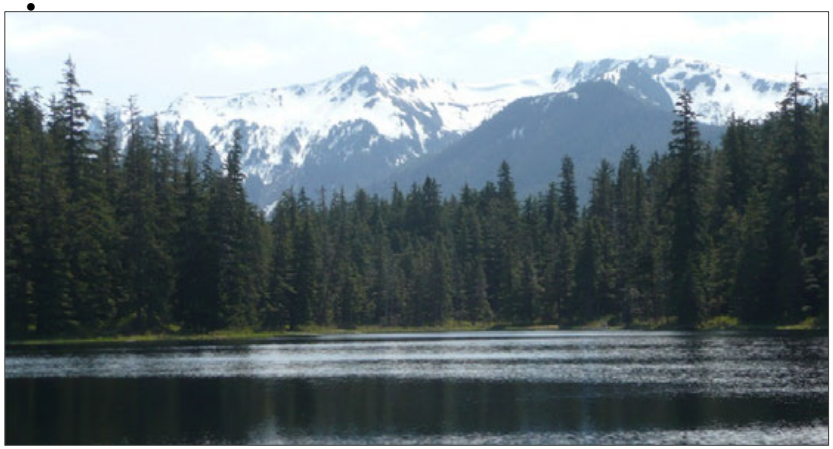


Figure WC5. The Kootznoowoo Wilderness Area in the vicinity of the proposed locations of Airport 3a and Airport 4 and their access alternatives. Inset of the greater Kootznoowoo Wilderness Area.

General area of Airport 3a



General area of Access 2 for Airport 3a

General area of Airport 4

General area of Access 3 for Airport 4

Figure WC6. Views of the Kootznoowoo Wilderness Area near the proposed locations of Airport 3a and Airport 4 and their access alternatives.

4.16.2.2. How did the FAA determine the existing condition of the Kootznoowoo Wilderness Area?

Terms to know

Social trails: Informal trails that are not designated and maintained by a land management agency.

The FAA examined the existing condition of the wilderness qualities and the resources that contribute to the public purposes in the vicinity of the proposed locations of Airport 3a or Airport 4 with their access alternatives (referred to in this section as the "wilderness alternatives") as well as the entire Kootznoowoo Wilderness Area (see Figure WC5).

The FAA determined existing conditions as follows:

- **Wilderness qualities in the vicinity of the wilderness alternatives:** The condition of wilderness qualities in the vicinity of the wilderness alternatives was assessed through record searches for past actions that might have affected wilderness qualities, direct observation during field visits, and discussions with U.S. Forest Service wilderness managers. During field visits, a wilderness specialist hiked cross-country throughout the area and mapped places where one or more of the wilderness qualities had already been affected by human actions. These observations were verified with the local wilderness resource managers. Indications that one or more wilderness qualities were affected included
    - obvious signs of human activity, such as cut logs or trees,
    - flagging and other types of improvements to ***social trails***,
    - human-caused noise, and
    - any permanent human development.
- **Public purposes in the vicinity of the wilderness alternatives:** The condition of the resources that contribute to public purposes in the vicinity of the wilderness alternatives was assessed as part of the analysis in other sections of this EIS. In general, this included field studies, document searches, and discussions with wilderness specialists and resource specialists. The particular methods used to assess each resource are described in each resource's respective EIS section, as listed in Figure WC2.

- **The greater Kootznoowoo Wilderness Area:** The condition of the Kootznoowoo Wilderness Area was assessed through discussions with wilderness and resource specialists at the U.S. Forest Service's Admiralty Island National Monument. Documents that describe the nature of the resources that contribute to public purposes were reviewed. No field visits were conducted other than in the vicinity of the wilderness alternatives. However, based on input from U.S. Forest Service representatives, the FAA assumes that the four wilderness qualities are in similar or better condition in the greater Kootznoowoo Wilderness Area than in the vicinity of the wilderness alternatives. This is because areas farther from Angoon and from access corridors such as rivers, roads, or marine waters tend to be visited less by humans than do areas that are more easily accessible.

4.16.2.3. What are the wilderness qualities like?

Some of the wilderness qualities have already been affected to some degree. In this EIS, effects to wilderness qualities are defined as "degradation," which means the wilderness quality has been changed in a way that detracts from its ability to contribute to wilderness character.

Wilderness qualities in the greater Kootznoowoo Wilderness Area: Locales near developed or more frequently used locations like the Pack Creek bear-viewing area (on the east side of the island), the Kanalku Bay watershed, and the Admiralty Island Cross-Island Canoe Route (see Figure WC5) are locations of higher use in the wilderness area. The U.S. Forest Service maintains 15 public use cabins in the wilderness, most of which are located in the central part of Admiralty Island within a short distance of the Cross-Island Canoe Route. They also maintain two trails and two shelters; one trail and shelter are on the north end of the island, and the other trail and shelter are on the east side of the island. These human-introduced facilities are allowed under ANILCA because it specifically provides allowances for public-use cabins in wilderness. Several dozen private cabins on private inholdings are located throughout the wilderness area (Lydon 2003; TheArmchairExplorer 2013). Evidence of historical logging is visible in certain areas, although it is in the form of second-growth forest stands compared to the primary-growth forests present outside previously logged areas. Apart from these developments and use areas, the Kootznoowoo Wilderness Area as a whole contains vast spaces where all four wilderness qualities are intact and unaltered.

Wilderness qualities in the vicinity of the wilderness alternatives: The existing conditions of the four wilderness qualities in the vicinity of the wilderness alternatives vary from completely unaltered to degraded, as shown in Table WC1. Because this portion of the Kootznoowoo Wilderness Area is reasonably accessible from Angoon—particularly by boat to the shoreline of Favorite Bay and then by cross-country foot travel—it receives more human activity than much of the rest of the wilderness area. This activity has led to some degradation of the natural quality in small areas near the wilderness alternatives, and to degradation of opportunities for solitude. The area retains its undeveloped quality, however, and the untrammeled quality remains unaffected. Table WC1 summarizes the existing conditions of the four wilderness qualities in the vicinity of the wilderness alternatives. The qualities are also discussed in more detail in the sections that follow.

Table WC1. Existing conditions of wilderness qualities in the vicinity of the wilderness alternatives

Quality	Existing Condition
Untrammeled quality	• All portions of the Kootznoowoo Wilderness Area near the wilderness alternatives retain their untrammeled quality.
Natural quality	• The natural quality in three locales is currently degraded as a result of development of social trails primarily for subsistence or recreation use as well as sites used for wind data collection for this EIS (Figure WC7). • Other areas in the vicinity of the wilderness alternatives retain the natural quality because they are unaffected by human actions and there are no changes to any natural ecological systems.
Undeveloped quality	• The undeveloped quality has been unaffected by human action because there are no permanent developments in the vicinity of the wilderness alternatives.
Opportunities for solitude or primitive and unconfined recreation	• Opportunities for primitive and unconfined recreation are unaffected; there are no developed recreational locations or limitations on where recreational activities may occur. • Opportunities for solitude are degraded periodically (fewer than 30 minutes total over the course of 24 hours; Figure WC8) by existing aircraft noise and visibility associated with the Angoon Seaplane Base and aircraft flying over the Kootznoowoo Wilderness Area.

4.16.2.3.1. Natural quality

The natural quality in three areas (Figure WC7) has been degraded through human activities, primarily the development and marking of social trails by subsistence and recreational users from Angoon for hunting, fishing, gathering plants, and hiking. Additionally, wind monitors were installed along the proposed runway for Airport 3a to gather information on wind conditions. The wind monitors were removed in October 2011. Evidence of the monitors was still visible in the immediate areas in 2012 but will diminish over time as the area is naturally reclaimed by the surrounding vegetation.

In comparison to the greater Kootznoowoo Wilderness Area, the condition of the natural quality near the wilderness alternatives is very similar. When compared to certain parts of the wilderness area, such as the cross-island canoe route, the Pack Creek bear-viewing area, and portions of the Kanalku Bay watershed, the natural quality near the wilderness alternatives is more intact. On the whole, the greater Kootznoowoo Wilderness Area, including the area near the wilderness alternatives, retains a high and equal level of the natural quality because the ecological

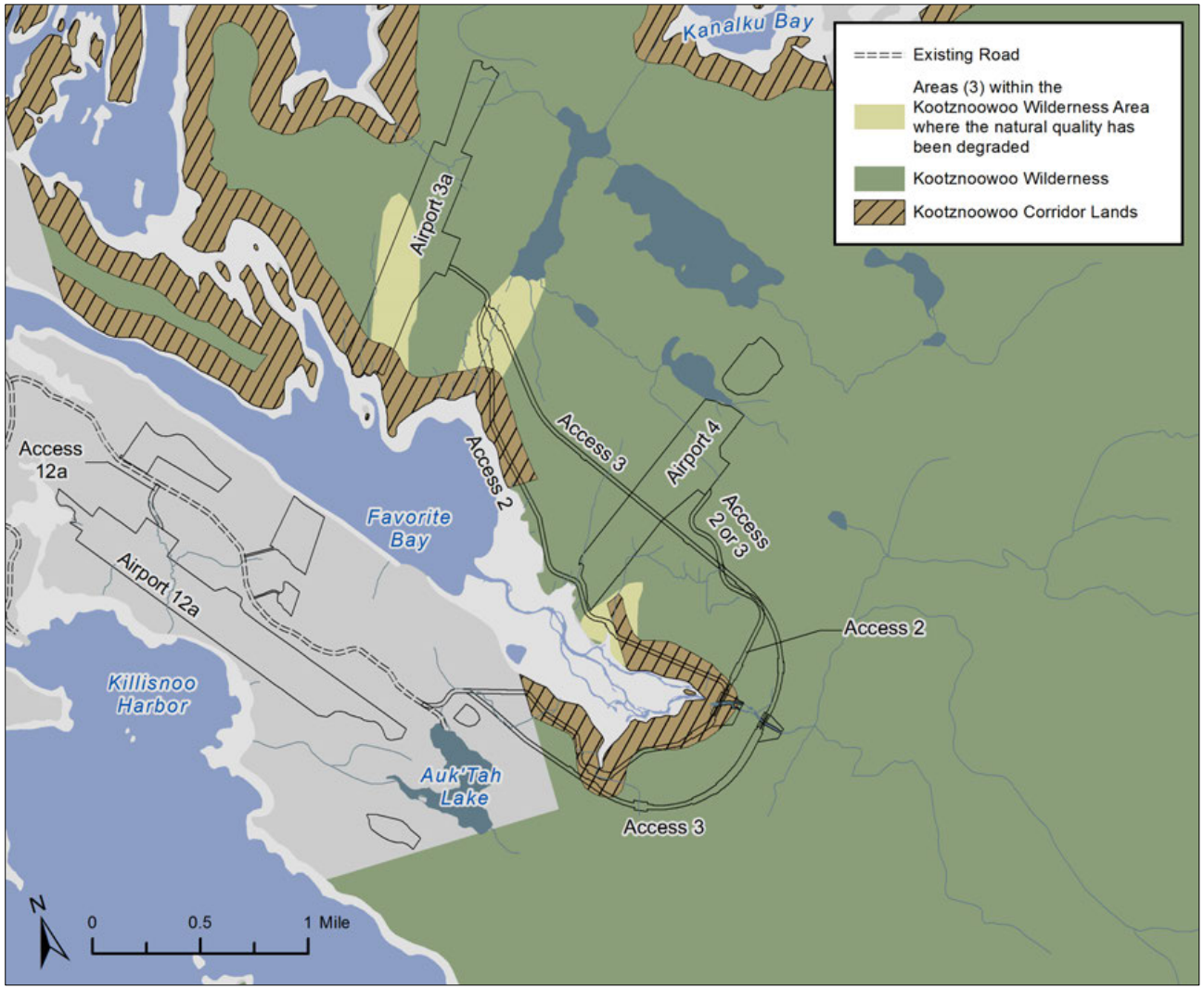


Figure WC7. Locations near the wilderness alternatives where the natural quality is currently degraded.

systems are substantially free from the effects of modern civilization.

4.16.2.3.2. Untrammeled quality and undeveloped quality

The untrammeled and undeveloped qualities of wilderness in the vicinity of the wilderness alternatives are unaffected by human actions because the area is substantially free from human control and manipulation and there have been no permanent improvements or modern human development since the wilderness area was designated in 1980.

In comparison to the greater Kootznoowoo Wilderness Area, the condition of the untrammeled and undeveloped qualities in the vicinity of the wilderness alternatives is very similar. When compared to certain parts of the wilderness area, such as the cross-island canoe route, the Pack Creek bear-viewing area, and the locations of the U.S. Forest Service cabins, the undeveloped quality in the vicinity of the wilderness alternatives is more intact. On the whole, the greater Kootznoowoo Wilderness Area, including the area near the wilderness alternatives, retains a high level of the untrammeled quality because the area is substantially free from human control and manipulation.

4.16.2.3.3. Opportunities for primitive and unconfined recreation, and opportunities for solitude

Opportunities for primitive and unconfined recreation are intact in the vicinity of the wilderness alternatives, in large part because the area has retained its natural and undeveloped qualities and because there are few regulations to restrict recreational opportunities.

However, opportunities for solitude are currently degraded during short spans of fewer than 30 minutes in a 24-hour period from commercial and private aircraft flying overhead, and from existing commercial seaplane operations at the Angoon Seaplane Base. The noise analysis conducted for this EIS indicates that the current average daily ambient (background) sound level in the vicinity of the wilderness alternatives is a day-night average sound level (DNL) of 27 A-weighted decibels (dBA), which is quieter than a birdcall, but there are times during the 24-hour period when airplane noise louder than ambient can be expected. These periods are referred to as “time above ambient,” or “TAA.” Figure WC8 shows the locations and periods of time (in minutes) when noise above ambient is currently heard in the Angoon area. See section 4.11 Noise for detailed information on the noise studies conducted for this EIS.

The visibility of aircraft flying overhead and seaplanes arriving or departing the Angoon Seaplane Base currently degrade opportunities for solitude because the sight of aircraft represents an encounter between a wilderness user and other people or motorized equipment. Existing air traffic from operations at the Angoon Seaplane Base results in an average of four potential encounters per day, and aircraft overflights result in another 10 potential encounters per day in the Kootznoowoo Wilderness Area (for further details on these numbers, see *Noise Analysis for Angoon Airport Environmental Impact Statement, Angoon, Alaska* [BridgeNet International. 2013b], included as Appendix G). This number of potential encounters (14) exceeds the recommended encounter rate for the wilderness area under the Recreation Opportunity Spectrum (ROS), which is a tool the U.S. Forest Service uses to manage lands for recreation opportunities. Areas are categorized based on the types of recreation opportunities available to visitors. Those opportunities are evaluated using several criteria, one of which is the potential for encounters with people or mechanized equipment. For this EIS, wilderness lands in the vicinity of the alternatives are categorized as either Primitive or Semi-Primitive Motorized, as described in the land management plan (U.S. Forest Service 2008a). Areas categorized as Primitive have a recommended encounter rate of fewer than three per day. Areas categorized as Semi-Primitive Motorized have a recommended encounter rate of fewer than six per day.

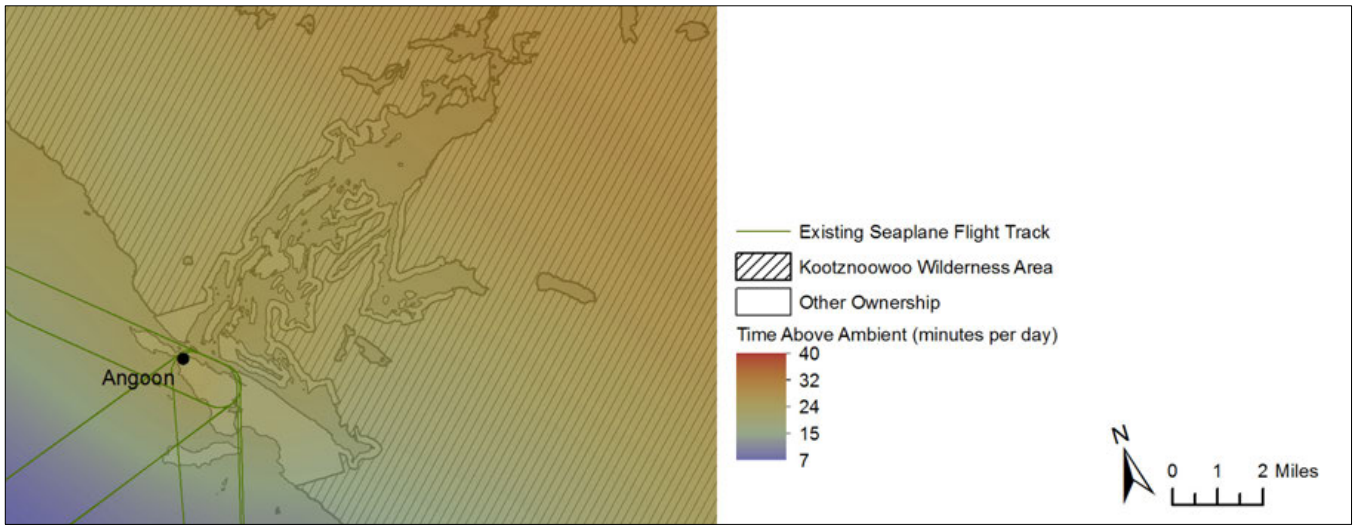


Figure WC8. Locations and periods of time (in minutes) when noise above ambient is heard.

Opportunities for solitude are also degraded by the noise of human activity in and around Angoon. These activities include construction, timber harvest, gravel mining, and use of residential and commercial structures on lands around the community of Angoon. From portions of the Kootznoowoo Wilderness Area near the proposed location of Airport 3a, users can commonly hear the sounds of mechanized equipment like cars, chainsaws, boats, and construction equipment being used in Angoon. Such sounds are typically not noticeable from the proposed location of Airport 4.

Compared to the greater Kootznoowoo Wilderness Area, opportunities for primitive and unconfined recreation in the vicinity of the wilderness alternatives are the same; there are no designated recreational areas in either area, and the same limitations, or lack thereof, on recreational activities apply to both areas.

Opportunities for primitive and unconfined recreation in the vicinity of the wilderness alternatives are similar to those of the greater Kootznoowoo Wilderness Area. Both areas have few restrictions on recreational use.

Opportunities for solitude are somewhat less available in the vicinity of the wilderness alternatives compared to most other parts of the greater Kootznoowoo Wilderness Area because noise from adjacent (non-wilderness) land uses is more audible. However, it is important to note that none of the lands in the greater Kootznoowoo Wilderness Area are entirely absent of noise from human activity. Aircraft, including high-altitude jets and low-altitude seaplanes and wheeled aircraft, travel over or near the Kootznoowoo Wilderness Area on a daily basis (Figure WC9). The routes of the high-altitude jets over the Kootznoowoo Wilderness Area tend to be consistent, while those of the low-altitude aircraft are less predictable and can be almost anywhere visual flight rules and aircraft limitations allow for safe aircraft travel.

Figure WC9. Seaplanes routinely fly over or near the Kootznoowoo Wilderness Area.

4.16.2.4. What are the resources that contribute to the public purposes like?

Because the lands in the vicinity of the wilderness alternatives remain largely undisturbed, the resources that contribute to the public purposes remain in excellent condition, as is the case throughout the greater wilderness area. Descriptions of the resources' existing conditions are provided in Table WC2, as are links to the related sections of the EIS with more information.

Table WC2. Existing conditions of the resources in the vicinity of the wilderness alternatives

Resource **EIS sections for further information**	**Public purposes to which the resource contributes**	**Existing condition**
Unspoiled natural ecosystem Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.2 Aquatic Habitats and Associated Species Section 4.6 Floodplains, Stream Geomorphology, and Hydrology Section 4.14 Water Quality Section 4.15 Wetlands	• Recreational use • Scientific use • Educational use • Conservation use	• The ecosystem is unspoiled and functional.
Brown bears Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.3 Special Status Species	• Recreational use • Scientific use • Educational use • Conservation use	• Habitat for the brown bear populations is unspoiled and functional. • The exceptions may be slight reductions in opportunities for scientific study of brown bears in a natural ecosystem, and in the conservation of Admiralty Island's brown bear population. Specifically, brown bear habitat is likely to have been altered somewhat by the sheer proximity of the area to humans and human activity in the community of Angoon and nearby portions of the Kootznoowoo Wilderness Area for subsistence and recreation. Similarly, brown bears that stray from the wilderness area into Angoon and prove themselves to be a nuisance or aggressive are sometimes killed as a matter of public safety. However, such killings are rare and have no notable effect on the overall brown bear population of the wilderness area.
Eagles Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.3 Special Status Species	• Recreational use • Scientific use • Educational use • Conservation use	• Habitat for the eagle populations is unspoiled and functional.
Cultural resources (Tlingit sites, historical sites) Section 4.8 Cultural Resources	• Recreational use • Scientific use • Educational use • Conservation use • Historical use	• Tlingit cultural sites are mostly untouched. • Regarding scientific and historical public purposes associated with Tlingit and other cultural sites, the area of the wilderness alternatives has a somewhat higher value than the vast majority of the greater Kootznoowoo Wilderness Area. As a protected bay with abundant marine and freshwater resources, Favorite Bay has always served as the breadbasket for those who live there, particularly the Alaska Native community.

Table WC2. Existing conditions of the resources in the vicinity of the wilderness alternatives

Resource **EIS sections for further information**	**Public purposes to which the resource contributes**	**Existing condition**
Customary and traditional subsistence use Section 4.13 Subsistence Resources and Uses	• Educational use • Historical use	• The area of the wilderness alternatives is used by Angoon residents for the harvest of traditional subsistence resources, continuing Tlingit customary and traditional subsistence practices. The existing conditions of these resources are very good, and the resources and Tlingit use of them contribute to the continuation of historical use of the Kootznoowoo Wilderness Area. Compared to the greater Kootznoowoo Wilderness Area, the condition of subsistence resources in the vicinity of the wilderness alternatives is similar, if not higher, due to easier access to hunting and gathering areas, and the abundance and diversity of resources available. It certainly sees more frequent subsistence use than most other parts of the greater Kootznoowoo Wilderness Area due to its close proximity to Angoon, the only permanent settlement on Admiralty Island.
Visual resources Section 4.9 Light Emissions and Visual Resources	• Scenic use	• The quality of scenery in the vicinity of the wilderness alternatives is high, because no permanent development or artificial manipulation of the landscape or vegetation is readily apparent. • The condition of scenery in the vicinity of the wilderness alternatives is effectively the same as that of the greater Kootznoowoo Wilderness Area.

4.16.3. Project effects

For all action alternatives, construction, operation, and maintenance of an airport and access road would affect the wilderness qualities and public purposes of portions of the Kootznoowoo Wilderness Area. The extent of effects would differ based on conditions unique to each alternative, and the degree to which each alternative does or does not overlap areas in which wilderness qualities or public purposes have already been degraded. The sections below describe the actions causing the effects, the methods used by the FAA evaluate effects, and the extent and intensity of the effects expected under each alternative.

4.16.3.1. How did the FAA determine the effects of the alternatives on wilderness qualities and public purposes?

Effects to the four wilderness qualities are complicated to assess because various actions can affect the qualities differently. The general types of actions that affect wilderness qualities and an explanation of these effects relative to the original definition of each quality (based on the Wilderness Act and on Landres et al. 2015 [see section 4.16.1.2]) are shown in Figure WC10.

What is discussed in this section?

- **The untrammeled quality**

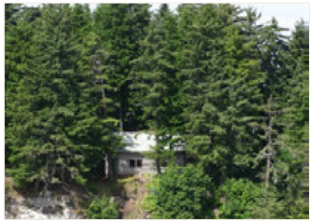
This quality is affected by any human action that intentionally manipulates the earth and its community of life. This is because these kinds of actions would change the affected area such that it would no longer be "unhindered and free from the intentional actions of modern human control or manipulation" (Landres et al. 2015:10–11). The presence of a road (see example at right) is an example of degradations to the untrammeled quality.

- **The natural quality**

The natural quality is affected by human-caused modifications that reduce or alter plant and wildlife habitat, isolate parts of the wilderness area, introduce the possibility of the spread of noxious and invasive plants, introduce the possibility of reduced air and water quality, or otherwise alter an area's natural ecological condition and function. This is because these kinds of actions would change the affected area such that it would no longer have "ecological systems [that] are substantially free from the effects of modern civilization" (Landres et al. 2015:11). Roads, such as the one shown at left, can cause all of these effects.

- **The undeveloped quality**

The undeveloped quality is affected by the presence or visibility of any human-caused modifications. This is because these kinds of actions would change the affected area such that it would no longer be "essentially without permanent improvements or the sights and sounds of modern human occupation" (Landres et al. 2015:11). The cabin in the forest at right is an example of degradations to the undeveloped quality.



- **Opportunities for solitude**

Opportunities for solitude are affected by the presence, visibility, or audibility of other humans, and would be affected by human-caused modifications or human activities. This is because these kinds of actions would change the affected area such that it no longer offered opportunities that are "relatively free from the encumbrances of modern society" (Landres et al. 2015:11). Overflights by aircraft, such as the seaplane shown at left, degrade opportunities for solitude with their noise.

- **Opportunities for primitive and unconfined recreation**

Opportunities for primitive and unconfined recreation are affected by the presence of certain human-caused modifications and restrictions on recreational use in specific locations. This is because these kinds of actions would change the affected area such that it no longer offered opportunities for "the experience of the benefits and inspiration derived from self-reliance, self-discovery, physical and mental challenge, and freedom from societal obligations" (Landres et al. 201511–12). Hiking off trail is an example of primitive and unconfined recreation.

Figure WC10. Wilderness qualities and the general ways actions affect them.

4.16.3.1.1. Determining wilderness quality effects

Terms to know

Culverting: The creation of a drain or pipe that allows water to flow under a road, runway, or similar structure.

Developments: For the purposes of section 4.16, Wilderness Character, the term "developments" refers to human-introduced installations and structures that are generally prohibited under the Wilderness Act.

As described in section 4.16.2.3, effects to wilderness qualities are discussed in terms of "degradation," which means the wilderness quality has been changed in a way that detracts from its ability to contribute to wilderness character. To evaluate specific effects to wilderness qualities and public purposes from the actions related to construction and operation of an airport and access road alternative, the FAA took the following steps:

- Quantified and/or described, as appropriate, the specific actions associated with airport and access road construction and operation that could result in changes to wilderness qualities and public purposes. These actions (as described in section 4.1.2 of the Chapter 4 introduction) are as follows:

Construction actions	Operations actions
Vegetation removal	Arrivals and departures of airplanes
Terrain disturbance	Maintenance of cleared areas (vegetation clearing)
Pavement	Maintenance of road and airport pavement
Tree felling	Vehicles traveling on airport access road
Bridge construction	Increased presence and activities of humans
Rerouting of streams	Noxious weed treatments, as required
Culverting of streams	Operation of radio-controlled lights during flight arrival and departure
	Airport generator refueling and aircraft refueling

- Counted the types of ***developments*** that would be associated with the airport and access road. These developments (as described in section 2.2 of Chapter 2: Purpose of and Need for a Land-Based Airport at Angoon or as listed in Table ALT1 in Chapter 3: Alternatives) are as follows:
  - Paved runway, taxiway, apron, and passenger parking lot
  - Paved access road with bridge across Favorite Creek
  - Perimeter fence
  - Culverts

  - Aircraft navigational aids like pilot-controlled rotating beacon, precision approach path indicator, and pilot-controlled lighted wind cones
  - Pilot-controlled runway lights
  - Electrical control building and generator
  - Communication tower

- Counted and/or described motorized equipment used for airport and access road operations and maintenance. Motorized equipment would consist of the following:
  - Aircraft on the ground
  - Equipment used for vegetation maintenance, such as mowers and chainsaws
  - Snow-removal and pavement maintenance equipment
  - Private vehicles
  - Generator

- Incorporated the analysis for other resources (for example, wildlife habitat, cultural resources, and visual resources) found in this EIS to determine changes in public purposes.

- Used professional judgment and discussions with the U.S. Forest Service to assess how the changes would or would not fit within the desired conditions of wilderness qualities and public purposes as outlined in their land management plan (U.S. Forest Service 2008a), and as directed by Chapter 2320 of *U.S. Forest Service Manual 2300*, which covers wilderness management (both the national manual [U.S. Forest Service 2007] and the Region 10 Alaska supplement [U.S. Forest Service 2003]).

Table WC3 summarizes the specific actions that would cause degradation of wilderness qualities and explains the measure of intensity for each effect.

Table WC3. Source and intensity of degradation of wilderness qualities

Quality	Specific action causing degradation	Measure of intensity
Untrammeled	• Construction actions and operations actions	• Number of construction actions and operations actions, as listed in section 4.16.3.1.1. Note: Proposed actions are not assigned relative values of intensity because all would cause degradation to the untrammeled quality.
Natural	• Construction actions and operations actions and the downstream or watershed effects of those actions.	• Number of acres of these actions and their downstream or watershed effects.
	• Isolation of wilderness	• Number of acres where a portion of the wilderness area (smaller than 5,000 acres) would be cut off from the main Kootznoowoo Wilderness Area by the construction of the proposed runway or access road. The Wilderness Act recommends wilderness lands be at least 5,000 contiguous acres.
Undeveloped	• Presence of developments	• Number of developments, as listed in section 4.16.3.1.1. Note: Proposed developments are not assigned relative values of intensity because all would cause degradation to the undeveloped quality. • Combined acreage of developments.
	• Presence of motorized equipment	• Description of motorized equipment, as listed in section 4.16.3.1.1.
Opportunities for solitude	• New or improved access to the wilderness area (increasing the chances of seeing another person)	• Number of acres of new or improved access, calculated as the area within 0.5 mile of the proposed airport or access road.
	• Light emissions from construction	• Description of the visibility of nighttime and low-light daytime light emissions from construction equipment and construction lights.
	• Light emissions during operation	• Description of the visibility of nighttime and low-light daytime light emissions from runway lights and navigation aids. • Number of acres where wilderness users would be able to see headlights from vehicle traffic and maintenance equipment at night and during daytime low-light conditions.
	• Presence of developments and motorized equipment	• Number of acres where developments and motorized equipment would be visible from within the wilderness area. • During operation, number of potential encounters with aircraft and motorized equipment per day, compared to the Recreation Opportunity Spectrum (ROS) standards (described in section 4.16.2.3.3). • Number of additional encounters with aircraft per day (in addition to those already resulting from operations at the Angoon Seaplane Base and aircraft overflights). • Number of new encounters per day with motorized equipment (private vehicles). • Qualitative description of public use of motorized vehicles and equipment associated with subsistence, recreation, and maintenance along the airport access road.

Table WC3. Source and intensity of degradation of wilderness qualities

Quality	Specific action causing degradation	Measure of intensity
	• Noise* from aircraft	• Increase in the number of minutes in a 24-hour period when aircraft noise related to the Angoon Airport would be louder than ambient (background) noise levels. The FAA uses a metric called "time above ambient" (TAA) to show this change. Other noise metrics are also used in section 4.11 Noise to describe changes in the volume of noise, but because any increase in noise volume would degrade opportunities for solitude, those measures are not reported in this section, and TAA is the most meaningful metric for effects to wilderness. • Number of acres of Kootznoowoo Wilderness Area where aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period.
	• Noise* from construction equipment • Noise from vehicles and maintenance equipment	• Qualititive description of temporary increases in noise from construction equipment and worker vehicles in localized areas. • Qualitative description of noise from vehicles and maintenance equipment during operation.
Primitive and unconfined recreation	• Presence of perimeter fence (restricting access) or pavement (hindering primitive and unconfined recreation)	• Number of acres of wilderness area where primitive and unconfined recreation could no longer occur.

* Effects analysis assumes that any sound level above ambient (DNL 27 dBA) would be noticeable and could degrade opportunities for solitude for the time those sound levels are above ambient. It should be noted that some wilderness users are more sensitive to unnatural sounds and may hear additional unnatural sounds that exist below ambient sound levels. See section 4.11 Noise for additional information on the ways noise was analyzed.

4.16.3.1.2. Determining public purpose effects

Effects on public purposes are somewhat easier to assess than effects on wilderness qualities because each public purpose is tied to a specific natural or cultural resource. Effects to public purposes are discussed in this EIS in terms of "degradation," which means that the contributing resources' ability to support these purposes is diminished. For example, bear habitat lost through construction of a runway or road diminishes the public purpose of conservation use in that part of the wilderness.

Table WC4 summarizes the resources and the public purposes to which they contribute, the actions that affect those resources and the associated public purposes, and the measures of intensity of those effects. Each listed EIS resource section provides the details of how that resource was analyzed, and those sections are the source of most of the data used to indicate intensity in this section. However, the total calculations for some measures of intensity in this section may not match calculations in the various resource sections because they have been combined; for example, construction actions, operations actions, and isolation of wilderness can be combined to help determine effects to brown bears.

Table WC4. Source and measure of effects to public purposes

Resource contributing to public purposes **EIS sections where effects to this resource are analyzed**	**Measure of effect to the contributing resource**	**Related public purposes**
Unspoiled natural ecosystem Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.2 Aquatic Habitats and Associated Species Section 4.6 Floodplains, Stream Geomorphology, and Hydrology Section 4.14 Water Quality Section 4.15 Wetlands	• Number of acres of construction actions and operations actions and the downstream and watershed effects of those actions.	• Recreational use • Scientific use • Educational use • Conservation use
Brown bears Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.3 Special Status Species	• Number of acres of brown bear habitat affected by construction actions, operations actions, and isolation of wilderness (habitat connectivity within wilderness area boundaries).	• Recreational use • Scientific use • Educational use • Conservation use
Eagles Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.3 Special Status Species	• Number of acres of eagle habitat affected by construction actions and operations actions.	• Recreational use • Scientific use • Educational use • Conservation use • Historical use
Cultural resources Section 4.8 Cultural Resources	• Number of acres of land with a high probability of containing cultural resources where risk to the resources increases due to direct and indirect effects.	• Educational use • Historical use
Customary and traditional subsistence use Section 4.13 Subsistence Resources and Uses	• Number of acres of subsistence use areas affected by construction actions and operations actions.	• Educational use • Historical use
Visual resources Section 4.9 Light Emissions and Visual Resources	• Number of acres in which scenery would be degraded due to construction actions, operations actions, and presence of developments.	• Scenic use

4.16.3.2. How would each alternative affect wilderness qualities and public purposes?

4.16.3.2.1. No action alternative

Under the no action alternative, there would be no construction or operation of an airport and access road in or near the Kootznoowoo Wilderness Area. As such, there would be no new effects to the four wilderness qualities and the public purposes of the wilderness area. Existing activities that would continue to degrade the untrammeled quality and opportunities for solitude in the vicinity of the wilderness alternatives are 1) the development, flagging, and other marking of social trails, and 2) aircraft flyovers, including scheduled seaplane service to Angoon, chartered and private aircraft for recreational purposes, and high-altitude aircraft transiting over the wilderness area.

4.16.3.2.2. Airport 3a with Access 2 (proposed action)

Airport 3a with Access 2 effects on wilderness qualities

Airport 3a with Access 2 would result in degradation of the four wilderness qualities at the intensities shown in Table WC5 and in the areas depicted on Figures WC11 and WC12.

Table WC5. Airport 3a with Access 2: Source and intensity of degradation of wilderness qualities

Quality degraded	Specific action causing effects	Intensity of effects
Untrammeled	• Construction actions and operations actions	• Seven construction actions and eight operations actions (listed in section 4.16.3.1.1) would degrade the untrammeled quality.
Natural	• Construction actions and operations actions, and the downstream or watershed effects of those actions	• 791 acres of wilderness where the natural quality would be degraded (Figure WC11).
	• Isolation of wilderness	• 126 acres of wilderness would be isolated from the main Kootznoowoo Wilderness Area.
Undeveloped	• Presence of developments	• Eight types of developments (listed in section 4.16.3.1.1) would be introduced into the wilderness area. • 22 acres of developments would be introduced into the wilderness area (Figure WC11).
	• Presence of motorized equipment	• Motorized equipment (listed in section 4.16.3.1.1) would be used for vegetation maintenance, pavement maintenance, snow removal, aircraft operations, public vehicular access between Angoon and the airport, and for electrical generation to operate the runway lights and navigational aids. • Wilderness users near the road would be able to see vehicles and maintenance equipment.

Table WC5. Airport 3a with Access 2: Source and intensity of degradation of wilderness qualities

Quality degraded	Specific action causing effects	Intensity of effects
Opportunities for solitude	• New or improved access to the wilderness area	• 1,713 acres of new or improved access would increase the chance of seeing another wilderness user (Figure WC12).
	• Light emissions from construction	• Construction areas and some equipment would be illuminated at night and and during daytime low-light conditions (for example, dense clouds or fog) with high-intensity lighting, creating visible skyglow throughout the wilderness area near the runway and access road for up to three construction seasons. The skyglow would be intensified by any local low-lying clouds, fog, rain, and high humidity. These effects would cease when construction ended.
	• Light emissions during operation	• At night and during daytime low-light conditions (for example, dense clouds or fog), intermittent, brief, and low-intensity skyglow caused by the airport's upward-directed runway lights and navigation aids would be visible in the immediate vicinity of the runway during approaches and takeoffs. • There would be 502 acres where wilderness users would be able to see headlights from vehicle traffic and maintenance equipment at night and during daytime low-light conditions (Figure WC12).
	• Presence of developments and motorized equipment	• There would be 502 acres where developments and motorized equipment would be visible from within the wilderness area (Figure WC12). • During operation, there would be seven additional encounters per day with aircraft and 24 new encounters per day with private vehicles traveling to and from the airport. These would exceed recommended encounter rates for wilderness lands designated as Primitive (fewer than three encounters per day) and Semi-Primitive Motorized (fewer than six encounters per day). • There would be unquantifiable public use of motorized vehicles and equipment associated with subsistence, recreation, and maintenance along the airport access road.
	• Noise from aircraft	• For up to 26 additional minutes in a 24-hour period, aircraft noise related to the proposed Angoon Airport would exceed ambient noise levels (Figure WC12). • In approximately 186,551 acres of wilderness area, aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period.
	• Noise from construction equipment • Noise from vehicles and maintenance equipment	• There would be temporary increases in noise from construction equipment and worker vehicles in localized areas near this alternative but not throughout the greater Kootznoowoo Wilderness Area. Construction noise would cease when construction ended. • During operation, wilderness users near the road and airport would be able to hear vehicles and maintenance equipment. Because there would be an unquantifiable public use of motorized vehicles and equipment associated with subsistence, recreation, and maintenance along the airport access road, it is not possible to quantify noise levels.
Primitive and unconfined recreation	• Presence of perimeter fence (restricting access) or pavement (hindering primitive and unconfined recreation)	• There would be 101 acres of wilderness area where primitive and unconfined recreation could no longer occur (Figure WC12).

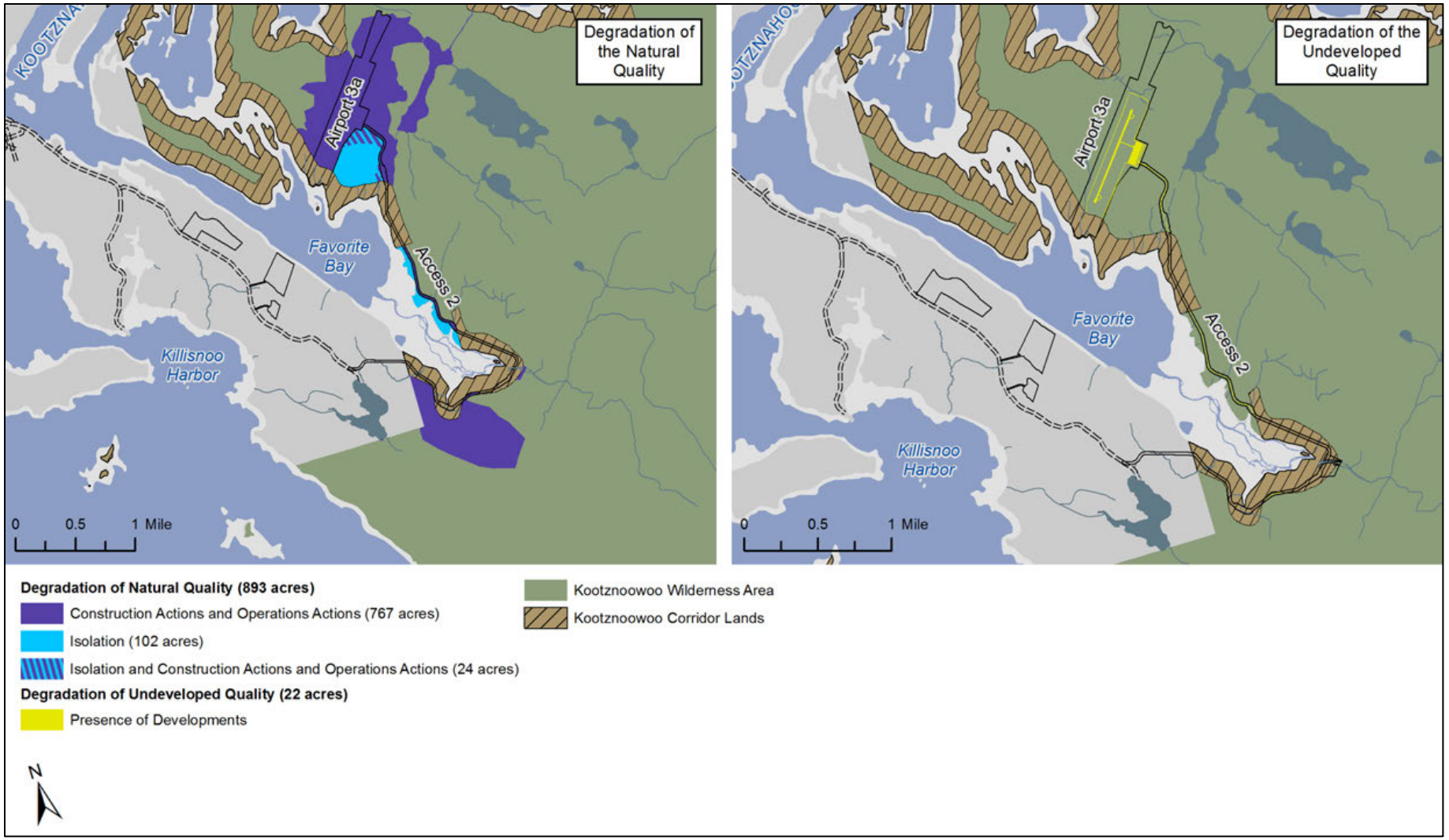


Figure WC11. Effects to the natural and undeveloped qualities from Airport 3a with Access 2.

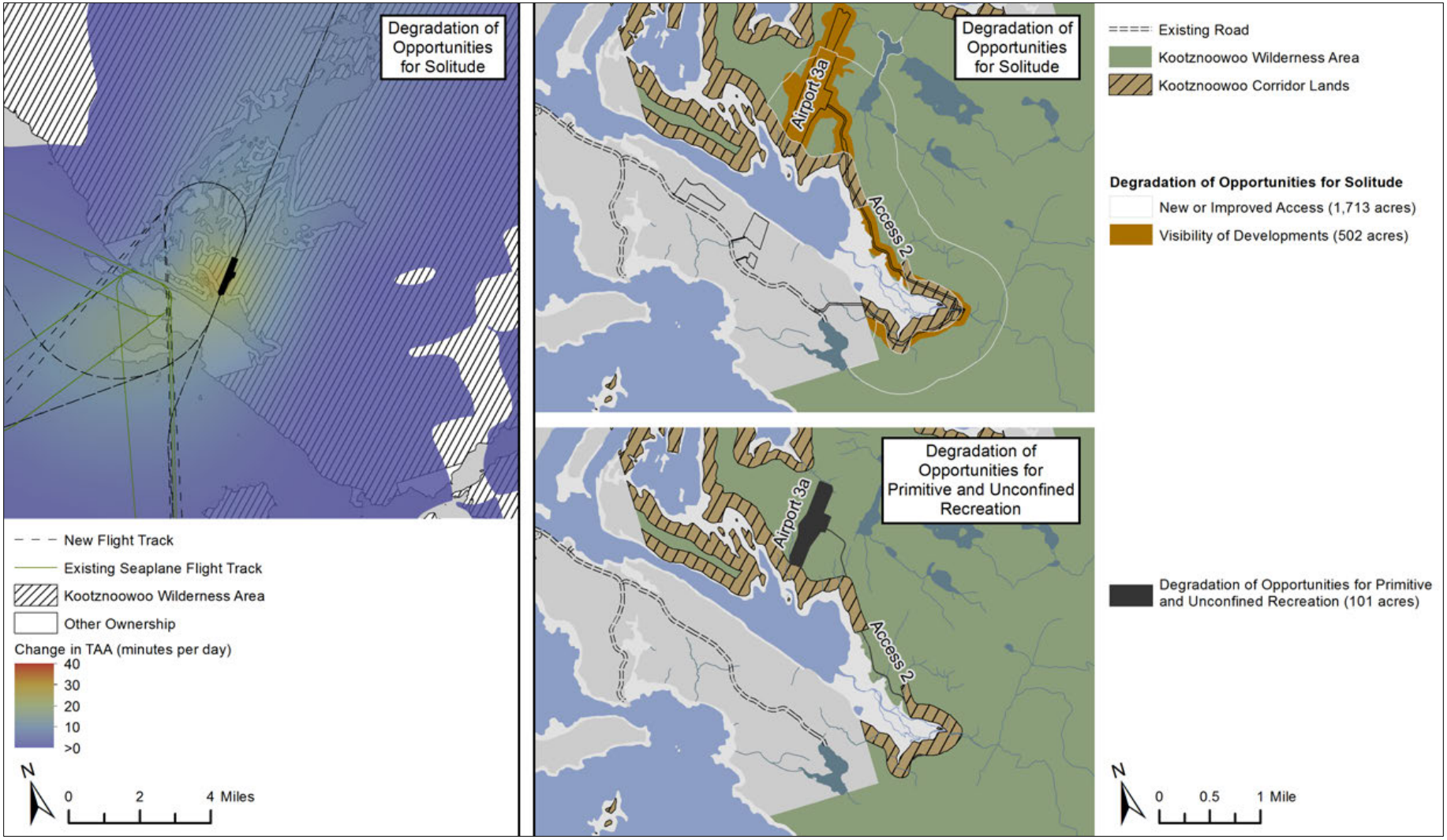


Figure WC12. Effects to opportunities for solitude and primitive and unconfined recreation from Airport 3a with Access 2.

Airport 3a with Access 2 effects on public purposes

Table WC6 summarizes the anticipated intensity of effects on the public purposes.

Table WC6. Source and measure of effects to public purposes for Airport 3a with Access 2

Resource contributing to public purposes **EIS sections where effects to this resource are analyzed**	**Measure of effect to the contributing resource**	**Effects to public purposes**
Unspoiled natural ecosystem Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.2 Aquatic Habitats and Associated Species Section 4.6 Floodplains, Stream Geomorphology, and Hydrology Section 4.14 Water Quality Section 4.15 Wetlands	• 893 acres of the wilderness ecosystem would be affected by construction actions, operations actions, and the downstream and watershed effects of those actions.	• Degradation of recreational use • Degradation of scientific use • Degradation of educational use • Degradation of conservation use
Brown bears Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.3 Special Status Species Section 4.5.2 Aquatic Habitats and Associated Species	• 306 acres of brown bear habitat would be affected by construction actions, operations actions, and isolation of wilderness.	• Degradation of recreational use • Degradation of scientific use • Degradation of educational use • Degradation of conservation use
Eagles Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.3 Special Status Species Section 4.5.2 Aquatic Habitats and Associated Species	• 180 acres of eagle habitat would be affected by construction actions and operation actions.	• Degradation of recreational use • Degradation of scientific use • Degradation of educational use • Degradation of conservation use • Degradation of historical use
Cultural resources Section 4.8 Cultural Resources	• 342 acres of land with a high probability of containing cultural resources would have increased risk to sites from direct and indirect effects.	• Degradation of educational use • Degradation of historical use
Customary and traditional subsistence use Section 4.13 Subsistence Resources and Uses	• 148 acres of subsistence use areas would be affected by construction actions and operation actions.	• Degradation of educational use • Degradation of historical use
Visual resources Section 4.9 Light Emissions and Visual Resources	• There would be 502 acres where scenery would be degraded by construction actions, operation actions, and presence of developments.	• Degradation of scenic use

4.16.3.2.3. Airport 3a with Access 3

Airport 3a with Access 3 effects on wilderness qualities

Airport 3a with Access 3 would result in degradation of the four wilderness qualities at the intensities illustrated in Table WC7 and in the areas depicted on Figures WC13 and WC14.

Table WC7. Airport 3a with Access 3: Source and intensity of degradation of wilderness qualities

Quality degraded	Specific action causing effects	Intensity of effects
Untrammeled	• Construction actions and operations actions	• Seven construction actions and eight operations actions (listed in section 4.16.3.1.1) would degrade the untrammeled quality.
Natural	• Construction actions and operations actions and the downstream or watershed effects of those actions.	• 817 acres of wilderness where the natural quality would be degraded (Figure WC13).
	• Isolation of wilderness	• 679 acres of wilderness would be isolated from the main Kootznoowoo Wilderness Area.
Undeveloped	• Presence of developments	• Eight types of developments (listed in section 4.16.3.1.1) introduced into the wilderness area. • 28 acres of developments introduced into the wilderness area (Figure WC13).
	• Presence of motorized equipment	• Motorized equipment (listed in section 4.16.3.1.1) would be used for vegetation maintenance, pavement maintenance, snow removal, aircraft operations, public vehicular access between Angoon and the airport, and for electrical generation to operate the runway lights and navigational aids. • Wilderness users near the road would be able to see vehicles and maintenance equipment.
Opportunities for solitude	• New or improved access to the wilderness area	• 2,495 acres of new or improved access would increase the chance of seeing another wilderness user (Figure WC14).
	• Light emissions from construction	• Construction areas and some equipment would be illuminated at night and during low-light daytime conditions with high-intensity lighting, creating visible skyglow throughout the wilderness area near the runway and access road for up to three construction seasons. The skyglow would be intensified by any local low-lying clouds, fog, rain, and high humidity. These effects would cease when construction ended.
	• Light emissions during operation	• At night and during daytime low-light conditions (for example, dense clouds or fog), intermittent, brief, and low-intensity skyglow caused by the airport's upward-directed runway lights and navigational aids would be visible in the immediate vicinity of the runway during approaches and takeoffs. • There would be 735 acres where wilderness users would be able to see headlights from vehicle traffic and maintenance equipment at night and during daytime low-light conditions (Figure WC14).

Table WC7. Airport 3a with Access 3: Source and intensity of degradation of wilderness qualities

Quality degraded	Specific action causing effects	Intensity of effects
	• Presence of developments and motorized equipment	• There would be 735 acres where developments and motorized equipment would be visible from within the wilderness area (Figure WC14). • During operation, there would be seven additional encounters per day with aircraft and 24 new encounters per day with private vehicles traveling to and from the airport. These would exceed recommended encounter rates for wilderness lands designated as Primitive (fewer than three encounters per day) and Semi-Primitive Motorized (fewer than six encounters per day). • There would be unquantifiable public use of motorized vehicles and equipment associated with subsistence, recreation, and maintenance along the airport access road.
	• Noise from aircraft	• For up to 26 additional minutes in a 24-hour period, aircraft noise related to the proposed Angoon Airport would exceed ambient noise levels (Figure WC14). • In approximately 186,551 acres of wilderness area, aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period.
	• Noise from construction equipment • Noise from vehicles and maintenance equipment	• There would be temporary increases in noise from construction equipment and worker vehicles in localized areas near this alternative but not throughout the greater Kootznoowoo Wilderness Area. Construction noise would cease when construction ended. • During operation, wilderness users near the road and airport would be able to hear vehicles and maintenance equipment. Because there would be an unquantifiable public use of motorized vehicles and equipment associated with subsistence, recreation, and maintenance along the airport access road, it is not possible to quantify noise levels.
Primitive and unconfined recreation	• Presence of perimeter fence (restricting access) or pavement (hindering primitive and unconfined recreation)	• There would be 106 acres of wilderness area where primitive and unconfined recreation could no longer occur (Figure WC14).

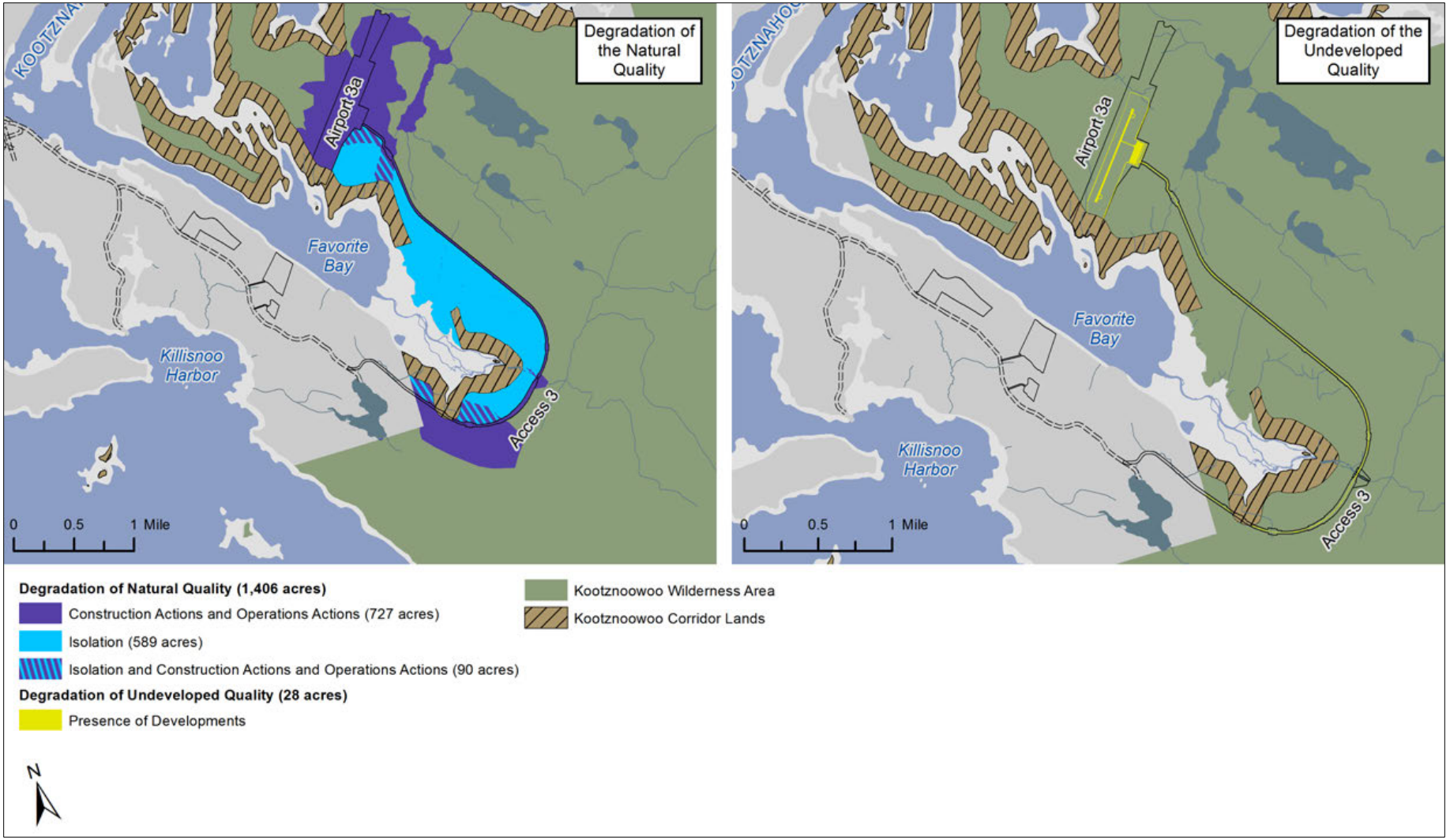


Figure WC13. Effects to the natural and undeveloped qualities from Airport 3a with Access 3.

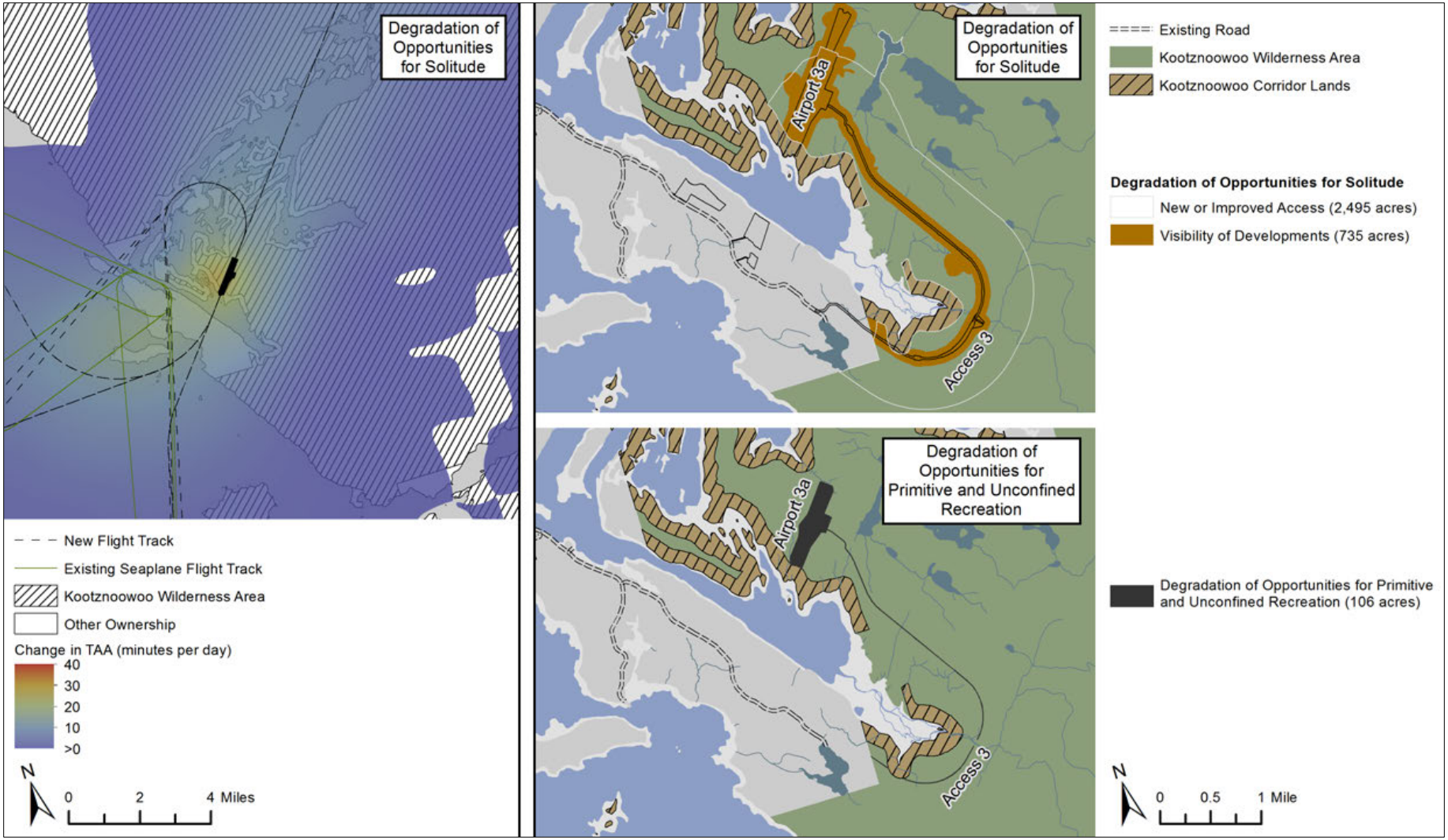


Figure WC14. Effects to opportunities for solitude and primitive and unconfined recreation from Airport 3a with Access 3.

Airport 3a with Access 3 effects on public purposes

Table WC8 summarizes the anticipated intensity of effects on the public purposes.

Table WC8. Source and measure of effects to public purposes for Airport 3a with Access 3

Resource contributing to public purposes **EIS sections where effects to this resource are analyzed**	**Measure of effect to the contributing resource**	**Effects to public purposes**
Unspoiled natural ecosystem Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.2 Aquatic Habitats and Associated Species Section 4.6 Floodplains, Stream Geomorphology, and Hydrology Section 4.14 Water Quality Section 4.15 Wetlands	• 1,406 acres of the wilderness ecosystem would be affected by construction actions, operations actions, and the downstream and watershed effects of those actions.	• Degradation of recreational use • Degradation of scientific use • Degradation of educational use • Degradation of conservation use
Brown bears Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.3 Special Status Species Section 4.5.2 Aquatic Habitats and Associated Species	• 895 acres of brown bear habitat would be affected by construction actions, operations actions, and isolation of wilderness.	• Degradation of recreational use • Degradation of scientific use • Degradation of educational use • Degradation of conservation use
Eagles Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.3 Special Status Species Section 4.5.2 Aquatic Habitats and Associated Species	• 216 acres of eagle habitat would be affected by construction actions and operation actions.	• Degradation of recreational use • Degradation of scientific use • Degradation of educational use • Degradation of conservation use • Degradation of historical use
Cultural resources Section 4.8 Cultural Resources	• 379 acres of land with a high probability of containing cultural resources would experience increased risk to sites from direct and indirect effects.	• Degradation of educational use • Degradation of historical use
Customary and traditional subsistence use Section 4.13 Subsistence Resources and Uses	• 151 acres of subsistence use areas would be affected by construction actions and operation actions.	• Degradation of educational use • Degradation of historical use
Visual resources Section 4.9 Light Emissions and Visual Resources	• There would be 735 acres in which scenery would be degraded by construction actions, operation actions, and presence of developments.	• Degradation of scenic use

4.16.3.2.4. Airport 4 with Access 2

Airport 4 with Access 2 effects on wilderness qualities

Airport 4 with Access 2 would result in degradation of the wilderness qualities at the intensities shown in Table WC9 and in the areas shown on Figures WC15 and WC16.

Table WC9. Airport 4 with Access 2: Source and intensity of degradation of wilderness qualities

Quality degraded	Specific action causing effects	Intensity of effects
Untrammeled	• Construction actions and operations actions	• Seven construction actions and eight operations actions (listed in section 4.16.3.1.1) would degrade the untrammeled quality.
Natural	• Construction actions and operations actions, and the downstream or watershed effects of those actions.	• There would be 1,402 acres of wilderness where the natural quality would be degraded (Figure WC15).
	• Isolation of wilderness	• 219 acres of wilderness would be isolated from the main Kootznoowoo Wilderness Area.
Undeveloped	• Presence of developments	• Eight types of developments (listed in section 4.16.3.1.1) would be introduced into the wilderness area • 22 acres of developments would be introduced into the wilderness area (Figure WC15).
	• Presence of motorized equipment	• Motorized equipment (listed in section 4.16.3.1.1) would be used for vegetation maintenance, pavement maintenance, snow removal, aircraft operations, public vehicular access between Angoon and the airport, and for electrical generation to operate the runway lights and navigational aids. • Wilderness users near the road would be able to see vehicles and maintenance equipment.
Opportunities for solitude	• New or improved access to the wilderness area	• 1,416 acres of new or improved access would increase the chances of seeing another wilderness user (Figure WC16).
	• Light emissions from construction	• Construction areas and some equipment would be illuminated at night and during low-light daytime conditions with high-intensity lighting, creating visible skyglow throughout the wilderness area near the runway and access road for up to three construction seasons. The skyglow would be intensified by any local low-lying clouds, fog, rain, and high humidity. These effects would cease when construction ended.
	• Light emissions during operation	• At night and during daytime low-light conditions (for example, dense clouds or fog), intermittent, brief, and low-intensity skyglow caused by the airport's upward-directed runway lights and navigational aids would be visible in the immediate vicinity of the runway during approaches and takeoffs. • There would be 528 acres where wilderness users would be able to see headlights from vehicle traffic and maintenance equipment at night and during daytime low-light conditions (Figure WC16).

Table WC9. Airport 4 with Access 2: Source and intensity of degradation of wilderness qualities

Quality degraded	Specific action causing effects	Intensity of effects
	• Presence of developments and motorized equipment	• There would be 528 acres where developments and motorized equipment would be visible from within the wilderness area (Figure WC16). • During operation, there would be seven additional encounters per day with aircraft and 24 new encounters per day with private vehicles traveling to and from the airport. These would exceed recommended encounter rates for wilderness lands designated as Primitive (fewer than three encounters per day) and Semi-Primitive Motorized (fewer than six encounters per day). • There would be unquantifiable public use of motorized vehicles and equipment associated with subsistence, recreation, and maintenance along the airport access road.
	• Noise from aircraft	• For up to 31 additional minutes in a 24-hour period, aircraft noise related to the proposed Angoon Airport would exceed ambient noise levels (Figure WC16). • In approximately 272,802 acres of wilderness area, aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period.
	• Noise from construction equipment • Noise from vehicles and maintenance equipment	• There would be temporary increases in noise from construction equipment and worker vehicles in localized areas near this alternative but not throughout the greater Kootznoowoo Wilderness Area. Construction noise would cease when construction ended. • During operation, wilderness users near the road and airport would be able to hear vehicles and maintenance equipment. Because there would be an unquantifiable public use of motorized vehicles and equipment associated with subsistence, recreation, and maintenance along the airport access road, it is not possible to quantify noise levels.
Primitive and unconfined recreation	• Presence of perimeter fence (restricting access) or pavement (hindering primitive and unconfined recreation)	• There would be 105 acres of wilderness area where primitive and unconfined recreation could no longer occur (Figure WC16).

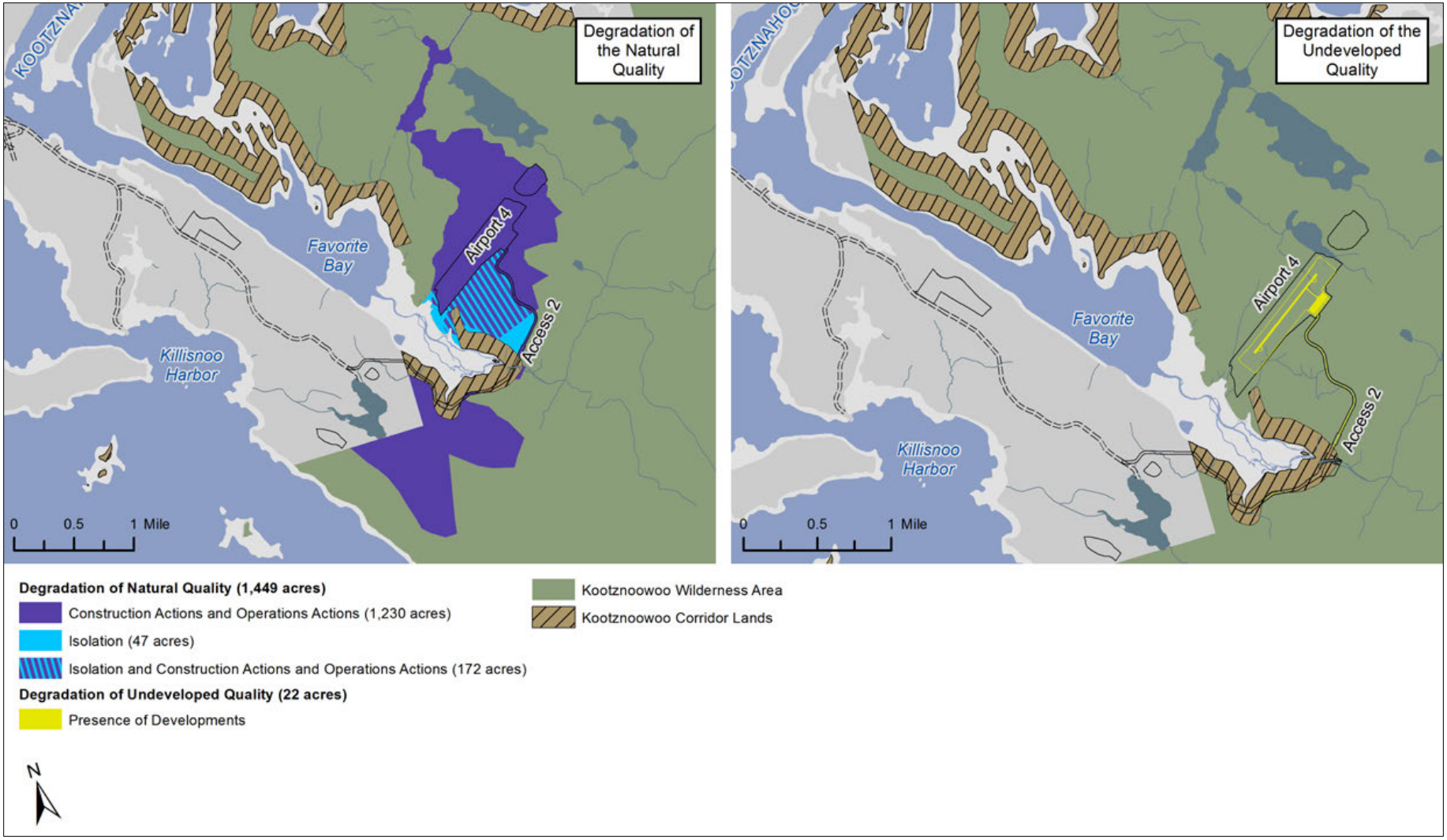


Figure WC15. Effects to the natural and undeveloped qualities from Airport 4 with Access 2.

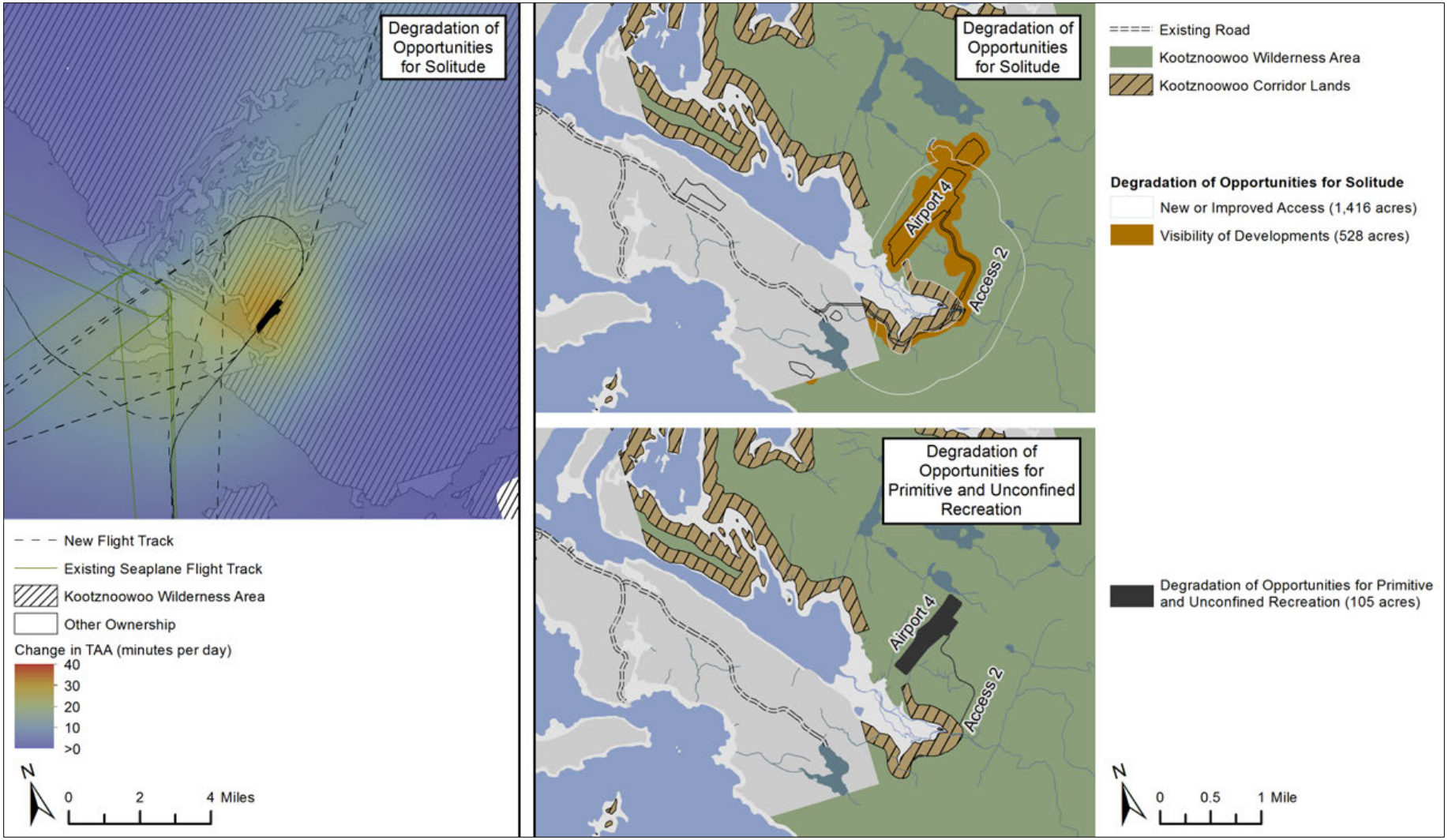


Figure WC16. Effects to opportunities for solitude and primitive and unconfined recreation from Airport 4 with Access 2.

Airport 4 with Access 2 effects on public purposes

Table WC10 summarizes the anticipated effects to the resources that contribute to the public purposes.

Table WC10. Source and measure of effects to public purposes for Airport 4 with Access 2

Resource contributing to public purposes **EIS sections where effects to this resource are analyzed**	**Measure of effect to the contributing resource**	**Effects to public purposes**
Unspoiled natural ecosystem Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.2 Aquatic Habitats and Associated Species Section 4.6 Floodplains, Stream Geomorphology, and Hydrology Section 4.14 Water Quality Section 4.15 Wetlands	• 1,449 acres of the wilderness ecosystem would be affected by construction actions, operations actions, and the downstream and watershed effects of those actions.	• Degradation of recreational use • Degradation of scientific use • Degradation of educational use • Degradation of conservation use
Brown bears Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.3 Special Status Species Section 4.5.2 Aquatic Habitats and Associated Species	• 406 acres of brown bear habitat would be affected by construction actions, operations actions, and isolation of wilderness.	• Degradation of recreational use • Degradation of scientific use • Degradation of educational use • Degradation of conservation use
Eagles Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.3 Special Status Species Section 4.5.2 Aquatic Habitats and Associated Species	• 187 acres of eagle habitat would be affected by construction actions and operation actions.	• Degradation of recreational use • Degradation of scientific use • Degradation of educational use • Degradation of conservation use • Degradation of historical use
Cultural resources Section 4.8 Cultural Resources	• 227 acres of land with a high probability of containing cultural resources would experience increased risk to sites from direct and indirect effects.	• Degradation of educational use • Degradation of historical use
Customary and traditional subsistence use Section 4.13 Subsistence Resources and Uses	• 104 acres of subsistence use areas would be affected by construction actions and operation actions.	• Degradation of educational use • Degradation of historical use
Visual resources Section 4.9 Light Emissions and Visual Resources	• There would be 528 acres where scenery would be degraded due to construction actions, operation actions, and presence of developments.	• Degradation of scenic use

4.16.3.2.5. Airport 4 with Access 3

Airport 4 with Access 3 effects on wilderness qualities

Airport 4 with Access 3 would result in degradation of the four wilderness qualities at the intensities shown in Table WC11 and in the areas depicted on Figures WC17 and WC18.

Table WC11. Airport 4 with Access 3: Source and intensity of degradation of wilderness qualities

Quality degraded	Specific action causing effects	Intensity of effects
Untrammeled	• Construction actions and operations actions	• Seven construction actions and eight operations actions (listed in section 4.16.3.1.1) would degrade the untrammeled quality.
Natural	• Construction actions and operations actions and the downstream or watershed effects of those actions	• There would be 1,418 acres of wilderness where the natural quality would be degraded (Figure WC17).
	• Isolation of wilderness	• 374 acres of wilderness would be isolated from the main Kootznoowoo Wilderness Area.
Undeveloped	• Presence of developments	• Eight types of developments (listed in section 4.16.3.1.1) would be introduced into the wilderness area. • 25 acres of developments would be introduced into the wilderness area (Figure WC17).
	• Presence of motorized equipment	• Motorized equipment (listed in section 4.16.3.1.1) would be used for vegetation maintenance, pavement maintenance, snow removal, aircraft operations, public vehicular access between Angoon and the airport, and for electrical generation to operate the runway lights and navigational aids. • Wilderness users near the road would be able to see vehicles and maintenance equipment.
Opportunities for solitude	• New or improved access to the wilderness area	• 1,724 acres of new or improved access would increase the chances of seeing another wilderness user (Figure WC18).
	• Light emissions from construction	• Construction areas and some equipment would be illuminated at night and and during low-light daytime conditions with high-intensity lighting, creating visible skyglow throughout the wilderness area near the runway and access road for up to three construction seasons. The skyglow would be intensified by any local low-lying clouds, fog, rain, and high humidity. These effects would cease when construction ended.
	• Light emissions during operation	• At night and during daytime low-light conditions (for example, dense clouds or fog), intermittent, brief, and low-intensity skyglow caused by the airport's upward-directed runway lights and navigation aids would be visible in the immediate vicinity of the runway during approaches and takeoffs. • There would be 630 acres where wilderness users would be able to see headlights from vehicle traffic and maintenance equipment at night and during daytime low-light conditions (Figure WC18).

Table WC11. Airport 4 with Access 3: Source and intensity of degradation of wilderness qualities

Quality degraded	Specific action causing effects	Intensity of effects
	• Presence of developments and motorized equipment	• There would be 630 acres where developments and motorized equipment would be visible from within the wilderness area (Figure WC18). • During operation, there would be seven additional encounters per day with aircraft and 24 new encounters per day with private vehicles traveling to and from the airport. These would exceed recommended encounter rates for wilderness lands designated as Primitive (fewer than three encounters per day) and Semi-Primitive Motorized (fewer than six encounters per day). • There would be unquantifiable public use of motorized vehicles and equipment associated with subsistence, recreation, and maintenance along the airport access road.
	• Noise from aircraft	• For up to 31 additional minutes in a 24-hour period, aircraft noise related to the proposed Angoon Airport would exceed ambient noise levels (Figure WC18). • In approximately 272,802 acres of wilderness area, aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period.
	• Noise from construction equipment • Noise from vehicles and maintenance equipment	• There would be temporary increases in noise from construction equipment and worker vehicles in localized areas near this alternative but not throughout the greater Kootznoowoo Wilderness Area. Construction noise would cease when construction ended. • During operation, wilderness users near the road and airport would be able to hear vehicles and maintenance equipment. Because there would be an unquantifiable public use of motorized vehicles and equipment associated with subsistence, recreation, and maintenance along the airport access road, it is not possible to quantify noise levels.
Primitive and unconfined recreation	• Presence of perimeter fence (restricting access) or pavement (hindering primitive and unconfined recreation)	• There would be 107 acres of wilderness area where primitive and unconfined recreation could no longer occur (Figure WC18).

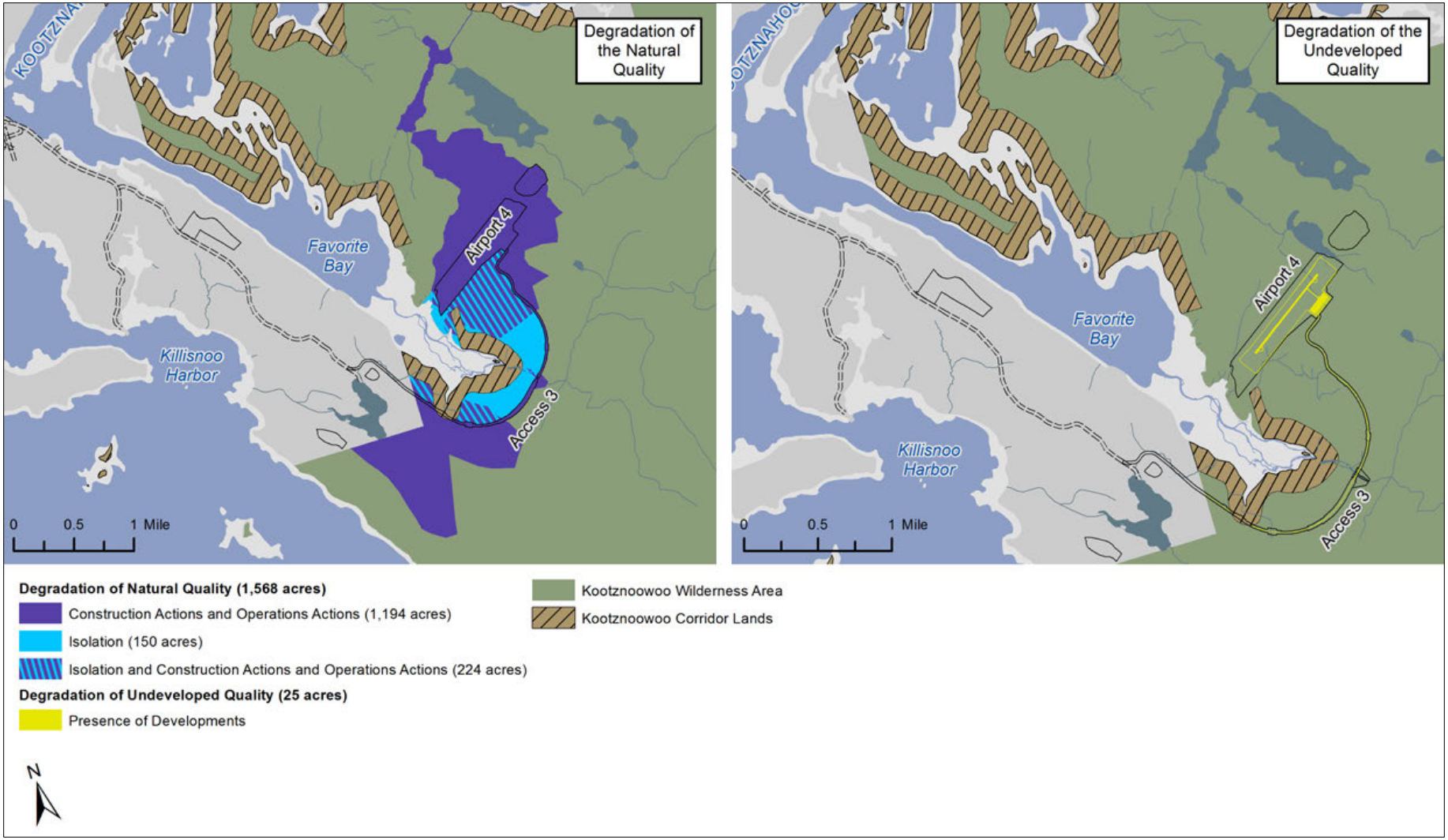


Figure WC17. Effects to the natural and undeveloped qualities from Airport 4 with Access 3.

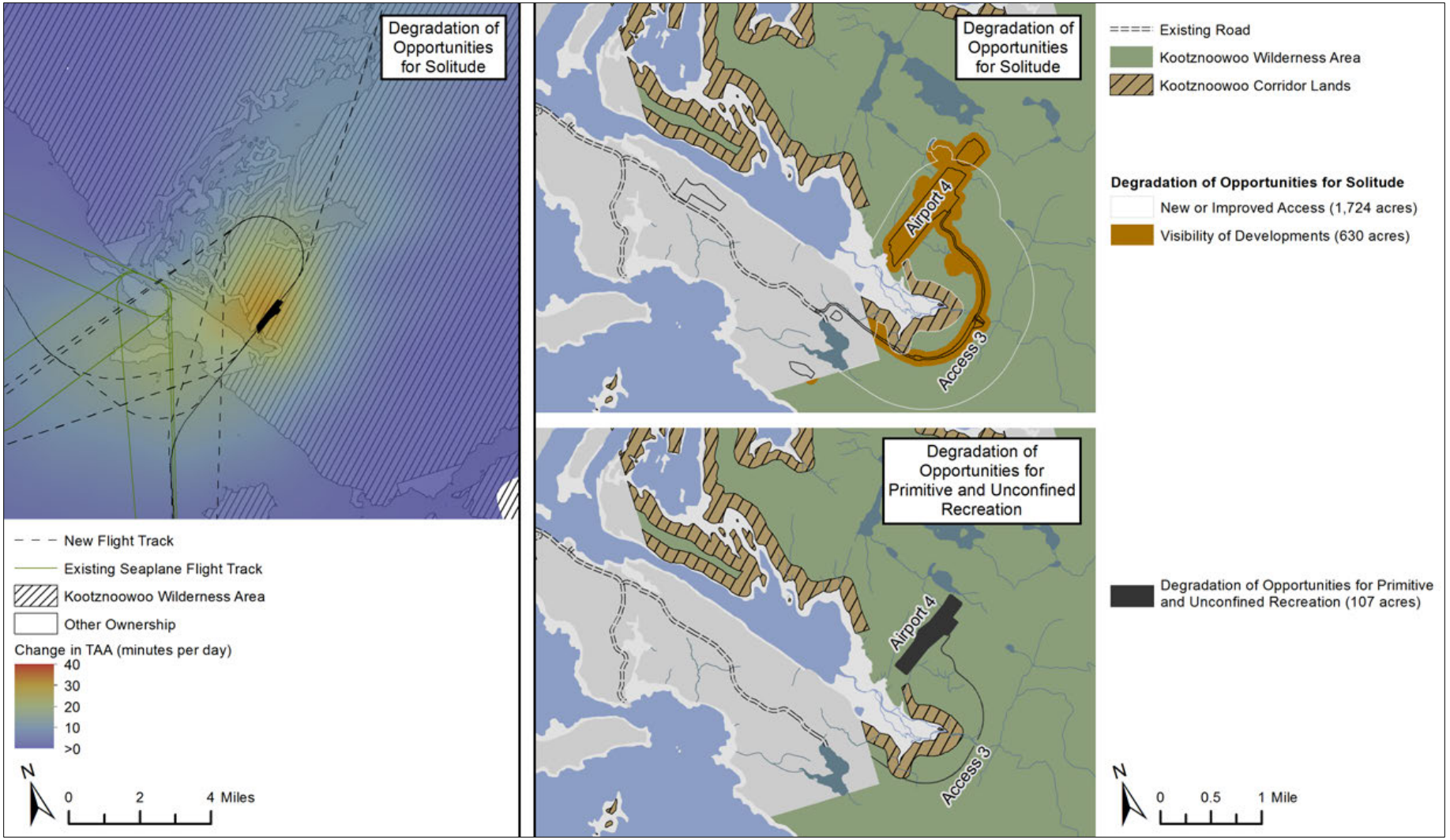


Figure WC18. Effects to opportunities for solitude and primitive and unconfined recreation from Airport 4 with Access 3.

Airport 4 with Access 3 effects on public purposes

Table WC12 summarizes the anticipated intensity of effects on the public purposes.

Table WC12. Source and measure of effects to public purposes for Airport 4 with Access 3

Resource contributing to public purposes **EIS sections where effects to this resource are analyzed**	**Measure of effect to the contributing resource**	**Effects to public purposes**
Unspoiled natural ecosystem Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.2 Aquatic Habitats and Associated Species Section 4.6 Floodplains, Stream Geomorphology, and Hydrology Section 4.14 Water Quality Section 4.15 Wetlands	• 1,568 acres of the wilderness ecosystem would be affected by construction actions, operations actions, and the downstream and watershed effects of those actions.	• Degradation of recreational use • Degradation of scientific use • Degradation of educational use • Degradation of conservation use
Brown bears Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.3 Special Status Species Section 4.5.2 Aquatic Habitats and Associated Species	• 584 acres of brown bear habitat would be affected by construction actions, operations actions, and isolation of wilderness.	• Degradation of recreational use • Degradation of scientific use • Degradation of educational use • Degradation of conservation use
Eagles Section 4.5.1 Terrestrial Habitats and Associated Species Section 4.5.3 Special Status Species Section 4.5.2 Aquatic Habitats and Associated Species	• 210 acres of eagle habitat would be affected by construction actions and operation actions.	• Degradation of recreational use • Degradation of scientific use • Degradation of educational use • Degradation of conservation use • Degradation of historical use
Cultural resources Section 4.8 Cultural Resources	• 232 acres of land with a high probability of containing cultural resources would experience increased risk to sites from direct and indirect effects.	• Degradation of educational use • Degradation of historical use
Customary and traditional subsistence use Section 4.13 Subsistence Resources and Uses	• 107 acres of subsistence use areas would be affected by construction actions and operation actions.	• Degradation of educational use • Degradation of historical use
Visual resources Section 4.9 Light Emissions and Visual Resources	• There would be 630 acres where scenery would be degraded by construction actions, operation actions, and presence of developments.	• Degradation of scenic use

4.16.3.2.6. Airport 12a with Access 12a (preferred alternative)

Airport 12a with Access 12a effects on wilderness qualities

Airport 12a with Access 12a would not occupy any part of the Kootznoowoo Wilderness Area. Therefore, there would be no effects to the untrammeled, natural, undeveloped, or primitive recreation qualities. However, light emissions, encounters with aircraft overflights, aircraft noise, and construction noise would affect opportunities for solitude. Table WC13 describes effects to opportunities for solitude for this alternative.

Table WC13. Airport 12a with Access 12a: Source and intensity of degradation of wilderness qualities

Quality degraded	Specific action causing effects	Intensity of effects
Opportunities for solitude	• New or improved access to the wilderness area	• No new or improved access would be created.
	• Light emissions from construction	• Construction areas and some equipment on the Angoon peninsula would be illuminated at night and and during low-light daytime conditions with high-intensity lighting, creating visible skyglow in adjacent portions of the wilderness area for up to three construction seasons. The skyglow would be intensified by any local low-lying clouds, fog, rain, and high humidity. These effects would cease when construction ended.
	• Light emissions during operation	• At night and during daytime low-light conditions (for example, dense clouds or fog), intermittent, brief, and low-intensity skyglow caused by the airport's upward-directed runway lights and navigational aids would be visible in portions of the wilderness near the runway during approaches and takeoffs.
	• Presence of developments and motorized equipment	• No developments and motorized equipment would be visible from within the wilderness area. • During operation, there would be seven additional encounters per day with aircraft. These would exceed recommended encounter rates for wilderness lands designated as Primitive (fewer than three encounters per day) and Semi-Primitive Motorized (fewer than six encounters per day).

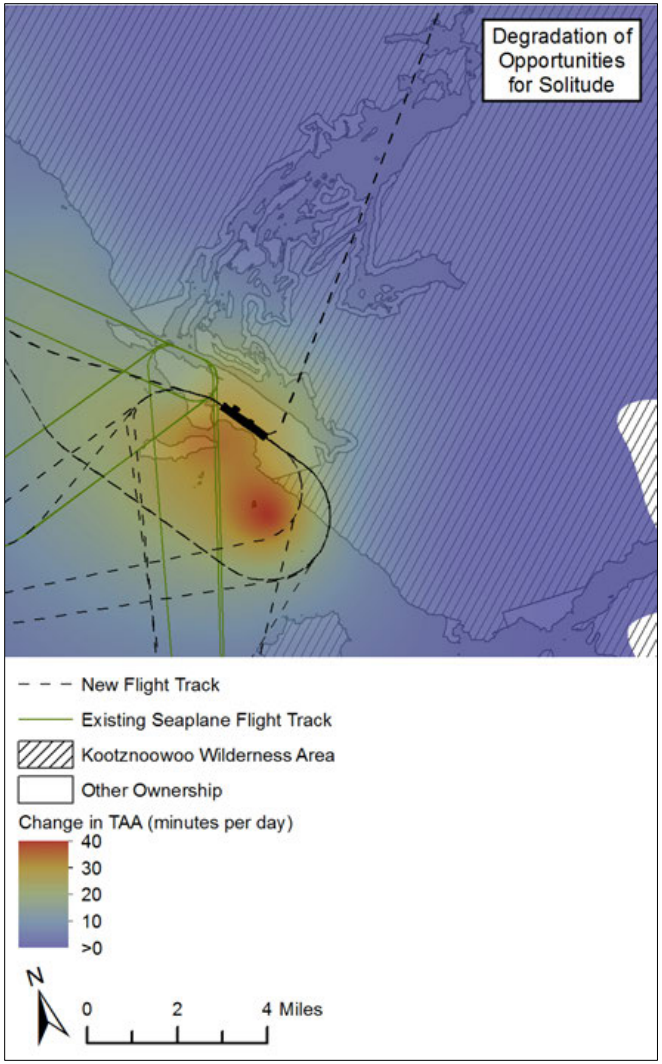


Figure WC19. Effects to opportunities for solitude from Airport 12a with Access 12a.

Table WC13. Airport 12a with Access 12a: Source and intensity of degradation of wilderness qualities

Quality degraded	Specific action causing effects	Intensity of effects
	• Noise from aircraft	• For up to 10 additional minutes in a 24-hour period, aircraft noise related to the proposed Angoon Airport would exceed ambient noise levels (Figure WC19). • In approximately 270,262 acres of wilderness area, aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period.
	• Noise from construction equipment and motor vehicles	• There would be temporary increases in noise from construction equipment and worker vehicles in parts of the wilderness area closest to this alternative but not throughout the greater Kootznoowoo Wilderness Area. Construction noise would cease when construction ended.

Airport 12a with Access 12a effects on public purposes

Because noise would not affect any public purposes, Airport 12a with Access 12a would have no effect on the public purposes of any portion of the Kootznoowoo Wilderness Area.

4.16.3.3. How do the effects to wilderness character and public purposes compare?

4.16.3.3.1. Wilderness qualities

Table WC14 compares the ways each action alternative would degrade the four wilderness qualities.

Table WC14. Comparison of effects to wilderness qualities

Quality	Specific action causing effects	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12
Untrammeled	• Construction actions and operations actions	• Seven construction actions and eight operations actions	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• 0 construction or operations actions
Natural	• Construction actions and operations actions, and the downstream or watershed effects of those actions	• 791 acres degraded	• 817 acres degraded	• 1,402 acres degraded	• 1,418 acres degraded	• 0 acre degraded
	• Isolation of wilderness	• 126 acres isolated	• 679 acres isolated	• 219 acres isolated	• 374 acres isolated	• 0 acre isolated
Undeveloped	• Presence of developments	• Eight types of developments introduced • 22 acres of developments introduced • Visibility of vehicles and maintenance equipment	• Eight types of developments introduced • 28 acres of developments introduced • Visibility of vehicles and maintenance equipment	• Same as Airport 3a with Access 2	• Eight types of developments introduced • 25 acres of developments • Visibility of vehicles and maintenance equipment	• No developments
	• Presence of motorized equipment	• Motorized equipment for maintenance of vegetation, pavement, snow removal, aircraft operations, public vehicular access, and for electrical generation	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• No motorized equipment

Table WC14. Comparison of effects to wilderness qualities

Quality	Specific action causing effects	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12
Opportunities for solitude	• New or improved access to the wilderness area	• 1,713 acres of new or improved access	• 2,495 acres of new or improved access	• 1,416 acres of new or improved access	• 1,724 acres of new or improved access	• 0 acre of new or improved access
	• Light emissions from construction	• Skyglow visible in the wilderness area near the runway and access road for up to three construction seasons	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Skyglow would be visible from adjacent portions of the wilderness area for up to three construction seasons
	• Light emissions during operation	• Intermittent, brief, and low-intensity skyglow from the airport's upward-directed runway lights and navigational aids in the immediate vicinity of the runway during approaches and takeoffs • 502 acres where headlights would be visible during night or daytime low-light conditions along the road corridor	• Intermittent, brief, and low-intensity skyglow from the airport's upward-directed runway lights and navigational aids in the immediate vicinity of the runway during approaches and takeoffs • 735 acres where headlights would be visible during night or daytime low-light conditions along the road corridor	• Intermittent, brief, and low-intensity skyglow from the airport's upward-directed runway lights and navigational aids in the immediate vicinity of the runway during approaches and takeoffs • 528 acres where headlights would be visible during night or daytime low-light conditions along the road corridor	• Intermittent, brief, and low-intensity skyglow from the airport's upward-directed runway lights and navigational aids in the immediate vicinity of the runway during approaches and takeoffs • 630 acres where headlights would be visible during night or daytime low-light conditions along the road corridor	• Intermittent, brief, and low-intensity skyglow from the airport's upward-directed runway lights and navigational aids in portions of the wilderness near the runway during approaches and takeoffs
	• Presence of developments and motorized equipment	• 502 acres where developments or motorized equipment would be visible • Exceedance of recommended encounter rates for ROS classes • Unquantifiable use of airport access road for subsistence, recreation, and maintenance	• 735 acres where developments or motorized equipment would be visible • Exceedance of recommended encounter rates for ROS classes • Unquantifiable use of airport access road for subsistence, recreation, and maintenance	• 528 acres where developments or motorized equipment would be visible • Exceedance of recommended encounter rates for ROS classes • Unquantifiable use of airport access road for subsistence, recreation, and maintenance	• 630 acres where developments or motorized equipment would be visible • Exceedance of recommended encounter rates for ROS classes • Unquantifiable use of airport access road for subsistence, recreation, and maintenance	• No developments or motorized equipment in or visible from wilderness • Exceedance of recommended encounter rates for ROS classes

Table WC14. Comparison of effects to wilderness qualities

Quality	Specific action causing effects	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12
	• Noise from aircraft	• Maximum of 26 additional minutes per day time above ambient (TAA) from existing conditions in wilderness boundary • 186,551 acres of wilderness where aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period	• Same as Airport 3a with Access 2 186,551 acres of wilderness where aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period	• Maximum of 31 additional minutes per day TAA from existing conditions in wilderness boundary • 272,802 acres of wilderness where aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period	• Same as Airport 4 with Access 2 • 272,802 acres of wilderness where aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period	• Fewer than 10 additional minutes per day TAA from existing conditions within the wilderness boundary • 270,262 acres of wilderness where aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period
	• Noise from construction equipment • Noise from vehicles and maintenance equipment	• Temporary increases in noise from construction equipment and worker vehicles in localized areas near this alternative only during construction • During operation, wilderness users near the road and airport would be able to hear vehicles and maintenance equipment. Because there would be an unquantifiable public use of motorized vehicles and equipment associated with subsistence, recreation, and maintenance along the airport access road, it is not possible to quantify noise levels.	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Same as Airport 3a with Access 2	• Temporary increases in noise from construction equipment and worker vehicles in parts of the wilderness area closest to this alternative only during construction
Opportunities for primitive and unconfined recreation	• Presence of perimeter fence (restricting access) or pavement (hindering primitive and unconfined recreation)	• 101 acres where primitive and unconfined recreation could no longer occur	• 106 acres where primitive and unconfined recreation could no longer occur	• 105 acres where primitive and unconfined recreation could no longer occur	• 107 acres where primitive and unconfined recreation could no longer occur	• 0 acre where primitive and unconfined recreation could no longer occur

4.16.3.3.2. Public purposes

Table WC15 compares the acreages of public purposes that would be degraded by the action alternatives.

Table WC15. Comparison of the intensity of effects to public purposes

Resource contributing to public purposes	Airport 3a with Access 2 (acres degraded)	Airport 3a with Access 3 (acres degraded)	Airport 4 with Access 2 (acres degraded)	Airport 4 with Access 3 (acres degraded)	Airport 12a with Access 12 (acres degraded)
Unspoiled natural ecosystem	893	1,406	1,449	1,568	0
Brown bears	306	895	406	584	0
Eagles	180	216	187	210	0
Cultural resources	342	379	227	232	0
Customary and traditional subsistence uses	148	151	104	107	0
Visual resources	502	735	528	630	0

4.16.3.4. Would any effects be irreversible or irretrievable?

All effects to wilderness qualities described above for each of the action alternatives would be both irreversible and irretrievable during construction and continued operation of the airport and access road. The public purposes would be similarly affected with the exception that no known irreversible or irretrievable effects to Tlingit cultural sites or other historical sites would occur; therefore, these effects would not contribute to irreversible or irretrievable losses of historical public purposes in the wilderness area.

4.16.3.5. How did the FAA determine the significance of the anticipated effects from the alternatives?

Neither the FAA nor the U.S. Forest Service has established significance thresholds for effects to wilderness qualities or public purposes.

ANILCA Title XI, which outlines the process by which a transportation or utility system could be authorized in a wilderness area in Alaska, requires agency decision-makers to assess the compatibility of the proposed actions with the purposes for which the wilderness area was established (as outlined under the Wilderness Act and any establishing legislation). However, neither ANILCA Title XI nor the Wilderness Act provides specific guidance on determining the compatibility of project *effects* with

the purposes of the wilderness area, or whether an effect that is found to be incompatible is automatically considered to be significant. Although there are exceptions under ANILCA Sections 811 and 1110(a) that allow certain motorized equipment and mechanized transport for subsistence uses and public access to wilderness areas in Alaska, these exceptions apply only to direct uses of the wilderness area rather than uses intended to serve non-wilderness lands, as would be the case with an airport serving Angoon.

Because the U.S. Forest Service is a cooperating agency assisting the FAA with this assessment of potential effects to wilderness character, and because the U.S. Forest Service has management jurisdiction over the federal lands of the Tongass National Forest, the FAA consulted with the U.S. Forest Service and used their guidance to make determinations of significance of project effects to wilderness qualities and public purposes. Significance is evaluated relative to the following two factors:

- The compatibility of the project effects with the desired conditions of the wilderness qualities and the public purposes, as outlined in the U.S. Forest Service's land management plan (2008a)
- The compatibility of the project effects with the provisions and desired conditions outlined in the Wilderness Act, as modified by ANILCA

Incompatibility with either the desired conditions of land management plan or the desired conditions of the Wilderness Act constitutes significance in this EIS. The effect need not be incompatible with both the plan and the act to be considered significant.

4.16.3.5.1. Desired conditions for wilderness qualities

Desired conditions for wilderness qualities are defined in the land management plan (U.S. Forest Service 2008a:3-8) as follows:

> All designated Wilderness on the Tongass National Forest is characterized by extensive, unmodified natural environments. Ecological processes and natural conditions are not measurably affected by past or current human uses or activities. Users have the opportunity to experience independence, closeness to nature, solitude and remoteness, and may pursue activities requiring self-reliance, challenge, and risk. Motorized and mechanized use is limited to the minimum needed for the administration of the Wilderness. Allow [sic] for access to state and private lands, subsistence uses, and public access and other uses to the extent provided for by ANILCA….

> If not specifically provided through an ANILCA exception, [Section 707 of ANILCA states] the resources within a designated Wilderness shall be administered in accordance with the applicable provisions of the Wilderness Act.

Desired conditions as discussed in the Wilderness Act (see section 4.16.1.2) are generally reflected in the land management plan language quoted above, but these conditions also include specific expectations such as a prohibition on permanent roads and extreme restrictions on permanent and temporary structures, landing of aircraft, and use of other motorized vehicles and equipment except in rare instances of emergency health and safety concerns or needs to administer the wilderness area itself.

4.16.3.5.2. Desired conditions for public purposes

With the exception of recreational use and scenic use, the Wilderness Act does not specifically call out desired conditions for public purposes. The U.S. Forest Service's land management plan only indirectly addresses desired conditions for purposes through its stated desired conditions for the resources that contribute to the public purposes. Table WC16 lists the public purposes, their contributing resources, and the desired conditions of those resources.

Table WC16. Kootznoowoo Wilderness Area public purposes and their desired conditions

Public purpose	Resources contributing to public purpose	Desired condition
Recreational use	• Brown bears and bald eagles	• Develop safe brown bear viewing opportunities for the public • No desired condition for bald eagles provided
	• Unspoiled natural ecosystem	• Opportunities exist for remote, unconfined recreation with experiences of solitude, self-reliance, and use of primitive skills
	• Cultural resources	• Manage significant and suitable heritage resource sites to realize their recreational and educational values to the public
Scenic use	• Visual resources	• Natural-appearing landscape • Management activities are not visible to the casual observer • Roads, facilities, and other structures are not visually evident or are subordinate to the landscape

Table WC16. Kootznoowoo Wilderness Area public purposes and their desired conditions

Public purpose	Resources contributing to public purpose	Desired condition
	• Brown bears and bald eagles	• Protect and study brown bear and eagle populations
	• Cultural resources	• Protect and study Tlingit cultural resources and other historical resources
	• Unspoiled natural ecosystem	• Appropriate research is encouraged and supported within the constructions of wilderness designation, and contributes to both the purposes of the wilderness national monument and improved management of other forest lands
Educational use	• Brown bears and bald eagles • Cultural resources • Customary and traditional subsistence use • Unspoiled natural ecosystem	• Protect and study of Tlingit cultural resources and other historical resources • Appropriate interpretive and educational efforts to allow the public to better understand the resources and appreciate how they fit into the context of geology, ecology, and human history
Conservation use	• Brown bears and bald eagles	• Protect and study brown bear and eagle populations • Emphasize management for indigenous wildlife species and natural habitat • Provide the abundance and distribution of habitat necessary to maintain viable populations • Prevent habituation of brown bears • Maintain habitat to support long-term nesting, perching, and winter roosting habitat capability for bald eagles
	• Cultural resources	• Protect and study Tlingit cultural resources and other historical resources
	• Unspoiled natural ecosystem	• Characterized by extensive, unmodified natural environments; ecological processes and natural conditions are not measurably affected by past or current human uses or activities
Historical use	• Cultural resources	• Protect and study Tlingit cultural resources and other historical resources
	• Customary and traditional subsistence use	• Allow access for subsistence uses as provided for in ANILCA

Source: U.S. Forest Service (2008a).

4.16.3.6. Would any of the action alternatives be compatible with the desired conditions for wilderness qualities and public purposes?

4.16.3.6.1. Wilderness qualities

For Airport 3a or Airport 4 with either access road, effects to all four wilderness qualities would be incompatible with the desired condition of the Kootznoowoo Wilderness Area as set forth by the Wilderness Act and land management plan.

For Airport 12a with Access 12a, long-term effects to wilderness qualities—specifically opportunities for solitude—would be limited to the visibility of aircraft, visibility of skyglow during operation, and aircraft noise in portions of Kootznoowoo Wilderness Area. This increase in noise TAA would be up to 10 additional minutes per 24-hour period (BridgeNet International 2013b) in areas where opportunities for solitude are already degraded by aircraft overflights and seaplane traffic from the Angoon Seaplane Base. The FAA has determined that the noise effects on opportunities for solitude in the wilderness area from Airport 12a with Access 12a would be infrequent and of short duration, and opportunities for solitude would be readily available very close by. For these reasons, these effects would be compatible with the desired conditions set forth in the Wilderness Act and the land management plan. Chapter 2320 of *U.S. Forest Service Manual 2300* (U.S. Forest Service 2007) requires the U.S. Forest Service to consider and disclose effects to wilderness qualities from both inside and outside the boundary of a wilderness area in an EIS. However, these policies also restrict the agency's ability to manage non–U.S. Forest Service lands to preserve wilderness character. Therefore, because these effects are outside of U.S. Forest Service jurisdiction, they are considered compatible with the wilderness area.

4.16.3.6.2. Public purposes

Based on the analysis presented in Tables WC6, WC8, WC10, and WC12, all effects to public purposes from Airport 3a and Airport 4 with either access would be incompatible with desired conditions shown in Table WC16 for brown bear and eagle habitat, natural ecological processes as they relate to hydrology and stream function, visual (scenic) resources, and subsistence resources and uses.

No specific effects on known cultural sites were identified for either Airport 3a or Airport 4 with either access road; therefore, effects would be compatible with desired conditions for cultural resources, although the wilderness alternatives would increase the challenge of managing Tlingit cultural sites and other historical sites.

Airport 12a with Access 12a would not affect any of the resources within the boundaries of the Kootznoowoo Wilderness Area, and its effects would therefore be compatible with the desired conditions of the related public purposes (U.S. Forest Service 2008a).

4.16.3.6.3. Summary finding of incompatibility and significance

Based on the findings of incompatibility discussed above, the FAA finds that both Airport 3a and Airport 4 with either access road would be incompatible with the desired conditions set forth in the Wilderness Act and the land management plan (U.S. Forest Service 2008a). By extension, the FAA therefore finds that the effects from any of the wilderness alternatives to wilderness qualities and public purposes would be significant.

Airport 12a with Access 12a would be compatible with the desired conditions of the Kootznoowoo Wilderness Area and therefore would have no significant effect on wilderness qualities and public purposes.

In general, the Forest Service has observed that, wilderness areas are rarely threatened by large-scale projects that would degrade large proportions of their acreages. Rather, wilderness areas are threatened by the cumulative effect of small incremental changes over time and by new precedents allowing previously incompatible uses. These incremental changes and new uses together could add up to significant development, modification, and occupation of the National Wilderness Preservation System over time. In this light, the wilderness alternatives for the proposed Angoon Airport indirectly affect the public's appreciation that this wild and undeveloped place is protected by national monument and wilderness area designations. Members of the public who may never visit Admiralty Island support the monument and wilderness area for its intrinsic spiritual and symbolic values, including the value of preserving an extensive, unaltered coastal island ecosystem; the subsistence and recreation opportunities afforded by vast undeveloped areas; and the value of an intact cultural landscape for the Tlingit Indians. These values reflect the national interest expressed in ANILCA Section 101, the Wilderness Act, and President Carter's monument proclamation.

The precedent of constructing an airport in the monument-wilderness when there is a viable alternative outside but nearby the monument-wilderness could increase concerns about the preservation of the Admiralty Island National Monument, the Kootznoowoo Wilderness Area, and other Alaskan national interest lands that could be subjected to ANILCA Title XI projects.

4.16.3.7. How could the effects described above be avoided, minimized, or mitigated?

Placement of either Airport 3a or Airport 4 in the wilderness area would affect all wilderness qualities and public purposes in the immediate area, and none of these effects could be entirely avoided or mitigated. Airport 12a with Access 12a would avoid direct use of wilderness lands, and therefore its only effect would be degradation of opportunities for solitude during those times when noise levels rose above ambient conditions.

The FAA has assumed that the best management practices, mitigation measures, and permit requirements discussed in Chapter 7: Mitigation could be implemented for any alternative. These actions are designed to minimize effects to resources and land uses, including wilderness qualities and public purposes, to the extent practicable.

Effects on the undeveloped quality from the visibility of permanent structures can be reduced by using natural color schemes incorporating green, brown, and tan, and natural materials such as wood for any aboveground structure or equipment.

Any further mitigation to address significant effects to wilderness character would be developed in collaboration with the U.S. Forest Service if final approval for a wilderness alternative is received from Congress and the President.

4.16.3.8. How effective would these minimization and mitigation measures be, and what effects would remain if they were implemented?

The measures discussed above would help minimize effects from the action alternatives to wilderness qualities and public purposes. However, most effects discussed in section 4.16.3.2 would remain and are unavoidable for Airport 3a and Airport 4 with either access road.

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4.17. Climate Change and Greenhouse Gas Emissions

This section describes existing weather conditions in the area of the airport and access road alternatives. It also addresses the ***emission*** of greenhouse gases during construction and operation of the proposed land-based airport. However, this section does not attempt to link emissions from the project to specific changes in climate at any scale—local, national, or global. This decision is based on guidance from the Council on Environmental Quality (2010:3) that "it is not currently useful for [the National Environmental Policy Act analysis] to attempt to link specific climatological changes, or the environmental impacts thereof, to the particular project or emissions, as such direct linkage is difficult to isolate and to understand."

What is discussed in this section?

4.17.1. Background information

4.17.1.1. What do the terms "climate," "climate change," and "greenhouse gases" mean?

"Climate" is defined as average weather patterns over a period of time—from a few decades to thousands of years. Climate fundamentally shapes our surroundings. Temperature, precipitation, winds, and meteorological events (for example, the timing of the first and last frost, the beginning and end of a rainy season, or a severe storm causing flooding) all influence the distribution of water, soils, plants, and wildlife across the globe. Consequently, climate is extremely important to local ecosystems as well as human health and infrastructure.

Terms to know

Carbon dioxide equivalent (CO_2e): A unit of measurement that allows the effects of different greenhouse gases to be compared using carbon dioxide as a standard unit for reference.

Emission: The release of a substance (usually a gas when referring to climate change) into the atmosphere.

Significant, lasting change to existing weather patterns is commonly called "climate change." The term "greenhouse gases" refers to a variety of gases in the Earth's atmosphere that react with sunlight in a way that influence global air temperature. Greenhouse gases are defined as including carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, in accordance with Executive Order [EO] 13514, Federal Leadership in Environmental, Energy, and Economic Performance. These greenhouse gases are typically reported in units of ***carbon dioxide equivalent (CO_2e).***

4.17.1.2. What is the relationship between fuel combustion, greenhouse gases, and climate change?

Terms to know

Contrails: The thin, wispy trails formed from water vapor that can sometimes be seen behind aircraft in flight.

Research has shown a direct correlation between fuel combustion and greenhouse gas emissions. In terms of U.S. contributions, the General Accounting Office reports that "domestic aviation contributes about 3 percent of total carbon dioxide emissions, according to [Environmental Protection Agency (EPA)] data" compared with other industrial sources, including the remainder of the transportation sector (20%) and power generation (41%). The International Civil Aviation Organization estimates that greenhouse gas emissions from aircraft account for roughly 3% of all anthropogenic greenhouse gas emissions globally. Climate change due to greenhouse gas emissions is a global phenomenon, so the affected environment is the global climate.

The scientific community is continuing efforts to better understand the effects of aviation emissions on the global atmosphere. The Federal Aviation Administration (FAA) is leading and participating in a number of initiatives intended to clarify the role that commercial aviation plays in greenhouse gas emissions and climate. The FAA, with support from the U.S. Global Change Research Program and its participating federal agencies (for example, the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, the EPA, and the Department of Energy) have developed the Aviation Climate Change Research Initiative in an effort to advance scientific understanding of regional and global climate effects from aircraft emissions. The FAA also funds the Partnership for AiR Transportation Noise and Emissions Reduction Center of Excellence research initiative to quantify the effects of aircraft exhaust and ***contrails*** upon global and U.S. climate and atmospheric composition. Similar research topics are being examined at the international level by the International Civil Aviation Organization.

4.17.1.3. What laws and regulations guided how climate change and greenhouse gases were assessed?

There are currently no federal standards for greenhouse gas emissions or climate change related to aviation projects. However, in 2009 the EPA determined that greenhouse gases at current and projected levels are a threat to public health and welfare. This finding (*Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act* [EPA 2009:66496]) and a 2007 U.S. Supreme Court ruling (*Massachusetts v. EPA,* 549 U.S. 497 [2007]) allow greenhouse gases to be regulated by the EPA under the authority of the Clean Air Act of 1970, as amended.

In 2012, the FAA issued its own guidance for assessing greenhouse gases and climate change (*Order 1050.1E, Chg 1, Guidance Memo #3: Considering Greenhouse Gases and Climate Change under the National Environmental Policy Act; Interim Guidance to FAA Order 1050.1E* [FAA 2012b]). This memo explicitly identifies climate change as a category of potential environmental effect to be considered in National Environmental Policy Act (NEPA) of 1969 (Public Law [PL] 91-190) documents, and provides additional details on what data to collect and how to document the extent and context of greenhouse gas emissions for aviation projects. As with Council on Environmental Quality guidance, the FAA memo states that the climate change section should not attempt to determine the effects of greenhouse gas emissions on climate change.

4.17.2. Existing conditions

4.17.2.1. How did the FAA identify existing greenhouse gas emissions and weather conditions?

Information on greenhouse gas emissions and weather in the Angoon area was gathered from existing data sources and air quality modeling output, including weather records (Western Regional Climate Center 2013) and estimated greenhouse gas emissions from 2011 Angoon seaplane operations reported in *Angoon Airport Environmental Impact Statement Air Quality Memorandum* (BridgeNet International 2013a, included as Appendix E and discussed in more detail in section 4.2.2 of Air Quality).

4.17.2.2. What are greenhouse gas emissions like in Angoon, nationally, and globally?

The primary sources of greenhouse gas emissions in Angoon include transportation emissions (from seaplane flights, ferry activity, and vehicle travel) and emissions from fuel combustion associated with the Angoon power plant.

Nationally, greenhouse gas emissions totaled 6,822 million metric tons CO_2e in 2010 (Environmental Protection Agency 2012). Global greenhouse gas emissions totaled 31,781 million metric tons CO_2e in 2010 (U.S. Energy Information Administration 2013).

4.17.2.3. What is Angoon's weather like?

Angoon's weather is typical of a ***temperate rain forest*** (see Figure CL1 for an image of the Angoon area). The Western Regional Climate Center reports that from 1949 to 2011, Angoon received an average of 42 inches of precipitation per year (Western Regional Climate Center 2013). During that time, Angoon's mean average annual temperature was 42.3 degrees Fahrenheit, with the highest average maximum temperatures occurring in July (62 degrees Fahrenheit), and the lowest minimum average temperatures occurring in January (23.5 degrees Fahrenheit).

What is discussed in this section?

Terms to know

Temperate rain forest: A forest with coniferous trees (an order of mostly evergreens with needle-shaped or scale-like leaves) or broadleaf trees (those with broad leaves). These forests have high precipitation levels and typically mild winters with cool summers.

Regionally, Alaska has reported a 3.1-degree-Fahrenheit rise in annual temperatures over the past 60 years, "with key effects occurring to permafrost and sea ice, forests and other vegetation, coastline communities and infrastructure, marine ecosystems and fisheries, and subsistence livelihoods" (Alaska Department of Environmental Conservation 2010c:7).

Figure CL1. The Angoon area's current climate is typical of a temperate rain forest in Southeast Alaska.

4.17.3. Project effects

What is discussed in this section?

For all action alternatives, construction, operation, and maintenance of an airport and access road would result in emissions of greenhouse gases. Although the nature of the effects would be the same for all action alternatives, the magnitude of effects would differ per alternative.

The sections below describe the actions causing the effects, the nature of the effects, the methods for analyzing effects, the assumptions used in the analysis, and the magnitude and extent of effects for each alternative.

4.17.3.1. How did the FAA determine the effects of the alternatives on climate?

According to FAA *Order 1050.1E. Chg 1, Guidance Memo #3*, the estimated level of greenhouse gas emissions produced by a proposed project can serve as a reasonable proxy for assessing potential climate change effects. Therefore, this environmental impact statement only evaluates the change in CO_2e emissions produced by the action alternatives as compared to the no action alternative when assessing project effects to climate. This approach also matches federal protocol (Council on Environmental Quality 2012) in using CO_2e as the single assessed metric to encompass all greenhouse gas emissions.

For small proposed airport projects such as Angoon, a quantitative assessment of greenhouse gas emissions is not required by the FAA (FAA 2012b). Because CO_2e emissions were calculated as part of an emissions inventory for air quality, however, they are reported in this section.

The FAA considered both construction and operation effects in the following analysis. Construction effects are considered temporary effects and would end as soon as construction ceases. Operation effects are considered long term and would continue throughout operation of the airport.

4.17.3.1.1. Construction

For all action alternatives, construction activities—removing vegetation; grading and recontouring the ground surface; paving the runway and road; potential extraction of materials such as gravel, soil, and rock from an on-island material source; and constructing a bridge across Favorite Creek—would require fuel-burning construction machinery, an increase in construction-related vehicle traffic, and two to three seasons of construction. These construction actions would temporarily increase CO_2e emissions due to fuel combustion from construction equipment and the vehicles of construction crews.

CO_2e emissions from construction were assessed qualitatively for all alternatives based on the duration and type of construction activity that would occur.

4.17.3.1.2. Operation

During airport operation, aviation fuel combustion associated with flight takeoffs and landings would result in CO_2e emissions. Additionally, the distance vehicles travel to and from the airport, regardless of the airport's location, would increase, as would the number of trips taken per year to meet incoming and departing flights. Both of these changes would increase long-term CO_2e emissions through additional fuel consumption.

CO_2e emissions from airport operations were calculated using the FAA-approved Emissions Dispersion Modeling System. This modeling tool considers emissions for aircraft, ground service equipment, and other sources, and provides the results in metric tons of CO_2e. CO_2e emissions for vehicle travel to and from the airport were assessed qualitatively for all alternatives based on the projected number and distance of trips.

4.17.3.2. How would greenhouse gas emissions change as a result of each alternative?

4.17.3.2.1. No action alternative

Under the no action alternative, no new construction-related CO_2e emissions would be generated because no construction would take place. However, CO_2e would continue to be produced in the Angoon area annually as a result of existing vehicle, aviation, and ferry activity, as well as fuel combustion for the Angoon power plant.

4.17.3.2.2. Action alternatives

Construction

Under all action alternatives, use of fuel-burning construction machinery and vehicles would generate new CO_2e emissions for the duration of the two- or three-season construction period. These emissions would be temporary (only occurring during construction), however, and negligible in quantity compared to U.S. and world greenhouse gas emissions.

Operation

Based on emission inventory results for air quality (see Appendix E), during operation of any action alternative, airplane takeoffs and landings would reduce related CO_2e emissions by almost 50% (829 metric tons versus 1,645 metric tons) as compared to continued seaplane operations under the no action alternative. This decrease would occur because the land-based airport would use a greater number of aircraft with higher-efficiency in-line (or horizontally opposed) engines compared to the no action alternative, which uses seaplanes with less-efficient radial engines. The greater distance traveled on land by residents using personal vehicles, and the increased number of trips to and from a land-based airport by car or truck would result in a negligible increase in CO_2e emissions under any of the action alternatives. However, as a net effect, total long-term CO_2e emissions for Angoon would decrease as a result of the airport's operation, assuming decreases in seaplane operations and all other emissions sources for the area remaining the same.

4.18. Environmental Justice and Children's Health and Safety

This section describes two topics—environmental justice and children's health and safety—as they relate to the airport and access road alternatives. It addresses the presence of ***environmental justice populations*** as well as the places where children gather and potential safety and health risks to children. It also identifies the potential for effects to environmental justice populations and children from construction and operation of the proposed land-based airport.

What is discussed in this section?

Terms to know

Environmental justice population: A group of people consisting of minority or low-income individuals or households.

4.18.1. Background information

4.18.1.1. What do the terms "environmental justice" and "children's health and safety" mean?

"Environmental justice" is a term related to the federal requirement to ensure

> the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including any racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies. (Environmental Protection Agency 1998)

The term "children's health and safety" refers to environmental risks that are specific or unique to children because of their behavior; the places they congregate, such as playgrounds, schools, or daycare centers (see Figure EJ1 for an aerial view of Angoon showing its high school); or their state of physical development. Per Executive Order (EO) 13045 (see section 4.18.1.2), risks to children may be greater than risks to adults for several reasons:

- Children's respiratory and nervous systems are still developing.
- Children consume more food and drinks and breathe more air in proportion to their body weight than adults, which increases their risk of taking in environmental contaminants.
- Children's behavior often exposes them more directly to environmental hazards.

4.18.1.2. What laws, policies, or regulations apply to environmental justice and children's health and safety in the Angoon area?

Federal Aviation Administration (FAA) *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) and *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b) guide how environmental justice and children's health and safety should be assessed for a proposed airport action. These orders are based on the following federal regulations:

- *Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations* (February 11, 1994). This order requires that federal agencies, to the greatest extent practical and required by law, identify and address adverse effects to environmental justice populations.
- *Executive Order 13045: Protection of Children from Environmental Health Risks.* This order requires that federal agencies, to the greatest extent practical and required by law, identify and address environmental health risks and safety risks to children.

Figure EJ1. Aerial view of Angoon. The local high school is the blue building at top.

- *Title VI of the Civil Rights Act.* Enacted in 1964, the Civil Rights Act (Public Law [PL] 88-352) outlawed discrimination against racial, ethnic, national, and religious minorities as well as women. Title VI specifically prohibits discrimination by race, color, or national origin for any federal program or activity receiving federal assistance.

The U.S. Department of Transportation (USDOT) also issued updated environmental justice guidance in their *Department of Transportation Updated Environmental Justice Order 5610.2(a)*, released in 2012. This document "reaffirms [US]DOT's commitment to environmental justice" and clarifies aspects of the original order, such as the role of, and process for, environmental justice analysis and a Title VI analysis in the National Environmental Policy Act (NEPA) of 1969 (PL 91-190) (USDOT 2012:2).

Collectively, these regulations shaped the FAA's approach in identifying existing conditions (section 4.18.2) and assessing the effects (section 4.18.3) of the alternatives on low-income or minority populations and children.

4.18.2. Existing conditions

This section describes current environmental justice populations and children's health and safety issues in the Angoon area.

4.18.2.1. Which factors did the FAA consider when evaluating the current status of environmental justice and children's health and safety in Angoon?

Per FAA Orders 1050.1E and 5050.4B, the FAA considered two factors in assessing current environmental justice and children's health and safety conditions in Angoon:

- Whether there are environmental justice populations in the Angoon area (see the blue sidebar titled "Identifying environmental justice populations")
- Where children congregate (for example, schools and recreational areas) and what environmental health and safety risks may be present in those areas

These factors were established through examinations of existing data; interviews with Angoon residents; and analyses of noise, air, and water quality. These findings are reported in sources cited in the text and in the following documents:

- *Socioeconomic Existing Conditions Technical Report for the Angoon Airport Environmental Impact Statement; Angoon, Alaska* (Southeast Strategies 2013), provided as Appendix M
- *Air Quality Memorandum* (BridgeNet International 2013a), provided as Appendix E
- *Noise Analysis Report* (BridgeNet International 2013b), provided as Appendix G
- *Angoon Airport Environmental Impact Statement Water Resources Technical Memorandum* (Vigil-Agrimis 2011), provided as Appendix J

What is discussed in this section?

Identifying environmental justice populations

Executive Order 12828 considers environmental justice populations to consist of low-income or minority persons. The U.S. Department of Transportation (USDOT) 2012 Updated Environmental Justice Order 5610.2(a) provides further clarification on how these two groups are defined.

Low-income individuals are defined as having a median household income at or below the U.S. Department of Health and Human Services' (HHS) poverty guidelines (USDOT 2012). Poverty guidelines vary by family size and geographic location. For example, in 2012, the HHS poverty guideline was $13,970 for a single individual and $28,820 for a family of four living in Alaska (USDOT 2012).

Minority individuals are defined as black; Hispanic or Latino; Asian American; American Indian or Alaskan Native; or Native Hawaiian or other Pacific Islander. Minority populations may consist of individuals living in close geographic proximity to each other or individuals who are geographically dispersed but would be similarly affected by a proposed project (USDOT 2012).

4.18.2.2. Does Angoon have an environmental justice population?

Based on U.S. Census data, Angoon has two environmental justice populations: a low-income population and a minority population. In some cases, these populations overlap, meaning an individual or household is both minority and low income. In other cases, the populations do not overlap, meaning an individual is minority but not low income, or low income but not minority. Approximately 31% of the population in Angoon, regardless of race, fell below the poverty line in 2011, and approximately 80% of the Angoon population was listed as Alaska Native or other Native American the same year (U.S. Census Bureau 2013) (Figure EJ2). Alaska Native or other Native American heritage individuals are considered a minority population under Executive Order 12898.

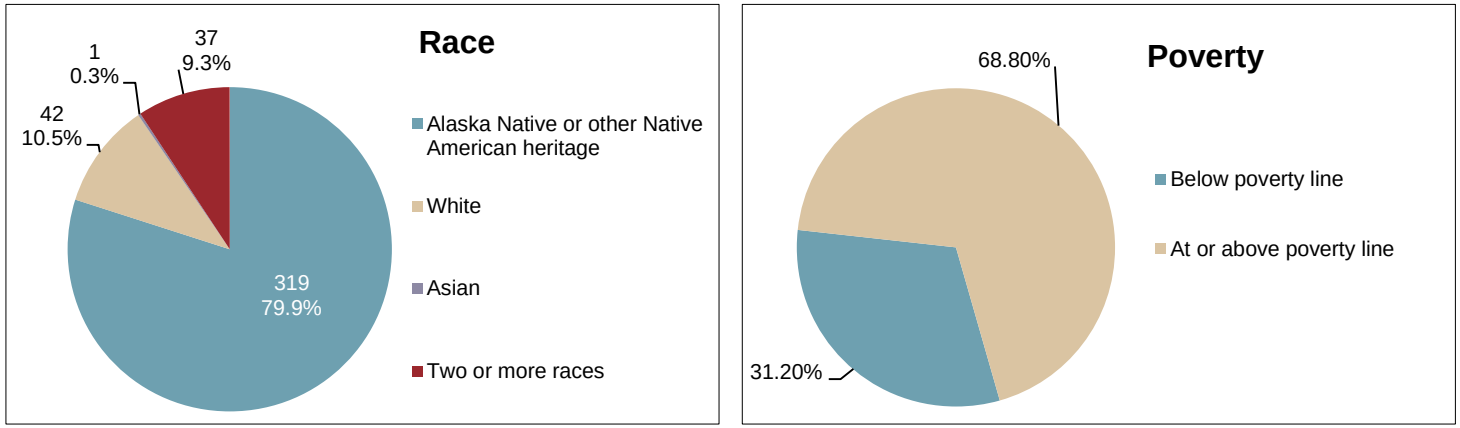

Figure EJ2. Angoon demographics by race and poverty status (U.S. Census Bureau 2013).

There are no particular geographic locations in the Angoon area where low-income or minority populations are concentrated; almost all current residents reside in the city. Because a high proportion of Angoon's population meets either criterion—minority or low income—this environmental impact statement (EIS) considers the entire community of Angoon to be an environmental justice population for the purposes of analysis and disclosure.

In addition to Angoon residents, non-resident minority landowners who obtained property in the Angoon area through their status as shareholders in Kootznoowoo, Inc. must also be considered part of the minority population because they are of Alaska Native or other Native American heritage. According to Kootznoowoo, Inc. (2013b), approximately 67% of stakeholders currently live outside of Angoon.

4.18.2.3. Where do children congregate in the Angoon area, and what health and safety risks are present?

Figure EJ3 shows the places where children congregate, which in Angoon are occupied houses, two schools, and the Head Start building in Angoon's city center. Other than playgrounds and athletic fields at the schools, there are no other children's recreational facilities in Angoon. There are no designated daycare centers or youth centers in Angoon; however, students do use the library in the senior center. Children may also use the ferry terminal, seaplane base, local undeveloped parks, and the nearby Admiralty Island National Monument and Kootznoowoo Wilderness Area (referred to in this EIS as the "Monument–Wilderness Area") for hunting, fishing, and other ***subsistence uses***.

Executive Order 13045 requires that an analysis of children's health and safety consider risks from products or substances that a child is likely to come in contact with or ingest, such as air, drinking water, recreational waters, or soil. Based on these factors, there are minimal existing health and safety risks to children in the Angoon area. The community maintains three active aboveground storage tanks for diesel fuel and gasoline, a solid waste landfill, and a water and wastewater treatment plant, but most of these sites are not located in close proximity to areas where children congregate (Figure EJ3). The one fuel storage tank located in the town core has no current or unresolved historic spills or leaks (Alaska Department of Environmental Conservation 2012a; Denali Commission 2011). Air quality and water quality in the area are generally good; ***ambient*** noise levels are quiet; and there are no known contamination issues for common subsistence resources consumed by children, such as deer and salmon. To minimize surface runoff of pollutants and correct previous filtration and disinfection issues, the City of Angoon constructed an earthen embankment around their landfill and retrofitted their water treatment facility in 2009 and 2010. Readers are encouraged to review the resource-specific analyses provided in this EIS for these or other area resources for their current condition.

Terms to know

Ambient: A term describing the background noise level at a given location. For this EIS, the noise level that is considered ambient is 27 A-weighted decibels, or dBA. See section 4.11 Noise for more information on how noise is analyzed.

Subsistence use: According to Section 803 of ANILCA, "the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade." See section 4.13 Subsistence Resources and Uses for more information.

Figure EJ3. Child activity areas in Angoon, and potential health and safety risks.

4.18.3. Project effects

What is discussed in this section?

4.18.3.1. How did the FAA determine the potential effects to low-income or minority populations and children?

For all action alternatives, the construction, operation, and maintenance of an airport and access road would affect environmental justice populations and children's health and safety. The sections below describe the methods for evaluating project effects to low-income or minority populations and children, and the similarities and differences in the magnitude and extent of effects between the alternatives.

4.18.3.1. How did the FAA determine the potential effects to low-income or minority populations and children?

The proposed land-based airport would provide critical improvements to aviation availability and reliability compared to existing ferry and seaplane transportation options (see Chapter 2: Purpose and Need, for details). Nevertheless, FAA Orders 1050.1E and 5050.4B require that an environmental justice analysis consider whether or not any proposed airport effects to natural, social, and cultural resources (for example, subsistence, socioeconomics, land use, or fisheries) would result in ***disproportionately high and adverse effects*** for environmental justice populations. The same orders require that an analysis of children's health and safety consider risks from products or substances that a child is likely to come into contact with or ingest, such as air, food, drinking water, recreational waters, or soil, and products they might use or be exposed to as a result of any action alternative being implemented.

Sections 4.18.3.3.1 and 4.18.3.3.2 describe the methods this EIS uses to determine how these low-income or minority populations and children could be affected by implementation of any action alternative.

Terms to know

Disproportionately high and adverse effect: As defined by the USDOT Order 5610.2(a), *Final DOT Environmental Justice Order*, a disproportionately high and adverse effect is "an adverse effect that: (1) is predominately borne by a minority population and/or a low-income population, or (2) 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" (USDOT 2012:15).

In the context of environmental justice, adverse effects are considered those individual or cumulative effects that may include but are not limited to "air, noise, and water pollution and soil contamination; destruction or disruption of man-made or natural resources; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community's economic vitality; destruction or disruption of the availability of public and private facilities and services; vibration; adverse employment effects; displacement of persons, businesses, farms, or nonprofit organizations; increased traffic congestion, isolation, exclusion or separation of minority or low-income individuals within a given community or from the broader community; and the denial of, reduction in, or significant delay in the receipt of, benefits of USDOT programs, policies, or activities." (USDOT 2012:14–15)

4.18.3.1.1. Environmental justice

Typical approaches to environmental justice analysis (see the blue sidebar titled "Typical analysis of environmental justice effects") do not work for many small communities in Alaska such as Angoon, for the following reasons:

- Evaluating only those resources identified as experiencing significant adverse effects may not address the needs of a given community (see Step 1 in the blue sidebar at right). Resources that do not experience significant effects (per FAA thresholds) could still have a substantial effect on environmental justice populations because those populations may have specific or unique relationships with the affected resources.
- There is no appropriate general population (see Step 2 in the sidebar at right) to use for comparison to establish whether an effect would be disproportionately high and adverse. For this EIS, the entire Angoon community is classified as a low-income or a minority population, or both.

Given these concerns, this EIS takes the following approach:

- The environmental justice analysis evaluates natural, social, and cultural resources that 1) would experience significant negative effects as defined in FAA Order 1050.1E, or 2) have a special meaning or use in the Angoon community. Table EJ1 lists the resources that meet either of the two criteria. Resources not listed in Table EJ1 failed to meet either criterion and are not carried forward for analysis of environmental justice effects.
- This analysis does not attempt to define disproportionality as a population percentage (as is the typical practice; see Step 2 in the sidebar above). Instead, this EIS assumes that project effects could be experienced more intensely by the population of Angoon because of their minority and low-income status than would be the case if the population were neither predominantly minority nor low income. This assumption is based on the fact that for a small community with limited socioeconomic means and a high dependence on local natural resources, even minor changes to local conditions could ripple across the community and result in substantial community effects. Therefore, this EIS defines "disproportionality" as any project effect that would result in a substantial decrease in the Angoon community's current ability to access, use, preserve, or otherwise experience local area resources that

Typical analysis of environmental justice effects

Usually, an assessment of environmental justice effects follows these steps:

1. Identify resource(s) that would experience a significant negative effect as a result of a proposed project.
2. Calculate the percentage of low-income or minority people that would be affected by dividing the number of low-income or minority people by the total number of people in the general population. If the effect is predominantly borne by the environmental justice population, a disproportionately high and adverse effect may occur.
3. Determine whether any mitigation or other offsetting benefits would reduce or prevent disproportionate effects.
4. Make final determination regarding disproportionately high and adverse effect, by resource.

1) cannot be minimized or mitigated; or 2) do not provide offsetting benefits to the Angoon community (USDOT 2012). Using this criterion, a determination is made for each identified resource as to whether project changes to local resources would result in a disproportionate effect on the Angoon community. To aid in this determination, project effects by resource are summarized from their respective sections in Chapter 4. Readers are referred to these sections for additional background information and analysis.

Table EJ1. Resources evaluated for their effect on environmental justice populations

Resource	Justification for inclusion	EIS section for more information
Cultural resources	• Cultural resources associated with Tlingit cultural heritage have special meaning and value to the Alaska Native population of Angoon.	Section 4.8 Cultural Resources
Light emissions and visual resources	• Airport 3a would create significant shoreline and surface visual disturbances that deviate from the Monument–Wilderness Area's designation as an area of high scenic integrity.	Section 4.9 Light Emissions and Visual Resources
Subsistence resources and uses	• Angoon residents have a unique relationship with local subsistence resources and rely on them as a food source, a bartering item, and a connection with their cultural heritage.	Section 4.13 Subsistence Resources and Uses
Wetlands	• Any of the action alternatives would result in significant adverse effects to wetlands due to wetland fill.	Section 4.15 Wetlands
Wilderness	• Airport 3a and Airport 4 would result in significant adverse effects to wilderness due to changes to wilderness qualities and public purposes.	Section 4.16 Wilderness Character
Monument	• Airport 3a and Airport 4 would result in significant adverse effects to the monument due to changes to monument purposes and federal reserved rights.	Section 4.19 Admiralty Island National Monument

4.18.3.1.2. Children's health and safety

Children's health and safety risks are analyzed using project effects for air quality, hazardous materials, noise levels, and water quality as the indicators for potential health or safety problems (Table EJ2).

Table EJ2. Actions that could change children's health and safety

Type of change	Project action	Duration of action	Measure of effect
Change in risk to children's health and safety	• Construction and personal vehicle traffic • Vegetation clearing, including potential extraction of construction materials such as gravel, soil, and rock from an on-island materials source • Road paving • Airport takeoffs and landings	Construction and operation	Air pollutant emissions from airport/road construction and operation
			Potential for hazardous material generation, spills, and unanticipated discovery from airport and road construction and operation
			Noise levels during airport and road construction and operation
			Changes in water quality from airport and road construction and operation

4.18.3.2. How did the FAA determine the significance of the potential effects from the alternatives?

4.18.3.2.1. Environmental justice

FAA Order 1050.1E states that actions that would cause a disproportionately high and adverse human health or environmental effect on low-income or minority populations may constitute a significant effect.

4.18.3.2.2. Children's health and safety

FAA Order 1050.1E states that an action causing disproportionate health and safety risks to children may result in a significant effect. For this EIS, exceedance of FAA significance thresholds for air quality, hazardous materials, noise, and water quality were used to determine the significance of project effects on children's health and safety (Table EJ3).

Table EJ3. FAA significance thresholds for effects to children's health and safety

Resource or issue	FAA threshold of significance	EIS section for more information
Air quality	One or more federal air quality standards exceeded	Section 4.2.3.2 in Air Quality
Hazardous materials	Unresolved issues related to hazardous materials, inability to meet hazardous material laws and regulations, involvement of a property on or eligible for the Environmental Protection Agency's National Priority List	Section 4.7.3.2 in Hazardous Materials, Pollution Prevention, and Solid Waste
Noise	An increase of at least 1.5 A-weighted decibels (dBA) in noise levels at noise-sensitive areas exposed to day-night average sound level (DNL) of 65 dBA or greater	Section 4.11.3.2 in Noise
Water quality	State water quality standards exceeded	Section 4.14.3.5 in Water Quality

What is discussed in this section?

4.18.3.3. How would each alternative affect environmental justice populations and children's health and safety?

4.18.3.3.1. Environmental justice

Cultural resources

Information on effects described here is summarized from section 4.8 Cultural Resources.

Under the no action alternative, there would be no effects to cultural resources.

Under any action alternative, there would be no direct effects to any historic properties affiliated with Angoon's environmental justice population.

Airports 3a and 4 with their respective access alternatives would pose increased risk to five known historic properties from indirect effects from new or improved access. For Airport 12a with Access 12a, four known historic properties would be located in the visual and vibration area of potential effects. In all cases, the FAA has concluded that the anticipated impacts to these sites from the alternatives would result in no adverse effects to the characteristics of the sites that render them eligible for the National Register.

Figure EJ4. Buried layers of ash and charcoal (right of arrow) in the earthen wall of an excavated pit show an ancient fire hearth's location.

Depending on alternative, from 84 to 128 acres would be disturbed in areas with a high probability for containing buried cultural resources (such as the one shown in Figure EJ4) important to Alaska Native ancestry. Acres of high-probability land that could be indirectly affected from new or improved access, vibration, and visual intrusions are summarized in section 4.8.3.3.2 of Cultural Resources. For both direct and potential indirect effects, the FAA would require monitoring during construction to minimize the potential for unanticipated damage or destruction of discovered cultural finds.

Any of the action alternatives could increase the potential for looting of artifacts and inadvertent or intentional trampling of or damage to cultural resources from increased human activity. However, this risk would be limited because of the small population of Angoon and the small amount of non-resident use of local lands.

Given this limited potential for significant effects to historical or cultural sites that are valued by the Alaska Native population, there would be no disproportionate effect to environmental justice populations.

Light emissions and visual resources

Information for effects described here is summarized from section 4.9 Light Emissions and Visual Resources.

Under the no action alternative, there would be no effects to visual resources or from light emissions.

During airport operations under any of the action alternatives, there would be skyglow from light emissions visible from multiple viewpoints (see section 4.9.2.4 of Light Emissions and Visual Resources for a discussion of the viewpoints used for analysis in this EIS), from residences, and from the wilderness. This skyglow would be intermittent and brief, occurring only when the pilot-controlled lights are turned on for low-light daytime and nighttime approaches and landings.

Construction of any alternative would involve lighting of construction areas and some equipment during nighttime or low-light daytime conditions. Skyglow created from these actions would temporarily be visible from all viewpoints.

Airport 3a construction and operation would cause long-term visual effects from one viewpoint in Favorite Bay (Figure EJ5). These long-term effects would be adverse and significant.

Airport 4 construction and operation would not result in long-term visual effects at any viewpoint. Airport 12a construction and operation would be visible from Whaler's Cove Lodge, and would cause long-term adverse effects from that viewpoint; however, no significance thresholds would be exceeded unless the public, tribes, or appropriate government agencies demonstrate that these effects are significant. None of the access roads would cause long-term effects that would be visible from any of the viewpoints.

Figure EJ5. Existing view of the proposed location of Airport 3a from near the center of Favorite Bay (top). Visual simulation of view after construction of Airport 3a (bottom).

The FAA could reduce visual effects by revegetating cleared areas, where possible, and feathering edges to provide a more natural transition between forest and cleared areas. Due to this mitigation and because 1) the view of Airport 12a has not been identified as objectionable ; and 2) the view of Airport 3a (as shown in Figure EJ5) is not visible from the primary population center for low-income and minority residents in Angoon's city core, there would be no disproportionate effect to environmental justice populations.

Subsistence

Information for effects described here is summarized from section 4.13 Subsistence Resources and Uses.

Under the no action alternative, there would be no effects to subsistence resources or uses (see Figure EJ6 for an example).

Figure EJ6. Blueberries are a subsistence resource used by Angoon residents.

Depending on the action alternative, subsistence users would experience a temporary loss of access to between 258 and 349 acres of subsistence use areas (less than 2% of total use areas) during construction.

Depending on the action alternative, a long-term loss of access to between 96 and 100 acres of subsistence use areas (less than 1% of total use areas) would occur during airport operations. However, under Airport 3a or Airport 4, access would be improved to as many as 2,116 acres of subsistence use areas (11% of total use areas), and new access would be opened to as many as 1,416 acres of subsistence use areas (7% of total use areas).

Under any of the action alternatives, there would be no major reductions in abundance or availability of subsistence resources because no more than 8% of each use area would be affected by any action alternative. Although there would be some increase in non-local use of the Angoon area, predominantly for sport fishing and marine invertebrate harvest, reported visitor levels are low and are not likely to substantially increase.

Based on these findings, the Angoon community would not experience a disproportionate adverse effect related to subsistence resources and uses. Reductions in access to subsistence use areas would be limited; reductions in the abundance and availability of subsistence resources and increases in competition would not be noticeable; and low-income and minority residents could use alternative subsistence areas located on along the road on the Angoon

peninsula or in Monument–Wilderness Area lands to meet their subsistence needs. Additionally, Airport 3a and Airport 4 would provide benefits to the community through improved and new subsistence access.

Wetlands

Information for effects described here is summarized from section 4.15 Wetlands.

Under the no action alternative, there would be no effects to wetlands.

Development of the proposed land-based airport for Airport 3a, Airport 4, and Airport 12a would convert between 43 and 112 acres of wetlands to ***uplands*** through wetland fill (depending on the alternative), and would result in the loss of ***wetland functions*** and ***services*** in areas where wetlands (Figure EJ7) would be filled. These effects to wetlands under all action alternatives would be considered a significant adverse effect. However, the Angoon community would not experience a disproportionate effect due to the limited extent of wetlands filled compared to the total acreage of wetlands in the area analyzed for effects to wetlands. This limited loss of acreage would not significantly affect the presence and abundance of wildlife species that use these habitats, and low-income and minority residents could use other wetland areas for subsistence activities. Long-term wetland effects would be offset through compensatory wetland mitigation.

Terms to know

Uplands: In wetlands studies, areas that lack wetland characteristics and that are seldom or infrequently flooded with water.

Wetlands: Areas that are inundated or saturated often enough and long enough that they support vegetation adapted to saturated soil. Wetlands include areas such as swamps, marshes, and bogs (40 CFR 230.3(t)).

Wetland functions: Benefits that wetlands provide as part of the environment, such as protecting and improving water quality, providing fish and wildlife habitat, storing floodwaters, and controlling erosion.

Wetland services: Attributes of wetlands that contribute specifically to human use or human well-being, such as providing plants and animals that humans can use for provisioning.

Figure EJ7. Wetlands near Angoon are often used for subsistence hunting, fishing, and gathering activities.

Wilderness

Information for effects described here is summarized from section 4.16 Wilderness Character.

Under the no action alternative, no effects to wilderness would occur. Figure EJ8 shows a representative view of wilderness lands near Angoon.

Figure EJ8. Monument–Wilderness Area lands near Angoon.

For Airports 3a and 4 (the two airport alternatives in the Kootznoowoo Wilderness Area), the wilderness qualities (see section 4.16.1.2 of Wilderness Character for a definition of each quality) would be affected as follows:

- The untrammeled quality would be affected by seven construction actions and eight operations actions.
- The natural quality would be degraded in areas ranging from 791 to 1,418 acres, depending on the alternative. Additionally, 126 to 670 acres of wilderness would be isolated, depending on the alternative.
- The undeveloped quality would be affected by the introduction of motorized equipment. Additionally, eight types of development would be introduced in areas ranging from 22 to 28 acres, depending on the alternative.
- Opportunities for primitive and unconfined recreation would no longer occur in areas ranging from 101 to 108 acres, depending on the action alternative.
- Opportunities for solitude would be affected in several ways:
    - Improved and new access would degrade this quality in areas ranging from 1,416 acres (for Airport 4 with Access 2) to 2,495 acres (for Airport 3a with Access 3).
    - Light emissions during construction and operations would degrade this quality during temporary construction activities and long-term, intermittent, brief skyglow from the airport's upward-directed runway lights and navigational aids in the immediate vicinity of the runway during approaches and takeoffs.

- The presence of development and motorized equipment would degrade this quality in areas ranging from 502 acres to 630 acres, depending on the action alternative. Additionally, this presence would result in additional exceedance of recommended encounter rates.
- Overhead aircraft noise would degrade this quality over a broader area.
- Construction-related noise could temporarily degrade this quality in localized areas during construction.

Airport 3a and Airport 4 would degrade public purposes (recreational, scientific, conservation, educational, and historic use) on Kootznoowoo Wilderness Area lands through the following project actions: ground disturbance, vegetation alteration, changes in water flow, human activity, isolation of wilderness areas, and improved or new access.

Airport 12a would degrade opportunities for solitude in the wilderness area as a result of light emissions during construction and operation, overhead aircraft noise, and temporary construction noise, but because it would not be located within the wilderness area boundaries, it would have no other effect on wilderness qualities or public purposes.

It would not be possible to fully mitigate effects to wilderness qualities and public purposes for Airport 3a or Airport 4, and therefore the effects would be significant and adverse. This would not result in disproportionate effects to the environmental justice population, however, because effects would be localized to the immediate vicinity of the airport and access road locations. Therefore, low-income and minority residents could seek out alternative locations for these qualities and purposes in the Kootznoowoo Wilderness Area.

Monument

Information for effects described here is summarized from section 4.19 Admiralty Island National Monument.

Under the no action alternative, no effects to the monument would occur. Table EJ4 provides a summary of effects to monument purposes, Table EJ5 provides a summary of effects to federal reserved rights.

Table EJ4. Comparison of effects to monument purposes

Resource contributing to monument purposes	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12
Cultural history of the Tlingit Indians Archaeological and historical resources	• 575 acres (cultural) • 203 acres (subsistence)	• 635 acres (cultural) • 171 acres (subsistence)	• 377 acres (cultural) • 127 acres (subsistence)	• 386 acres (cultural) • 109 acres (subsistence)	• No effects
Unspoiled coastal island ecosystem, including brown bears and bald eagles	• 923 acres (actions and downstream) • 288 acres (isolation) • 718 acres (scenery) • Night and low-light skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.	• 925 acres (actions and downstream) • 945 acres (isolation) • 802 acres (scenery) • Night and low-light skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.	• 1,473 acres (actions and downstream) • 347 acres (isolation) • 624 acres (scenery) • Night and low-light skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.	• 1,477 acres (actions and downstream) • 544 acres (isolation) • 665 acres (scenery) • Night and low-light skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.	• Night and low-light skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.

Table EJ5 Comparison of effects to federal reserved rights on Kootznoowoo Corridor Lands

Federal reserved right	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12
Right of public access and use	• 3 acres enclosed by perimeter fence	• 3 acres enclosed by perimeter fence	• 0 acres enclosed by perimeter fence	• 0 acres enclosed by perimeter fence	• No effect
Right of quiet enjoyment	• Up to 26 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer	• Up to 26 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer	• Up to 30 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer	• Up to 30 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer	• Up to 31 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer
	• Temporary localized increases from construction and vehicles	• Temporary localized increases from construction and vehicles	• Temporary localized increases from construction and vehicles	• Temporary localized increases from construction and vehicles	• No effect
	• Permanent localized increases from motorized equipment	• Permanent localized increases from motorized equipment	• Permanent localized increases from motorized equipment	• Permanent localized increases from motorized equipment	• No effect
Development rights	• 55 acres of developments	• 22 acres of developments	• 23 acres of developments	• 3 acres of developments	• No effect

It would not be possible to fully mitigate effects to monument purposes and federal reserved rights for Airport 3a or Airport 4, and therefore the effects would be significant and adverse. This would not result in disproportionate effects to the environmental justice population, however, because effects would be localized to the immediate vicinity of the airport and access road locations. Therefore, low-income and minority residents could seek out alternative locations for purposes and rights.

4.18.3.3.2. Children's health and safety

Under the no action alternative, there would be no changes in air quality, hazardous materials, noise exposure, or water quality.

None of the action alternatives would increase the likelihood of residents (including children) coming into direct or indirect contact with hazardous materials that could affect health. None of the action alternatives would disturb any known hazardous materials or solid waste sites, and wastes would be barged out of Angoon and disposed of in certified landfills.

Any of the action alternatives could result in inadvertent hazardous material discovery or spill during construction. However, the actual risk of significant hazardous materials exposure from spills would be low given the following:

- The lack of development in the proposed locations of the alternatives
- The small volume of hazardous materials that would be used in operations and maintenance
- The pollution prevention and spill response measures required for all facilities approved by the FAA and operated by the Alaska Department of Public Facilities and Transportation

See section 4.7 Hazardous Materials, Pollution Prevention, and Solid Waste for more information.

Any of the action alternatives would increase air pollutant emissions and in-water turbidity and sediment compared to the no action alternative, but these pollutant increases would remain within federal air quality standards and state water quality standards (see section 4.2 Air Quality and section 4.14 Water Quality for more information).

The noise analysis in section 4.11 Noise shows that schools and other areas where children congregate would not experience a change in aircraft noise exposure of more than a day-night average sound level (DNL) 1.5 A-weighted decibels (dBA) at or above 65 dBA; that is, none of the action alternatives would result in significant noise effects on noise-sensitive areas occupied by children. (See section 4.11 Noise for more information about the ways noise is measured.)

For these reasons, none of the action alternatives would result in a disproportionate risk to children's health and safety.

4.18.3.4. How did the FAA consider the requirements of Title VI of the Civil Rights Act?

The FAA follows Title VI of the Civil Rights Act, and in so doing has sought to provide early and ongoing coordination and collaboration with the community of Angoon throughout the airport planning and NEPA process. Information regarding the FAA's public outreach efforts to provide fair treatment, meaningful involvement, and project information to minority and low-income residents is discussed in Chapter 9: Coordination and Consultation. Based on these efforts, no populations protected by Title VI would experience a disproportionately high and adverse effect from implementation of the proposed land-based airport.

4.18.3.5. Would any effects be irreversible or irretrievable?

There would be no irreversible or irretrievable effects to children's health and safety. Effects to resources that influence environmental justice populations are discussed in the "project effects" subsection of each resource section in Chapter 4: Existing Conditions and Project Effects.

4.18.3.6. Would any of the alternatives have a significant effect on an environmental justice population?

Based on the preceding analysis, there would be no disproportionate adverse effects to low-income or minority residents as a result of the proposed project. For this reason, none of the action alternatives would have a significant effect on the environmental justice population.

4.18.3.7. Would any of the alternatives have a significant effect on children's health and safety?

Based on the preceding analysis, there would be no disproportionate health and safety risks to children as a result of the proposed project. For this reason, none of the action alternatives would have a significant effect on children's health and safety.

4.18.3.8. How could the effects described above be avoided, minimized, or mitigated?

Because no significant effects are anticipated for low-income and minority populations or children's health and safety, no additional mitigation measures beyond those discussed in Chapter 7: Mitigation would be implemented under any action alternative. Chapter 7 describes best management practices that would be implemented during construction. Best management practices are relatively common activities in construction and are intended to prevent pollution, minimize environmental harm, and assure that appropriate response action is taken if unacceptable environmental effects occur. Through the use of these best management practices, effects are reduced during construction. The best management practices described in Chapter 7 were considered during effects analysis for these populations.

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4.19. Admiralty Island National Monument

Two of the three airport alternatives—Airport 3a and Airport 4—and large portions of their access road alternatives are located in the federally designated Admiralty Island National Monument (referred to in this section as "the monument"). This section addresses the existing conditions of the purposes of the monument and ***federal reserved rights*** of the Kootznoowoo Corridor Lands. It also addresses the potential changes to those conditions from construction and operation of the proposed land-based airport.

4.19.1. Background information

4.19.1.1. What is the Admiralty Island National Monument, and why was it established?

The monument encompasses nearly all of Admiralty Island (see Figure MNT1) and is managed by the U.S. Forest Service as part of the Tongass National Forest. The monument overlaps with the majority of the Kootznoowoo Wilderness Area (Section 4.16 Wilderness Character) but with minor differences such as the Kootznoowoo Corridor Lands located around the shoreline of Favorite Bay and other local bays. These lands are in the Monument but are not within the wilderness.

The 1.1 million–acre monument was established in 1978 by President Jimmy Carter's Proclamation 4611 under the Antiquities Act of 1906 (16 United States Code [USC] 431).

As stated in Proclamation 4611, "Admiralty Island is outstanding for its superlative combination of scientific and historic objects. Admiralty Island contains unique resources of scientific interest which need protection to assure continued opportunities for study…. Designation of a smaller area would not serve the scientific purpose of preserving intact this unique island ecosystem." The resources the Proclamation intended to protect and preserve are as follows:

- The cultural history of the Tlingit Indians
- Archaeological and historical resources, including whaling stations, canneries, old mining structures, and old village sites
- An unspoiled coastal island ecosystem, including dense populations of brown bears and bald eagles

What is discussed in this section?

Terms to know

Federal reserved rights: Used here, those rights that the federal government retained when portions of the Admiralty Island National Monument were transferred to Kootznoowoo, Inc., under ANILCA. See section 4.19.1.3.

The Alaska National Interest Lands Conservation Act (ANILCA) (Public Law [PL] 96-487 Section 503(b)) reaffirmed the designation of the monument, and subsequent sections provide guidance on the management of the monument and adjoining uses. See section 4.19.1.3 for more information. ANILCA Section 503(c) states that the monument "shall be managed…to protect objects of ecological, cultural, geological, historical, prehistorical, and scientific interest."

The Admiralty Island National Monument Land Management Act of 1990 (PL 101-378) further defined the monument in Section 202 as follows:

> Admiralty Island National Monument, Alaska, is an area of unparalleled natural beauty containing multiple values including but not limited to, fish and wildlife, forestry, recreational, subsistence, educational, wilderness, historical, cultural, and scenic values of enduring benefit to the Nation and the Native peoples residing therein.

4.19.1.2. What are the purposes of the monument?

Based on the above-cited proclamations and acts, the monument's purposes and values (hereafter referred to in this section as "purposes") are as follows:

- From the 1978 proclamation: Scientific study, historic study, and preservation
- From ANILCA Section 503(c): Objects of ecological, cultural, geological, historical, prehistorical, and scientific interest
- From the 1990 act: Fish and wildlife, forestry, recreational, subsistence, educational, wilderness, historical, cultural, and scenic values

These monument purposes overlap with but are different from the purposes of the Kootznoowoo Wilderness Area (section 4.16 Wilderness Character). The purposes are listed in Figure MNT1 under the resources that contribute to them—the cultural history of the Tlingit Indians, other archaeological and historical resources, and an unspoiled island ecosystem, including brown bears and bald eagles (as listed in section 4.19.1.1, above). These resources are addressed in more detail in other resource sections throughout Chapter 4. (Because the alternatives would not alter geological features such as karst terrain or mineral interests, geology is not analyzed as a resource in the EIS.) The evaluation of potential project effects to these purposes (section 4.19.3) incorporates information from those resource sections. Because the existing conditions of and project effects to the cultural history of the Tlingit Indians are identical to the existing conditions of and project effects to archaeological and historical resources, these two resources are combined throughout the rest of this section.

Resource: Cultural history of the Tlingit Indians
Archaeological and historical resources

Tlingit stone-ringed hearth

Monument purposes to which the resources contribute

- Scientific and historic study purposes
- Subsistence purposes
- Educational purposes
- Historical and prehistorical purposes
- Cultural purposes

EIS sections for more information

- Section 4.8 Cultural Resources
- Section 4.13 Subsistence Resources and Uses

Resource: Unspoiled coastal island ecosystem, including brown bears and bald eagles

Monument purposes to which the resource contributes

- Scientific and historic study purposes
- Ecological purposes
- Preservation purposes
- Fish and wildlife purposes
- Forestry purposes
- Recreational purposes
- Subsistence purposes
- Educational purposes
- Wilderness purposes
- Historical and prehistorical purposes
- Cultural purposes
- Scenic purposes

EIS sections for more information

- Section 4.5.1 Terrestrial Habitats and Species
- Section 4.5.2 Aquatic Habitats and Species
- Section 4.5.3 Special Status Species
- Section 4.6 Floodplains, Stream Geomorphology, and Hydrology
- Section 4.8 Cultural Resources
- Section 4.9 Light Emissions and Visual Resources
- Section 4.13 Subsistence Resources and Uses
- Section 4.14 Water Quality
- Section 4.15 Wetlands
- Section 4.16 Wilderness Character

Figure MNT1. Resources that contribute to monument purposes.

4.19.1.3. How do the Kootznoowoo Corridor Lands relate to the monument?

When ANILCA was passed, Congress recognized "the necessity to reconcile the national need to preserve the natural and recreational values of the monument with the economic and cultural needs and expectations of Kootznoowoo, Inc., and Sealaska, Incorporated, as provided by the Alaska Native Claims Settlement Act and this Act" (Section 506(a)(1)). As part of reconciling federal and Alaska Native corporation needs, Section 506(a)(3)(C) of ANILCA conveyed rights, title, and interest in lands in parts of the monument from mean high tide to approximately 660 feet inland to Kootznoowoo, Inc., the local Alaska Native corporation. Known as the Kootznoowoo Corridor Lands, these lands are considered part of the monument, and, therefore, the federal government has reserved certain rights, as follows:

> (i) All timber rights are reserved subject to subsistence uses consistent with Title VIII of this Act.
>
> (ii) The right of public access and use within such area, subject to regulation by the Secretary of Agriculture to insure protection of the resources, and to protect the rights of quiet enjoyment of Kootznoowoo, Incorporated, granted by law, including subsistence uses consistent with Title VIII of this Act.
>
> (iii) The subsurface estate.
>
> (iv) The development rights, except that the Secretary of Agriculture is authorized to permit construction, maintenance, and use of structures and facilities on said land which he determines to be consistent with the management of the Admiralty Island National Monument: *Provided*, That all structures and facilities so permitted shall be constructed of materials which blend and are compatible with the immediate and surrounding landscape. (ANILCA Section 506(a)(3)(C))

Because these federal reserved rights—timber rights; right of public access and use; right of quiet enjoyment of Kootznoowoo, Inc.; subsurface estate; and development rights—include restrictions on development and use of the corridor lands, this section will evaluate effects to these reserved rights from the airport and access road alternatives.

4.19.1.4. Are there other ways that ANILCA applies to the monument?

In most national monuments, an airport typically would be prohibited. However, Title XI of ANILCA provides exceptions for ***conservation system units***, such as national monuments, in Alaska, and certain ***transportation and utility systems***, like airports, can be sited in a monument if proper procedures are followed (see Chapter 5: Requirements of the Alaska National Interest Lands Conservation Act [ANILCA] for more information).

The specific requirements of Title XI as they relate to monument purposes are discussed here. (The other procedural requirements of Title XI, as they relate to approvals and disapprovals of applications, coordination requirements, and terms and conditions for approved applications, are discussed in greater detail in Chapter 5.)

Section 1104 of ANILCA states that an environmental impact statement (EIS) must be prepared to assess the effects of a proposed transportation system and its alternatives, and it establishes timelines and procedures for coordinating with other agencies and allowing public comment. Section 1104(2)(g)(2) outlines eight specific criteria that should be considered for approval or disapproval of a transportation system in an Alaska conservation system unit. Seven of the eight criteria address a variety of topics not specifically related to the monument. One of the eight criteria is the identification of any impacts that would affect the purposes for which the monument was established. These purposes are described in section 4.19.1.2, above, and analysis of these effects to the monument purposes and the resources that contribute to them, as presented throughout this section, satisfies that criterion.

Terms to know

Conservation system unit: Per ANILCA (Section 102(4)), "any unit in Alaska of the National Park System, National Wildlife Refuge System, National Wild and Scenic Rivers System, National Trails System, National Wilderness Preservation System, or a National Forest Monument."

Transportation and utility system: As defined in ANILCA Section 1102(4)(A), the term "transportation or utility system" is any system—such as roads, transmission lines, or airports, as defined in ANILCA 1102(4)(B)—where any portion of that system is located in a conservation system unit.

4.19.1.4.1. Agency policies

Federal Aviation Administration

The Federal Aviation Administration's (FAA) *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* requires an assessment of the compatibility of the FAA's actions with existing land uses and designations (FAA 2006a:A-13 to A-17). This policy does not apply specifically to national monuments, but Order 1050.1E's Appendix A, Compatible Land Use does direct the FAA to consider the effects of airport-related noise on nearby lands where noise would interfere with normal activities associated with its use. National monuments are typically considered noise-sensitive areas by the FAA and are therefore subject to evaluation for noise effects. This section of the order details methods for evaluating current noise conditions and future noise effects regarding compatible land use, but it does not direct the way effects to monument purposes should be evaluated. Other sections of the order provide direction on the documentation and evaluation of effects to the specific resources that contribute to the monument purposes. These purposes are discussed in section 4.19.1.3.

U.S. Forest Service

The U.S. Forest Service, as manager of the monument, is required by law to manage the land and its uses in ways that preserve the area's monument purposes.

To meet this mandate, the U.S. Forest Service has developed management prescriptions for the monument in the *Tongass National Forest Land and Resource Management Plan* (hereafter referred to as the "land management plan" [U.S. Forest Service 2008a]) with the goal of maintaining the purposes for which it was designated. The management prescriptions do not state how effects to monument purposes are to be documented or evaluated. Rather, the land management plan establishes the desired conditions for the monument (see section 4.19.3.5), and any proposed uses of it are considered in that context.

4.19.2. Existing conditions

4.19.2.1. Which airport and access alternatives would be located in the monument?

As stated in the introduction, Airport 3a and Airport 4 would be located almost entirely in the monument (Figure MNT2). The southern part of Airport 3a would overlap the Kootznoowoo Corridor Lands, a strip of land along much of the shoreline of Favorite Bay that is jointly managed by Kootznoowoo, Inc. (the local Alaska Native corporation) and the U.S. Forest Service, and is considered part of the monument. Access 3 for either airport alternative would be located entirely on monument lands, except for a short length where it would connect to the existing Angoon road system on non-monument lands. Portions of Access 2 for either airport alternative also would be located in the monument, with much of it occupying Kootznoowoo Corridor Lands.

Airport 12a with Access 12a is the only action alternative that would not occupy any portion of the monument. However, aircraft noise from the Airport 12a area would be audible from portions of the monument.

What is discussed in this section?

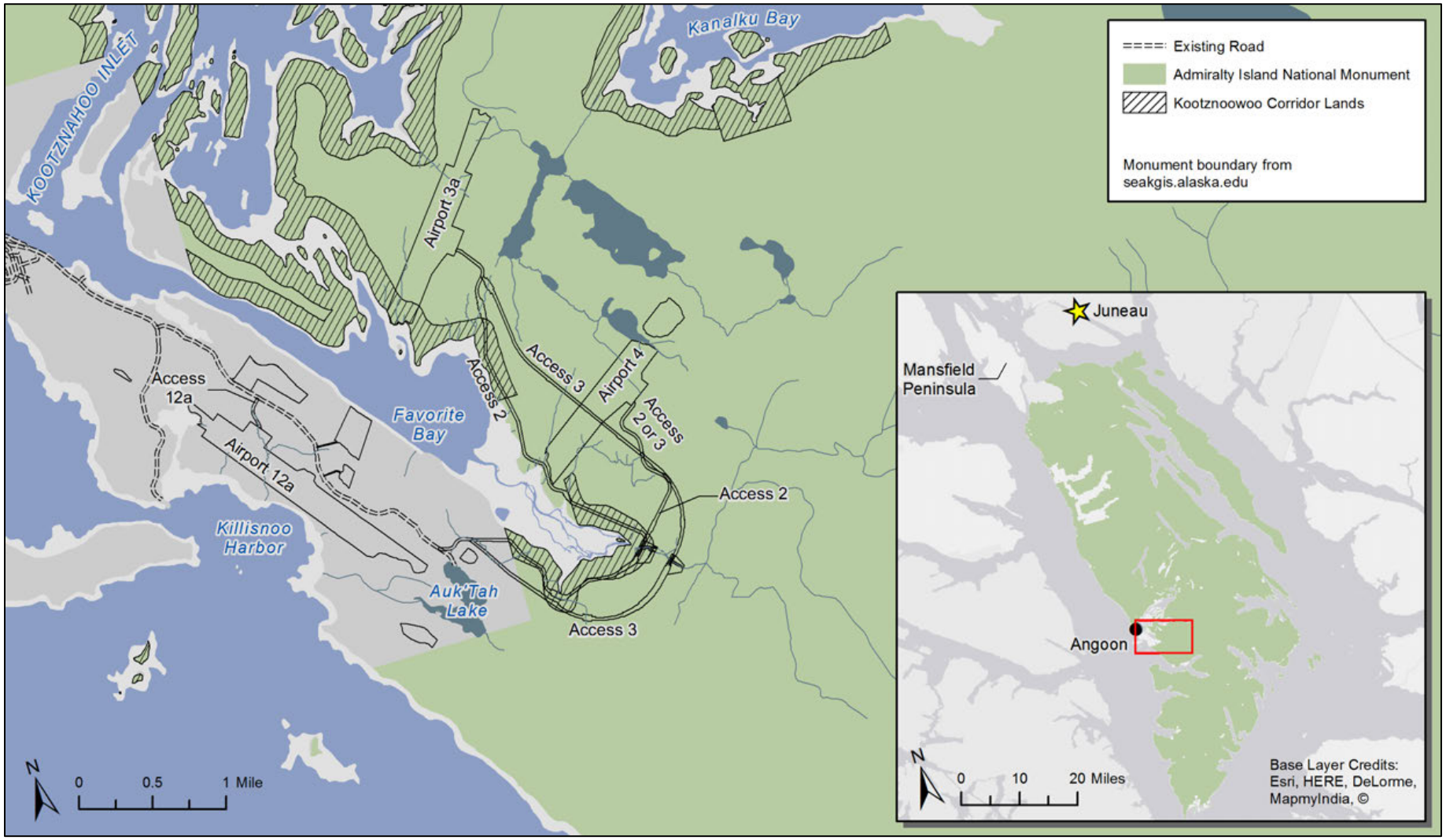

Figure MNT2. The monument in the vicinity of the proposed locations of Airport 3a and Airport 4, and their access alternatives.

4.19.2.2. How did the FAA determine the existing condition of the monument purposes and reserved rights?

The FAA examined the existing condition of the federal reserved rights and the resources that contribute to the monument purposes near the proposed locations of Airport 3a or Airport 4 with their access alternatives (referred to in this section as the "monument alternatives"). The FAA also considered the existing condition of the greater monument.

The FAA determined existing conditions of the monument purposes and federal reserved rights as follows:

- **The vicinity of the monument alternatives:** The condition of the resources that contribute to monument purposes near monument alternatives was assessed as part of the analysis in other sections of this EIS. In general, this included field studies, document searches, and discussions with wilderness specialists and resource specialists. The particular methods used to assess each resource are described in each resource's respective EIS section, as listed in Table MNT1.
- **The greater monument:** The condition of the resources that contribute to monument purposes in the greater monument was assessed through discussions with resource specialists at the U.S. Forest Service's Admiralty Island National Monument District. Documents that describe the nature of the resources that contribute to monument purposes were reviewed. No field visits were conducted other than in the vicinity of the monument alternatives. However, based on input from U.S. Forest Service representatives, the FAA assumes that the monument purposes are in similar or better condition in the greater monument than in the vicinity of the monument alternatives. This is because areas farther from Angoon and from access corridors such as rivers, roads, or marine waters tend to be visited less by humans than do areas that are more easily accessible.

4.19.2.3. What are the existing conditions of the resources that contribute to the monument purposes?

Because the lands in the vicinity of the monument alternatives remain largely undisturbed, the resources that contribute to them remain in excellent condition, as is the case throughout the greater monument. Descriptions of the resources' existing conditions are provided in Table MNT1, as are links to the related sections of the EIS with more information.

Table MNT1. Existing conditions of the resources in the vicinity of the monument alternatives

Resource **EIS sections for further information**	**Monument purposes to which the resource contributes**	**Existing condition**
Cultural history of the Tlingit Indians Archaeological and historical resources Section 4.8 Cultural Resources Section 4.13 Subsistence Resources and Uses	• Scientific and historic study purposes • Subsistence purposes • Educational purposes • Historical and prehistorical purposes • Cultural purposes	• Tlingit cultural sites are mostly untouched. • Archaeological and historical evidence of past human activity is plentiful around Favorite Bay and other nearby bays. Modern-day Alaska Natives continue to use these areas for their cultural practices, including subsistence hunting and gathering, gathering of traditional materials for art and ritual objects, and other cultural practices. As a protected bay with abundant marine and freshwater resources, Favorite Bay has always served as the breadbasket for those who live there, particularly the Alaska Native community. • The area of the monument alternatives is used by Angoon residents for the harvest of traditional subsistence resources, continuing Tlingit customary and traditional subsistence practices. The existing conditions of these resources are very good, and the resources and Tlingit use of them contribute to the continuation of historical use of the monument. Compared to the greater monument, the condition of subsistence resources in the vicinity of the monument alternatives is similar, if not better, due to easier access to hunting and gathering areas, and the abundance and diversity of resources available. It certainly sees more frequent subsistence use than most other parts of the greater monument due to its close proximity to Angoon, the only permanent settlement on Admiralty Island.
Unspoiled coastal island ecosystem, including brown bears and bald eagles Section 4.5.1 Terrestrial Habitats and Species Section 4.5.2 Aquatic Habitats and Species Section 4.5.3 Special Status Species Section 4.6 Floodplains, Stream Geomorphology, and Hydrology Section 4.8 Cultural Resources Section 4.9 Light Emissions and Visual Resources Section 4.13 Subsistence Resources and Uses Section 4.14 Water Quality Section 4.15 Wetlands Section 4.16 Wilderness Character	• Scientific and historic study purposes • Ecological purposes • Preservation purposes • Fish and wildlife purposes • Forestry purposes • Recreational purposes • Subsistence purposes • Educational purposes • Wilderness purposes • Historical and prehistorical purposes • Cultural purposes • Scenic purposes	• The ecosystem is unspoiled and functional. • Habitat for the brown bear and eagles is unspoiled and functional, with minor exceptions as discussed in section 4.5.1 and section 4.5.3. • The quality of scenery in the vicinity of the monument alternatives is high, because no developments or light emissions are readily apparent.

4.19.2.4. What are the existing conditions of the federal reserved rights on Kootznoowoo Corridor Lands?

Because the Kootznoowoo Corridor Lands in the vicinity of the monument alternatives remain largely undisturbed, the resources related to the federal reserved rights remain in excellent condition. This is also the case for other portions of the Kootznoowoo Corridor Lands in the monument. Descriptions of the existing conditions of reserved rights are provided in Table MNT2.

Table MNT2. Existing conditions of the federal reserved rights in the vicinity of the monument alternatives

Federal reserved rights	Existing condition
Timber rights	• Since the establishment of the monument, no timbering has occurred on Kootznoowoo Corridor Lands, other than small-scale subsistence timber harvest for building supplies or firewood.
Right of public access and use	• The public currently has unencumbered access and use of Kootznoowoo Corridor Lands in the area.
Right of quiet enjoyment	• Kootznoowoo, Inc., shareholders can expect to hear the sounds of boats and aircraft noise from seaplanes flying to Angoon and aircraft transiting overhead. In addition, shareholders may also hear chainsaws and other motorized equipment from the Angoon road system.
Subsurface estate	• No subsurface mineral extraction has occurred on Kootznoowoo Corridor Lands.
Development rights	• No developments currently exist on Kootznoowoo Corridor Lands.

4.19.3. Project effects

For all action alternatives, construction, operation, and maintenance of an airport and access road would affect the purposes of the monument and federal reserved rights of the Kootznoowoo Corridor Lands. The extent of effects would differ based on conditions unique to each alternative and the degree to which each alternative does or does not overlap areas where monument purposes and federal reserved rights have already been degraded. The sections below describe the actions causing the effects, the methods used by the FAA to evaluate effects, and the extent and intensity of the effects expected under each alternative.

4.19.3.1. How did the FAA determine the effects of the alternatives on monument purposes and federal reserved rights?

To evaluate specific effects to monument purposes and federal reserved rights from the actions related to construction and operation of an airport and access road alternative, the FAA took the following steps:

- Quantified and/or described, as appropriate, the specific actions associated with airport and access road construction and operation that could result in changes to monument purposes and federal reserved rights. These actions (as described in section 4.1.2 of the Chapter 4 introduction) are as follows:

Construction actions	Operations actions
Vegetation removal	Arrivals and departures of airplanes
Terrain disturbance	Maintenance of cleared areas (vegetation clearing)
Pavement	Maintenance of road and airport pavement
Tree felling	Vehicles traveling on access road
Bridge construction	Increased presence and activities of humans
Rerouting of streams	Noxious weed treatments, as required
Culverting of streams	Operation of radio-controlled lights during flight arrival and departure
	Airport generator refueling and aircraft refueling

What is discussed in this section?

- Incorporated the analysis for other resources (for example, wildlife habitat, cultural resources, and visual resources) found in this EIS to determine changes in federal reserved rights.
- Used professional judgment and discussions with the U.S. Forest Service to assess how the changes would or would not fit within the desired conditions of monument purposes and federal reserved rights as outlined in their land management plan (U.S. Forest Service 2008a).

Terms to know

Isolation: Used here, isolation refers to a portion of land that has been disconnected from the main body of the monument through the construction of the road or runway.

4.19.3.1.1. Determining effects to monument purposes

Effects to monument purposes are tied to specific natural or cultural resources, and are discussed in this EIS in terms of "degradation," which means that the contributing resources' ability to support monument purposes is diminished. For example, brown bear habitat lost through construction of a runway or road diminishes the monument purpose of fish and wildlife in that part of the monument.

Table MNT3 summarizes the resources and the monument purposes to which they contribute, provides the measure of effect to the contributing resources, and lists the related monument purposes. Each listed EIS resource section provides the details of how that resource was analyzed, and those sections are the source of most of the data used to indicate intensity in this section. However, the total calculations for some measures of intensity in this section may not match calculations in the various resource sections because they have been combined; for example, construction actions, operations actions, and ***isolation*** of land can be combined to help determine effects to the unspoiled coastal island ecosystem.

Table MNT3. Source and measure of effects to monument purposes

Resource contributing to monument purposes **EIS sections where effects to this resource are analyzed**	**Measure of effect to the contributing resource**	**Related monument purposes**
Cultural history of the Tlingit Indians Archaeological and historical resources Section 4.8 Cultural Resources Section 4.13 Subsistence Resources and Uses	• Number of acres of land with a high probability of containing cultural resources where risk of direct or indirect effects to those resources increases. • Number of acres of subsistence use areas affected by construction actions and operations actions.	• Scientific and historic study purposes • Subsistence purposes • Educational purposes • Historical and prehistorical purposes • Cultural purposes
Unspoiled coastal island ecosystem, including brown bears and bald eagles Section 4.5.1 Terrestrial Habitats and Species Section 4.5.2 Aquatic Habitats and Species Section 4.5.3 Special Status Species Section 4.6 Floodplains, Stream Geomorphology, and Hydrology Section 4.8 Cultural Resources Section 4.9 Light Emissions and Visual Resources Section 4.13 Subsistence Resources and Uses Section 4.14 Water Quality Section 4.15 Wetlands Section 4.16 Wilderness Character	• Number of acres of construction actions and operations actions, and the downstream and watershed effects of those actions. • Number of acres where a portion of the monument would be cut off (isolated), which changes habitat connectivity within the monument boundary. • Number of acres where scenery would be degraded due to construction actions, operations actions, and presence of developments. • Description of the visibility of nighttime and low-light daytime light emissions from construction equipment and construction lights. • Description of the visibility of nighttime and low-light daytime light emissions from runway lights.	• Scientific and historic study purposes • Ecolocial purposes • Preservation purposes • Fish and wildlife purposes • Forestry purposes • Recreational purposes • Subsistence purposes • Educational purposes • Wilderness purposes • Historical and prehistorical purposes • Cultural purposes • Scenic purposes

4.19.3.1.2. Determining effects to federal reserved rights on Kootznoowoo Corridor Lands

As described in section 4.19.1.3, federal reserved rights on Kootznoowoo Corridor Lands are as follows:

- Timber rights
- Right to public access and use
- Right to quiet enjoyment
- Subsurface estate rights
- Development rights

Effects to federal reserved rights are discussed in terms of changes to the environment that could influence the federal government's ability to manage these reserved rights.

Table MNT4 summarizes the specific actions that would cause effects within the boundaries of the Kootznoowoo Corridor Lands, and provides the measure of intensity for each effect. Effects to resources related to timber rights are discussed in sections 4.5 Biological Resources, and 4.15, Wetlands. The possibility of effects to the subsurface estate are dismissed in section 3.4.2.2.2 of Chapter 3: Alternatives, and Appendix C. Therefore, effects to these two federal reserved rights are not included in this section.

Table MNT4. Source and measure of effects to federal reserved rights

Federal reserved right	Action causing the effect	Measure of effects
Right of public access and use	• Presence of perimeter fence (restricting access)	• Number of acres of Kootznoowoo Corridor Lands where non-airport-related public access and use could no longer occur.
Right of quiet enjoyment	• Noise* from aircraft	• Increase in the number of minutes in a 24-hour period when aircraft noise related to the Angoon Airport would be louder than ambient (background) noise levels. The FAA uses a metric called "time above ambient" to show this change. Other noise metrics are also used in section 4.11 Noise to describe changes in the volume of noise, but because any increase in noise volume could affect the right of quiet enjoyment, those measures are not reported in this section, and time above ambient is the most meaningful metric for effects to quiet enjoyment. • Number of acres of Kootznoowoo Corridor Lands where aircraft noise above ambient could be heard for 1 minute or longer in a 24-hour period.
	• Noise* from construction equipment and motor vehicles	• Description of temporary increases in noise level in localized areas from construction equipment and worker vehicles.
	• Noise* from motor vehicles and maintenance equipment	• Description of permanent increases in noise level in localized areas from motorized equipment, including aircraft on the ground, equipment for vegetation maintenance, snow removal and pavement maintenance, private vehicles, and generators.
Development rights	• Presence of developments	• Number of acres where developments would be present.

* Effects analysis assumes that any sound level above ambient (day-night average [DNL] 27 A-weighted decibels [dBA]) would be noticeable and could affect the right of quiet enjoyment for the time those sound levels are above ambient. It should be noted that some users are more sensitive to unnatural sounds and may hear additional unnatural sounds that exist below ambient sound levels. See section 4.11 Noise for additional information on the ways noise was analyzed.

4.19.3.2. How would each alternative affect monument purposes and federal reserved rights?

4.19.3.2.1. No action alternative

Under the no action alternative, there would be no construction or operation of an airport and access road in or near the monument. For this reason, there would be no new effects to the monument purposes or federal reserved rights. Existing activities that would continue to affect the right of quiet enjoyment in the vicinity of the monument alternatives consist of boats on nearby waterways; use of chainsaws and other motorized equipment from the Angoon road system; and aircraft flyovers, including scheduled seaplane service to Angoon, chartered and private aircraft for recreational purposes, and high-altitude aircraft transiting over the monument.

4.19.3.2.2. Airport 3a with Access 2 (proposed action)

Airport 3a with Access 2 effects to monument purposes

Airport 3a with Access 2 would result in degradation of the monument purposes at the intensities shown in Table MNT5 and in the areas depicted on Figures MNT3 and MNT4.

Table MNT5. Source and measure of effects to monument purposes for Airport 3a with Access 2

Resource contributing to monument purposes **EIS sections where effects to this resource are analyzed**	**Effects to the contributing resource**	**Monument purposes degraded**
Cultural history of the Tlingit Indians Archaeological and historical resources Section 4.8 Cultural Resources Section 4.13 Subsistence Resources and Uses	• 575 acres of land with a high probability of containing cultural resources where risk of direct or indirect effects to those resources increases. • 203 acres of subsistence use areas affected by construction actions and operations actions.	• Scientific and historic study purposes • Educational purposes • Historical and prehistorical purposes • Cultural purposes • Subsistence purposes
Unspoiled coastal island ecosystem, including brown bears and bald eagles Section 4.5.1 Terrestrial Habitats and Species Section 4.5.2 Aquatic Habitats and Species Section 4.5.3 Special Status Species Section 4.13 Subsistence Resources and Uses Section 4.9 Light Emissions and Visual Resources Section 4.16 Wilderness Character Section 4.8 Cultural Resources Section 4.6 Floodplains, Stream Geomorphology, and Hydrology Section 4.14 Water Quality Section 4.15 Wetlands	• 923 acres of construction actions and operations actions and the downstream and watershed effects of those actions. • 288 acres of monument land isolated. • 718 acres where scenery would be degraded due to construction actions, operations actions, and presence of developments. • Construction areas and some equipment would be illuminated at night and during daytime low-light conditions (for example, dense clouds or fog) with high-intensity lighting, creating visible skyglow throughout the monument near the runway and access road for up to three construction seasons. The skyglow would be intensified by any local low-lying clouds, fog, rain, and high humidity. These effects would cease when construction ended. • At night and during daytime low-light conditions (for example, dense clouds or fog), intermittent, brief, and low-intensity skyglow caused by the airport's upward-directed runway lights and navigational aids would be visible in the immediate vicinity of the runway during approaches and takeoffs, and headlights from vehicle traffic could be seen near the road.	• Scientific and historic study purposes • Ecological purposes • Preservation purposes • Fish and wildlife purposes • Forestry purposes • Recreational purposes • Subsistence purposes • Educational purposes • Wilderness purposes • Historical and prehistorical purposes • Ccultural purposes • Scenic purposes

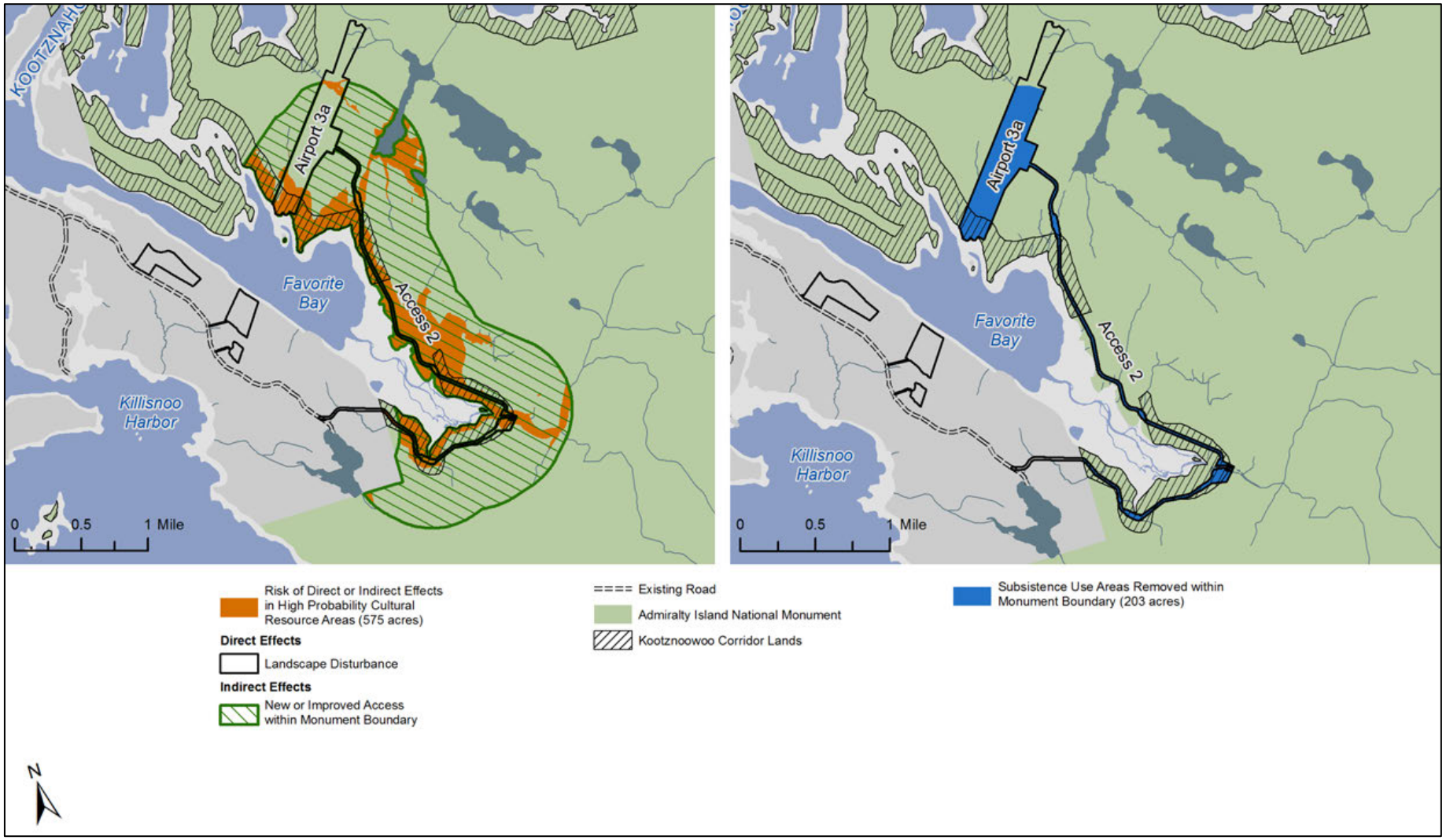

Figure MNT3. Effects from Airport 3a with Access 2 to the cultural history of the Tlingit Indians and archaeological and historical resources. *Note*: These areas were calculated based on the analysis in Section 4.8. Cultural Resources and Section 4.13 Subsistence Resources and Uses.

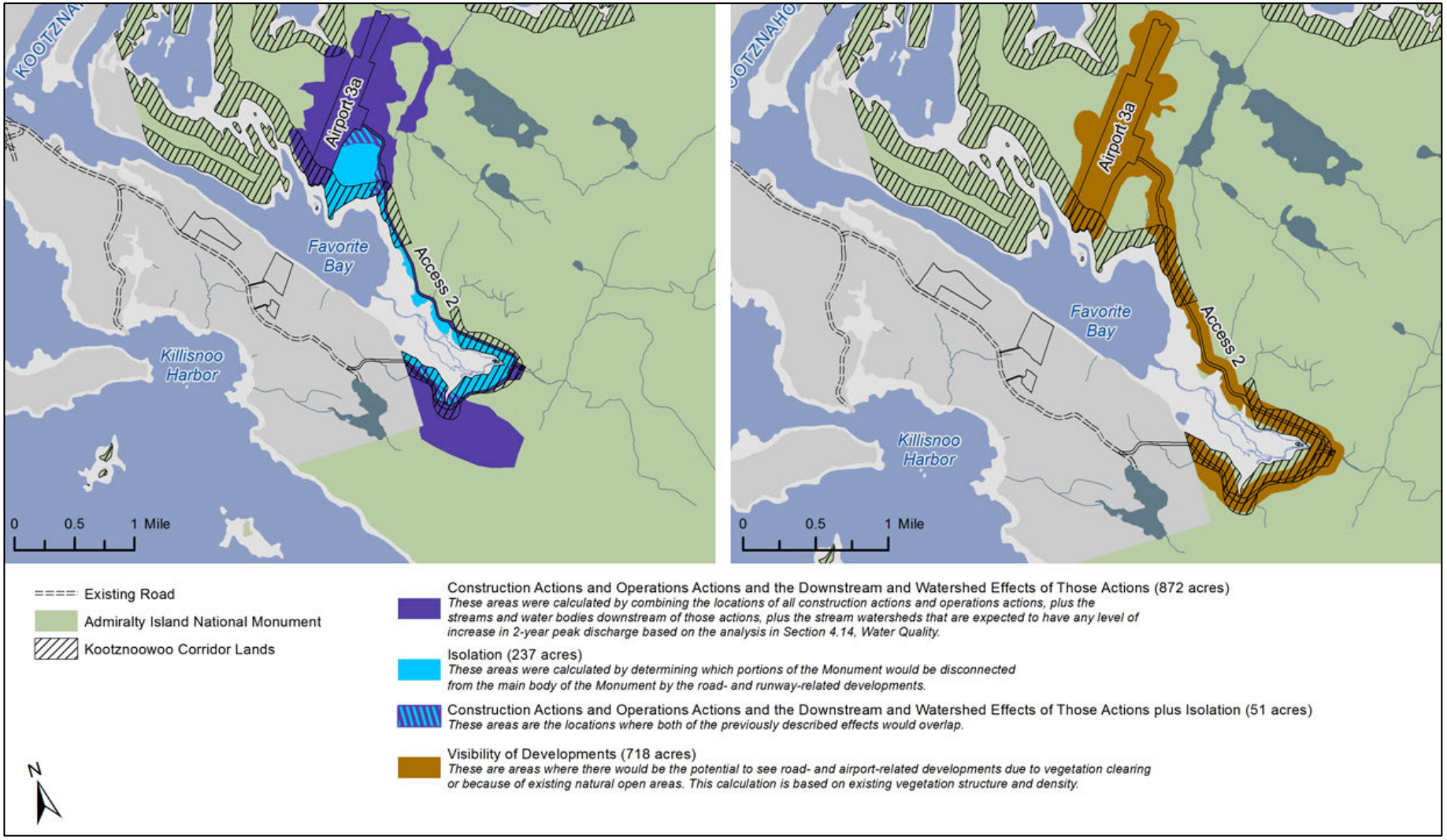

Figure MNT4. Effects from Airport 3a with Access 2 to the unspoiled coastal island ecosystem, including brown bears and bald eagles.

Airport 3a with Access 2 effects to federal reserved rights

Table MNT6 and Figure MNT5 summarize the potential effects to the federal reserved rights.

Table MNT6. Source and measure of effects to federal reserved rights for Airport 3a with Access 2

Federal reserved right	Action causing the effect	Measure of effect
Right of public access and use	• Presence of perimeter fence (restricting access)	• 3 acres of Kootznoowoo Corridor Lands where non-airport-related public access and use could no longer occur.
Right of quiet enjoyment	• Noise* from aircraft	• For up to 26 additional minutes in a 24-hour period, aircraft noise related to the proposed Angoon Airport would exceed ambient noise levels. • In 4,542 acres (or all) of the Kootznoowoo Corridor Lands, aircraft noise above ambient could be heard for 1 minute or longer in a 24-hour period.
	• Noise* from construction equipment and motor vehicles	• During construction, there would be temporary increases in noise level in localized areas from construction equipment and worker vehicles.
	• Noise* from motor vehicles and maintenance equipment	• During airport operations, there would be permanent increases in noise level in localized areas from motorized equipment, including aircraft on the ground, equipment for vegetation maintenance, snow removal and pavement maintenance, private vehicles, and generators.
Development rights	• Presence of developments	• 55 acres where developments are present.

* Effects analysis assumes that any sound level above ambient (DNL 27 dBA) would be noticeable and could affect the right of quiet enjoyment for the time those sound levels are above ambient. It should be noted that some users are more sensitive to unnatural sounds and may hear additional unnatural sounds that exist below ambient sound levels. See section 4.11 Noise for additional information on the ways noise was analyzed.

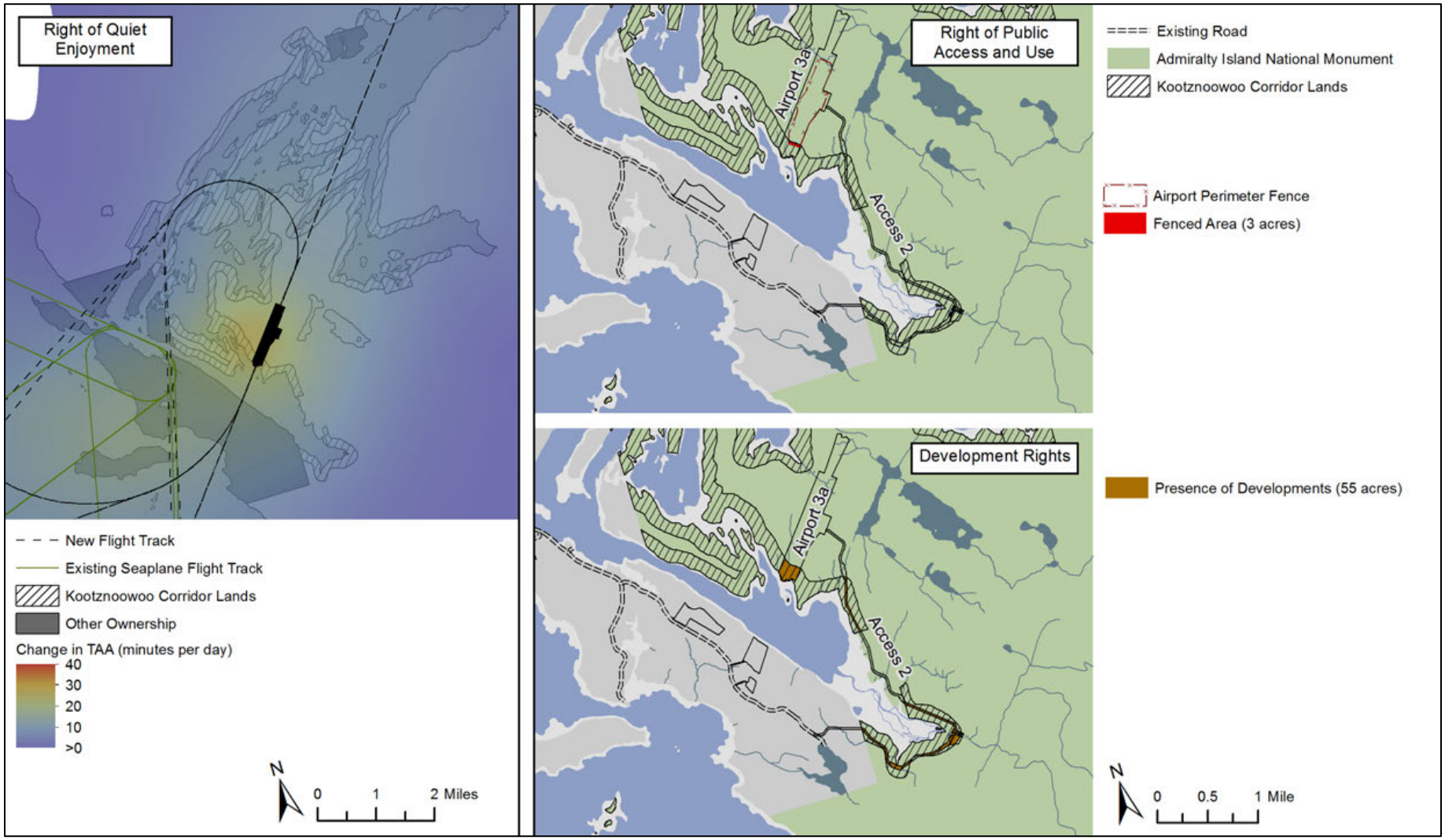

Figure MNT5. Effects from Airport 3a with Access 2 to federal reserved rights.

4.19.3.2.3. Airport 3a with Access 3

Airport 3a with Access 3 effects to monument purposes

Airport 3a with Access 3 would result in degradation of the monument purposes at the intensities illustrated in Table MNT7 and in the areas depicted on Figures MNT6 and MNT7.

Table MNT7. Source and measure of effects to monument purposes for Airport 3a with Access 3

Resource contributing to monument purposes **EIS sections where effects to this resource are analyzed**	**Effects to the contributing resource**	**Monument purposes degraded**
Cultural history of the Tlingit Indians Archaeological and historical resources Section 4.8 Cultural Resources Section 4.13 Subsistence Resources and Uses	• 635 acres of land with a high probability of containing cultural resources where risk of direct or indirect effects to those resources increases. • 171 acres of subsistence use areas affected by construction actions and operations actions.	• Scientific and historic study purposes • Educational purposes • Historical and prehistorical purposes • Cultural purposes • Subsistence purposes
Unspoiled coastal island ecosystem, including brown bears and bald eagles Section 4.5.1 Terrestrial Habitats and Species Section 4.5.2 Aquatic Habitats and Species Section 4.5.3 Special Status Species Section 4.13 Subsistence Resources and Uses Section 4.9 Light Emissions and Visual Resources Section 4.16 Wilderness Character Section 4.8 Cultural Resources Section 4.6 Floodplains, Stream Geomorphology, and Hydrology Section 4.14 Water Quality Section 4.15 Wetlands	• 925 acres of construction actions and operations actions and the downstream and watershed effects of those actions. • 945 acres of monument land isolated. • 802 acres where scenery would be degraded due to construction actions, operations actions, and presence of developments. • Construction areas and some equipment would be illuminated at night and during daytime low-light conditions (for example, dense clouds or fog) with high-intensity lighting, creating visible skyglow throughout the monument near the runway and access road for up to three construction seasons. The skyglow would be intensified by any local low-lying clouds, fog, rain, and high humidity. These effects would cease when construction ended. • At night and during daytime low-light conditions (for example, dense clouds or fog), intermittent, brief, and low-intensity skyglow caused by the airport's upward-directed runway lights and navigational aids would be visible in the immediate vicinity of the runway during approaches and takeoffs, and headlights from vehicle traffic could be seen near the road.	• Scientific and historic study purposes • Ecological purposes • Preservation purposes • Fish and wildlife purposes • Forestry purposes • Recreational purposes • Subsistence purposes • Educational purposes • Wilderness purposes • Historical and prehistorical purposes • Cultural purposes • Scenic purposes

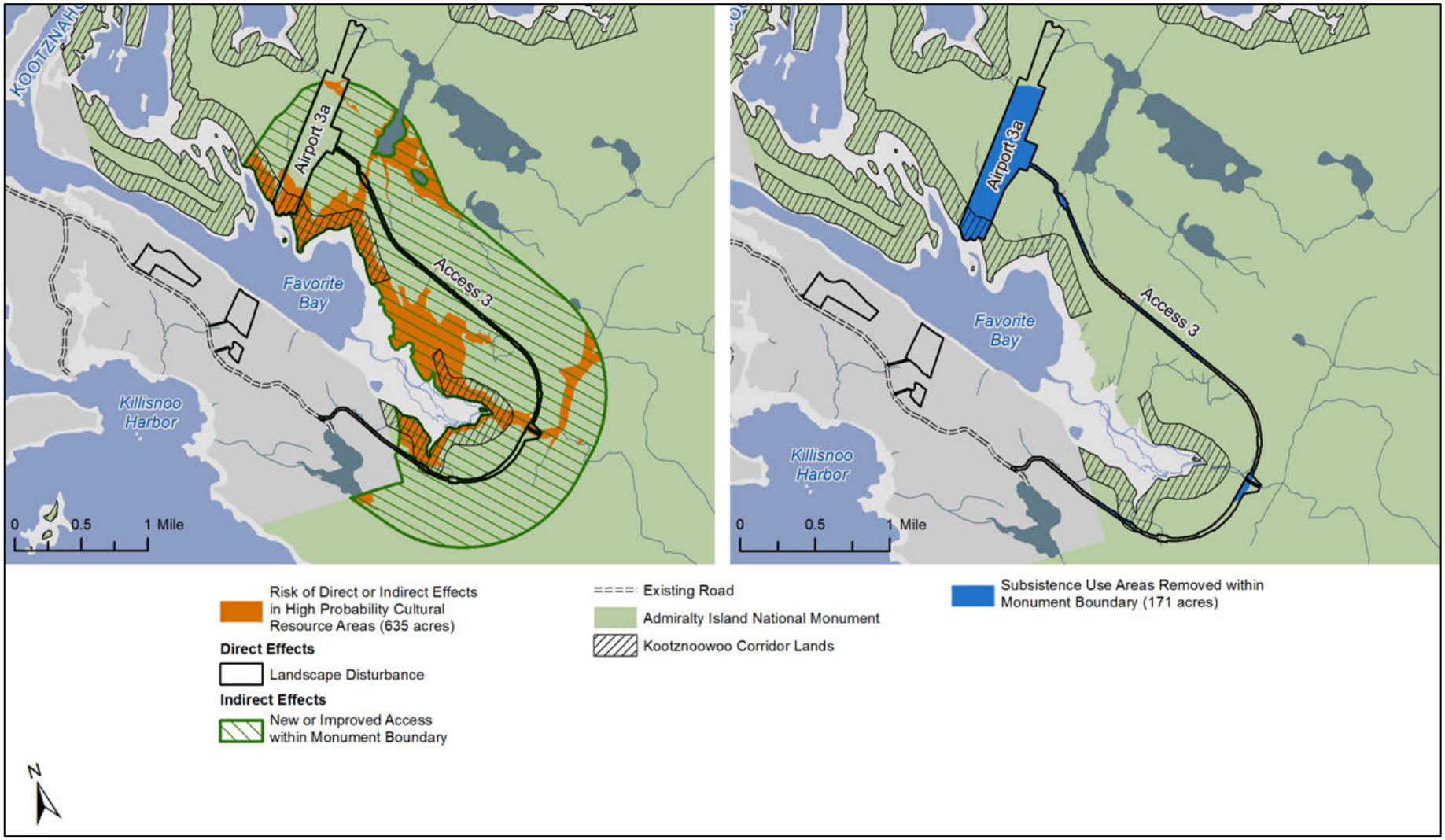

Figure MNT6. Effects from Airport 3a with Access 3 to the cultural history of the Tlingit Indians and archaeological and historical resources. *Note*: These areas were calculated based on the analysis in Section 4.8. Cultural Resources and Section 4.13 Subsistence Resources and Uses.

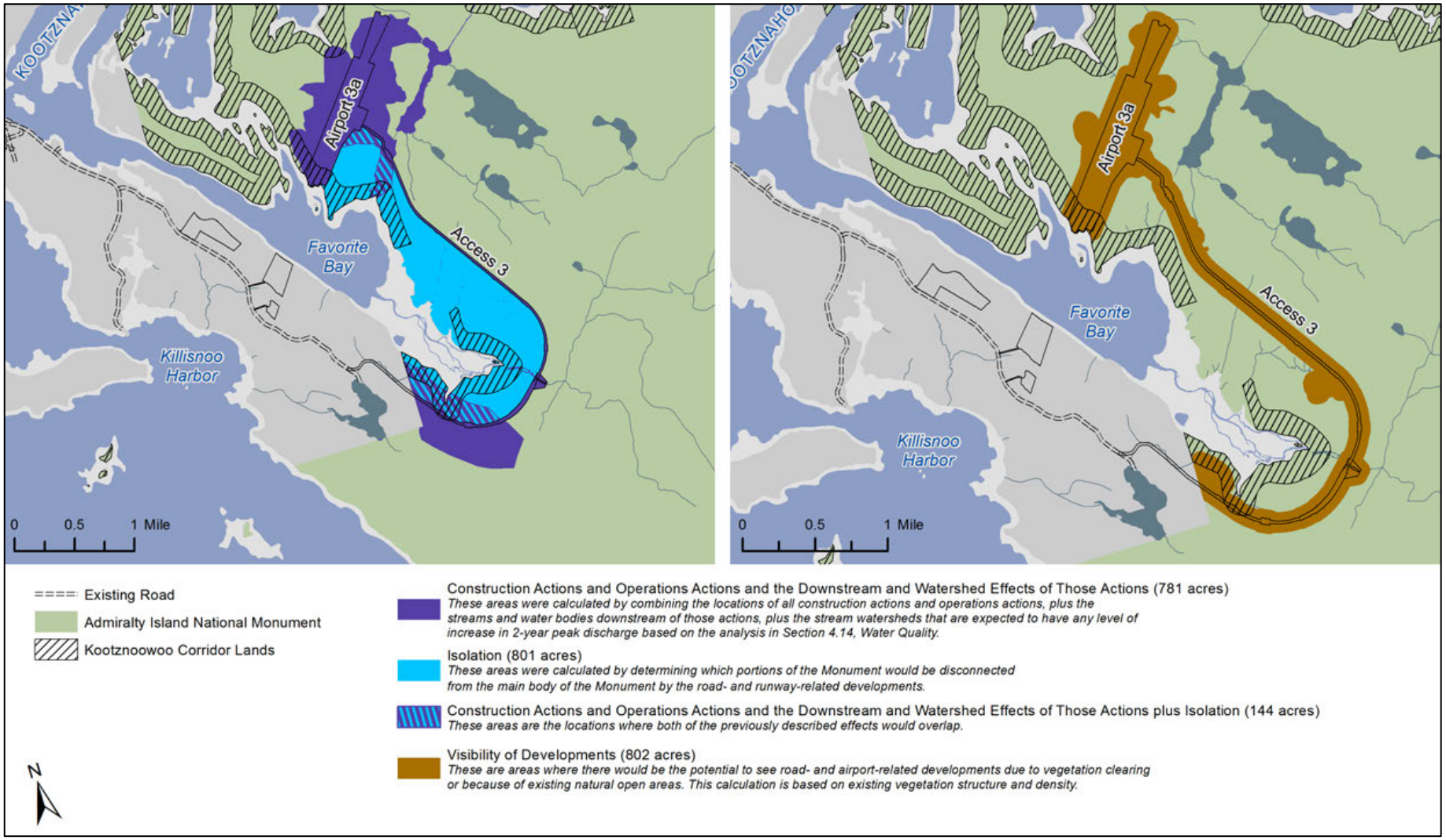

Figure MNT7. Effects from Airport 3a with Access 3 to the unspoiled coastal island ecosystem, including brown bears and bald eagles.

Airport 3a with Access 3 effects to federal reserved rights

Table MNT8 and Figure MNT8 summarize the potential effects to federal reserved rights.

Table MNT8. Source and measure of effects to federal reserved rights for Airport 3a with Access 3

Federal reserved right	Action causing the effect	Measure of effect
Right of public access and use	• Presence of perimeter fence (restricting access)	• 3 acres of Kootznoowoo Corridor Lands where non-airport-related public access and use could no longer occur.
Right of quiet enjoyment	• Noise* from aircraft	• For up to 26 additional minutes in a 24-hour period, aircraft noise related to the proposed Angoon Airport would exceed ambient noise levels. • In 4,542 acres (or all) of the Kootznoowoo Corridor Lands, aircraft noise above ambient could be heard for 1 minute or longer in a 24-hour period.
	• Noise* from construction equipment and motor vehicles	• During construction, there would be temporary increases in noise level in localized areas from construction equipment and worker vehicles.
	• Noise* from motor vehicles and maintenance equipment	• During airport operations, there would be permanent increases in noise level in localized areas from motorized equipment, including aircraft on the ground, equipment for vegetation maintenance, snow removal and pavement maintenance, private vehicles, and generator.
Development rights	• Presence of developments	• 22 acres where developments are present.

* Effects analysis assumes that any sound level above ambient (DNL 27 dBA) would be noticeable and could affect the right of quiet enjoyment for the time those sound levels are above ambient. It should be noted that some users are more sensitive to unnatural sounds and may hear additional unnatural sounds that exist below ambient sound levels. See section 4.11 Noise for additional information on the ways noise was analyzed.

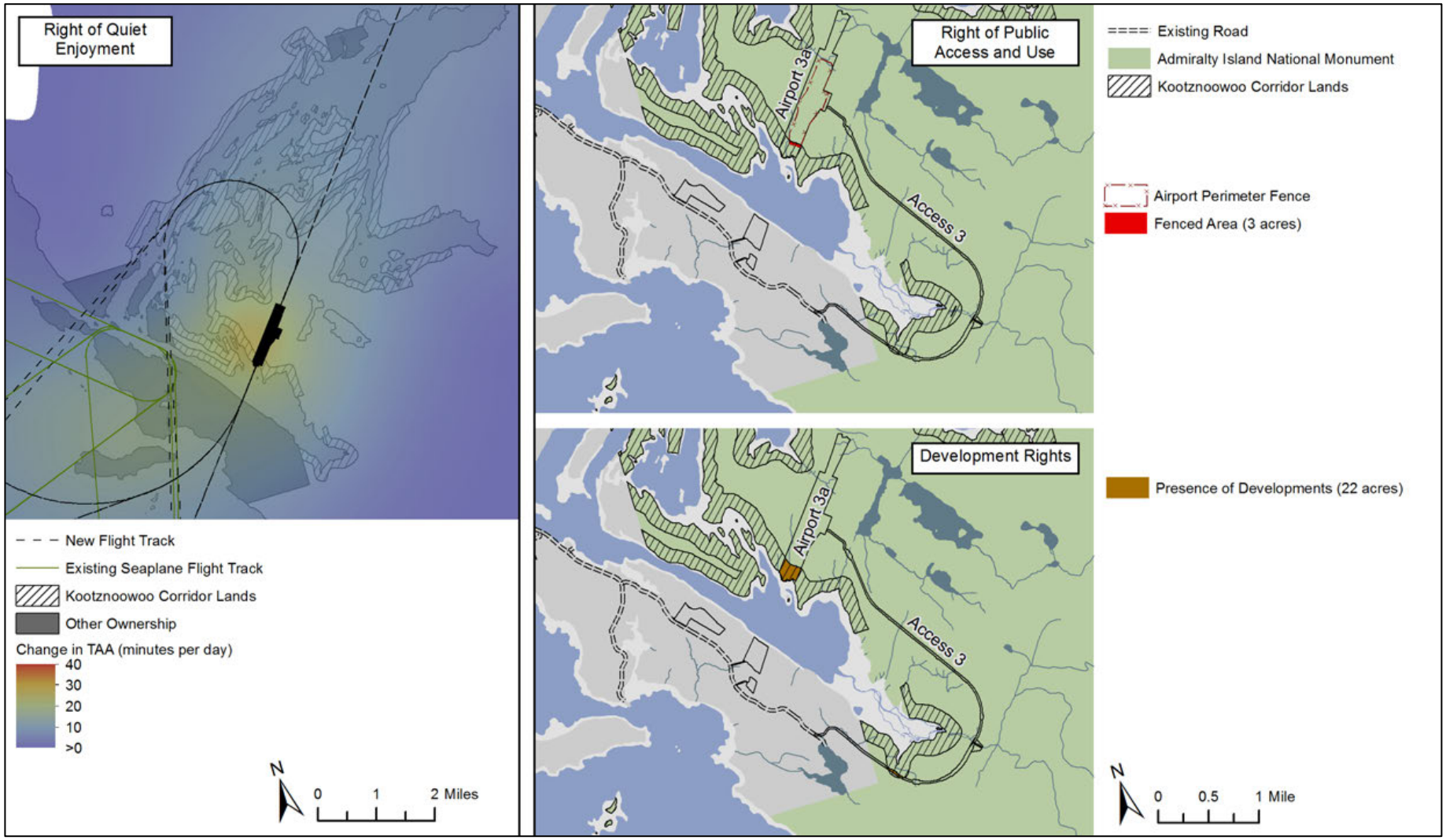

Figure MNT8. Effects from Airport 3a with Access 3 to federal reserved rights.

4.19.3.2.4. Airport 4 with Access 2

Airport 4 with Access 2 effects to monument purposes

Airport 4 with Access 2 would result in degradation of the monument purposes at the intensities illustrated in Table MNT9 and in the areas depicted on Figures MNT9 and MNT10.

Table MNT9. Source and measure of effects to monument purposes for Airport 4 with Access 2

Resource contributing to monument purposes **EIS sections where effects to this resource are analyzed**	**Effects to the contributing resource**	**Monument purposes degraded**
Cultural history of the Tlingit Indians Archaeological and historical resources Section 4.8 Cultural Resources Section 4.13 Subsistence Resources and Uses	• 377 acres of land with a high probability of containing cultural resources where risk of direct or indirect effects to those resources increases. • 127 acres of subsistence use areas affected by construction actions and operations actions.	• Scientific and historic study purposes • Educational purposes • Historical and prehistorical purposes • Cultural purposes • Subsistence purposes
Unspoiled coastal island ecosystem, including brown bears and bald eagles Section 4.5.1 Terrestrial Habitats and Species Section 4.5.2 Aquatic Habitats and Species Section 4.5.3 Special Status Species Section 4.13 Subsistence Resources and Uses Section 4.9 Light Emissions and Visual Resources Section 4.16 Wilderness Character Section 4.8 Cultural Resources Section 4.6 Floodplains, Stream Geomorphology, and Hydrology Section 4.14 Water Quality Section 4.15 Wetlands	• 1,473 acres of construction actions and operations actions and the downstream and watershed effects of those actions. • 347 acres of monument land isolated. • 624 acres where scenery would be degraded due to construction actions, operations actions, and presence of developments. • Construction areas and some equipment would be illuminated at night and during daytime low-light conditions (for example, dense clouds or fog) with high-intensity lighting, creating visible skyglow throughout the monument near the runway and access road for up to three construction seasons. The skyglow would be intensified by any local low-lying clouds, fog, rain, and high humidity. These effects would cease when construction ended. • At night and during daytime low-light conditions (for example, dense clouds or fog), intermittent, brief, and low-intensity skyglow caused by the airport's upward-directed runway lights and navigational aids would be visible in the immediate vicinity of the runway during approaches and takeoffs, and headlights from vehicle traffic could be seen near the road.	• Scientific and historic study purposes • Ecological purposes • Preservation purposes • Fish and wildlife purposes • Forestry purposes • Recreational purposes • Subsistence purposes • Educational purposes • Wilderness purposes • Historical and prehistorical purposes • Cultural purposes • Scenic purposes

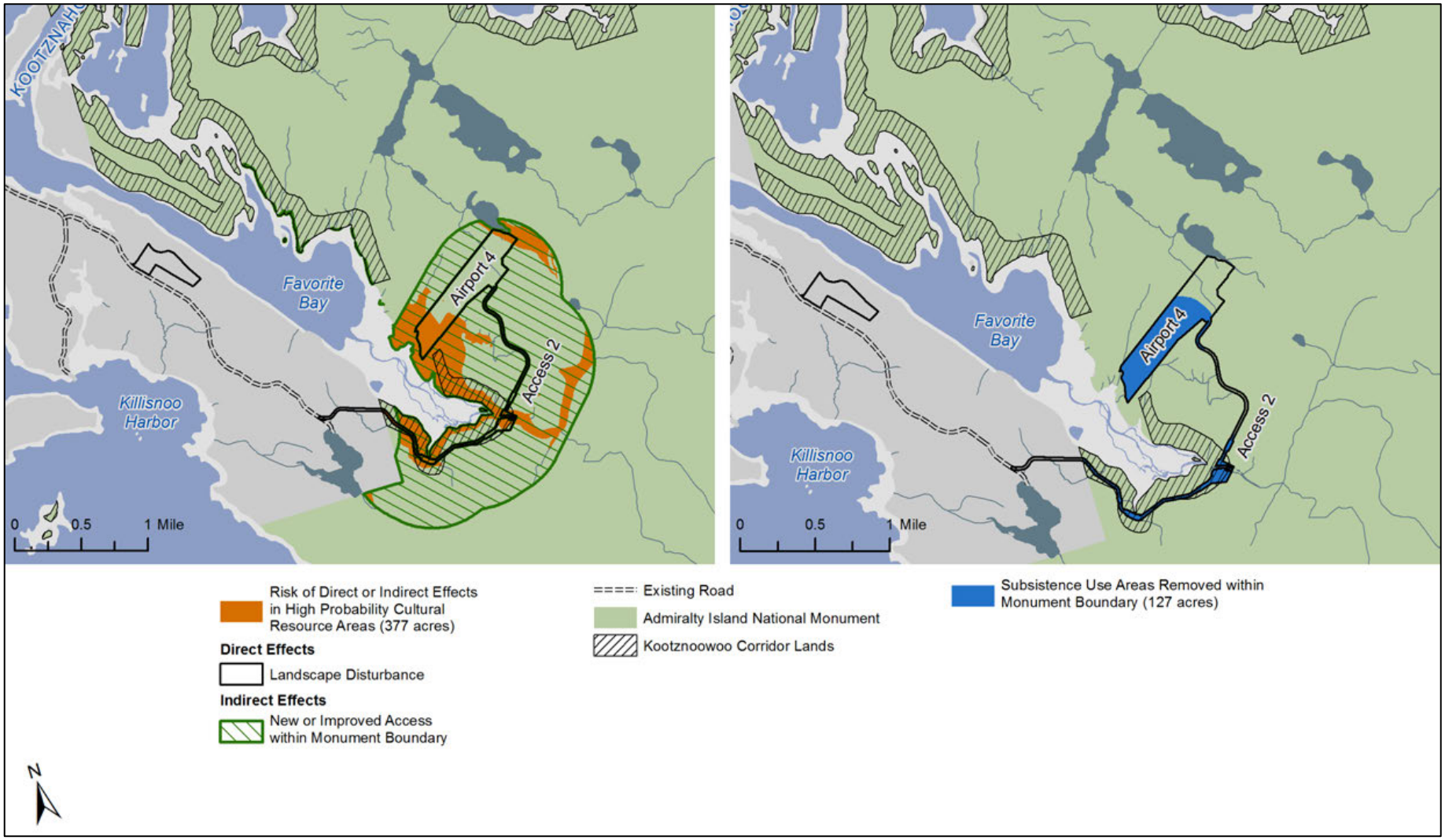

Figure MNT9. Effects from Airport 4 with Access 2 to the cultural history of the Tlingit Indians and archaeological and historical resources. *Note*: These areas were calculated based on the analysis in Section 4.8. Cultural Resources and Section 4.13 Subsistence Resources and Uses.

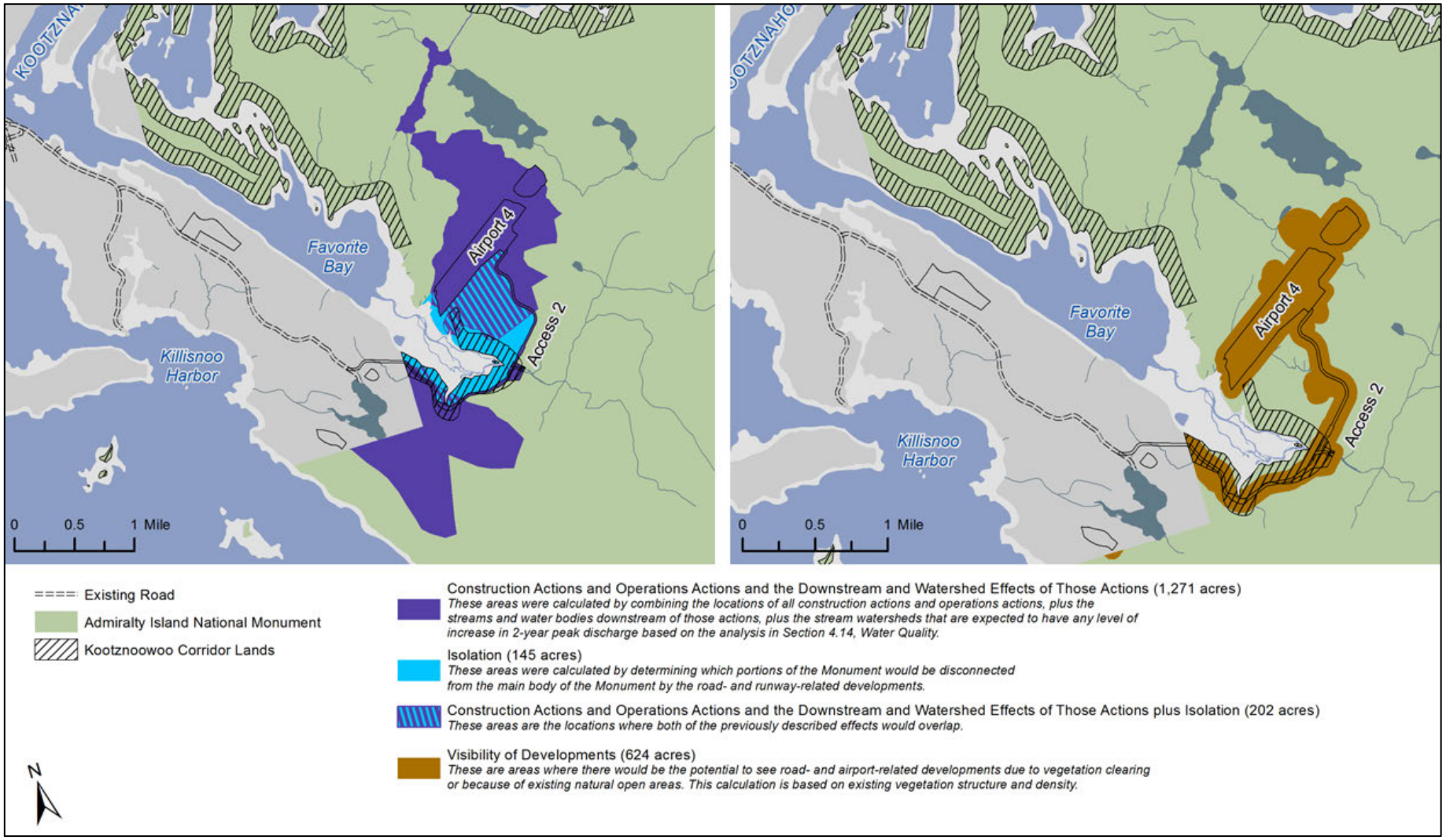

Figure MNT10. Effects from Airport 4 with Access 2 to the unspoiled island ecosystem, including brown bears and bald eagles.

Airport 4 with Access 2 effects to federal reserved rights

Table MNT10 and Figure MNT11 summarize the potential effects to federal reserved rights.

Table MNT10. Source and measure of effects to federal reserved rights for Airport 4 with Access 2

Federal reserved right	Action causing the effect	Measure of effect
Right of public access and use	• Presence of perimeter fence (restricting access)	• There would be no portions of the Kootznoowoo Corridor Lands where non-airport-related public access and use could no longer occur.
Right of quiet enjoyment	• Noise* from aircraft	• For up to 30 additional minutes in a 24-hour period, aircraft noise related to the proposed Angoon Airport would exceed ambient noise levels. • In 4,542 acres (or all) of the Kootznoowoo Corridor Lands, aircraft noise above ambient could be heard for 1 minute or longer in a 24-hour period.
	• Noise* from construction equipment and motor vehicles	• During construction, there would be temporary increases in noise level in localized areas from construction equipment and worker vehicles.
	• Noise* from motor vehicles and maintenance equipment	• During airport operations, there would be permanent increases in noise level in localized areas from motorized equipment, including aircraft on the ground, equipment for vegetation maintenance, snow removal and pavement maintenance, private vehicles, and generators.
Development rights	• Presence of developments	• 23 acres where developments are present.

* Effects analysis assumes that any sound level above ambient (DNL 27 dBA) would be noticeable and could affect the right of quiet enjoyment for the time those sound levels are above ambient. It should be noted that some users are more sensitive to unnatural sounds and may hear additional unnatural sounds that exist below ambient sound levels. See section 4.11 Noise for additional information on the ways noise was analyzed.

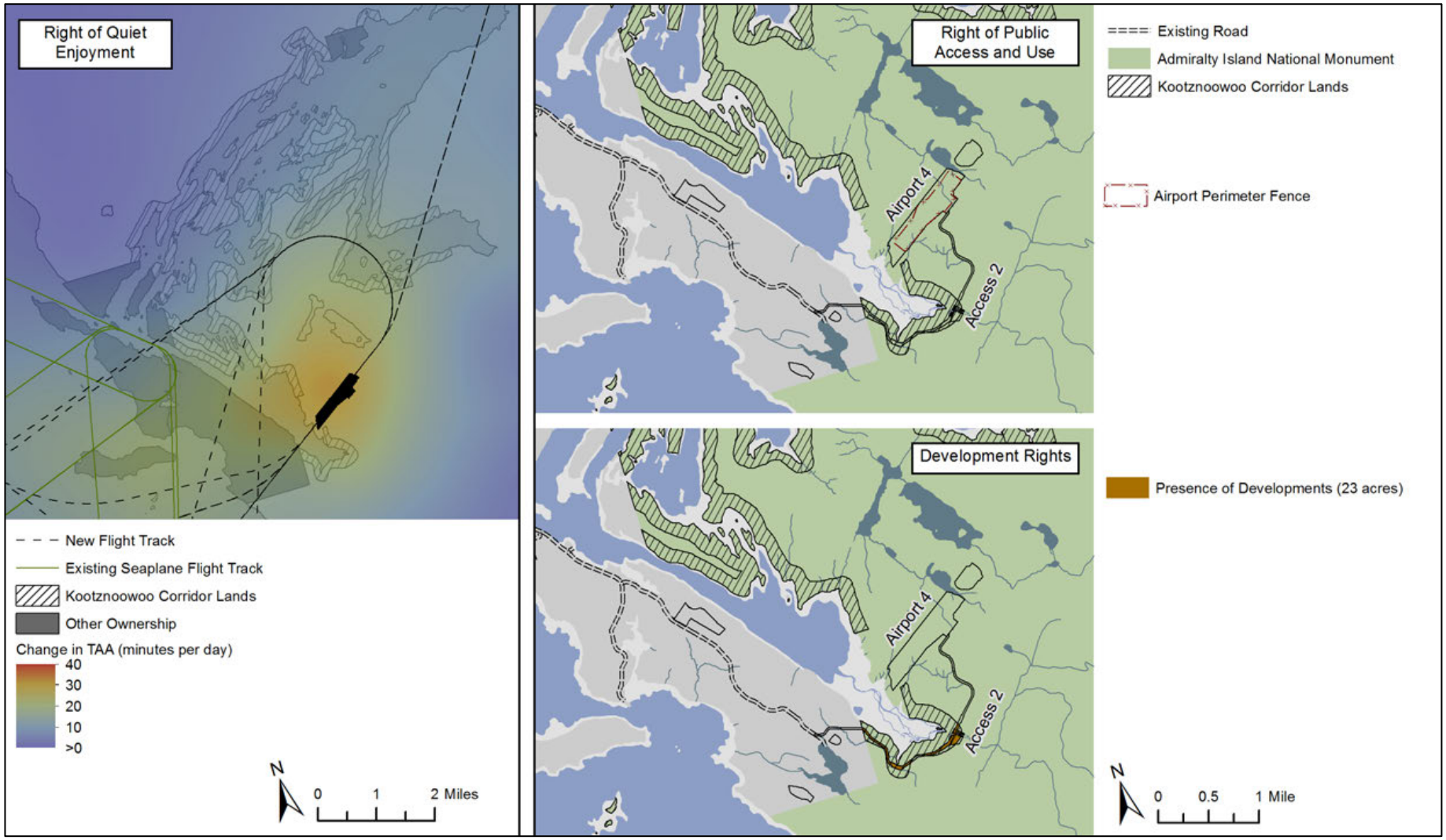

Figure MNT11. Effects from Airport 4 with Access 2 to federal reserved rights.

4.19.3.2.5. Airport 4 with Access 3

Airport 4 with Access 3 effects to monument purposes

Airport 4 with Access 3 would result in degradation of the monument purposes at the intensities shown in Table MNT11 and in the areas depicted on Figures MNT12 and MNT13.

Table MNT11. Source and measure of effects to monument purposes for Airport 4 with Access 3

Resource contributing to monument purposes **EIS sections where effects to this resource are analyzed**	**Effects to the contributing resource**	**Monument purposes degraded**
Cultural history of the Tlingit Indians Archaeological and historical resources Section 4.8 Cultural Resources Section 4.13 Subsistence Resources and Uses	• 386 acres of land with a high probability of containing cultural resources where risk of direct or indirect effects to those resources increases. • 109 acres of subsistence use areas affected by construction actions and operations actions.	• Scientific and historic study purposes • Educational purposes • Historical and prehistorical purposes • Cultural purposes • Subsistence purposes
Unspoiled coastal island ecosystem, including brown bears and bald eagles Section 4.5.1 Terrestrial Habitats and Species Section 4.5.2 Aquatic Habitats and Species Section 4.5.3 Special Status Species Section 4.13 Subsistence Resources and Uses Section 4.9 Light Emissions and Visual Resources Section 4.16 Wilderness Character Section 4.8 Cultural Resources Section 4.6 Floodplains, Stream Geomorphology, and Hydrology Section 4.14 Water Quality Section 4.15 Wetlands	• 1,477 acres of construction actions and operations actions, including the downstream and watershed effects of those actions. • 544 acres of monument land would be isolated. • 665 acres where scenery would be degraded due to construction actions, operations actions, and presence of developments. • Construction areas and some equipment would be illuminated at night and during daytime low-light conditions (for example, dense clouds or fog) with high-intensity lighting, creating visible skyglow throughout the monument near the runway and access road for up to three construction seasons. The skyglow would be intensified by any local low-lying clouds, fog, rain, and high humidity. These effects would cease when construction ended. • At night and during daytime low-light conditions (for example, dense clouds or fog), intermittent, brief, and low-intensity skyglow caused by the airport's upward-directed runway lights and navigational aids would be visible in the immediate vicinity of the runway during approaches and takeoffs, and headlights from vehicle traffic could be seen near the road.	• Scientific and historic study purposes • Ecological purposes • Preservation purposes • Fish and wildlife purposes • Forestry purposes • Recreational purposes • Subsistence purposes • Educational purposes • Wilderness purposes • Historical and prehistorical purposes • Cultural purposes • Scenic purposes

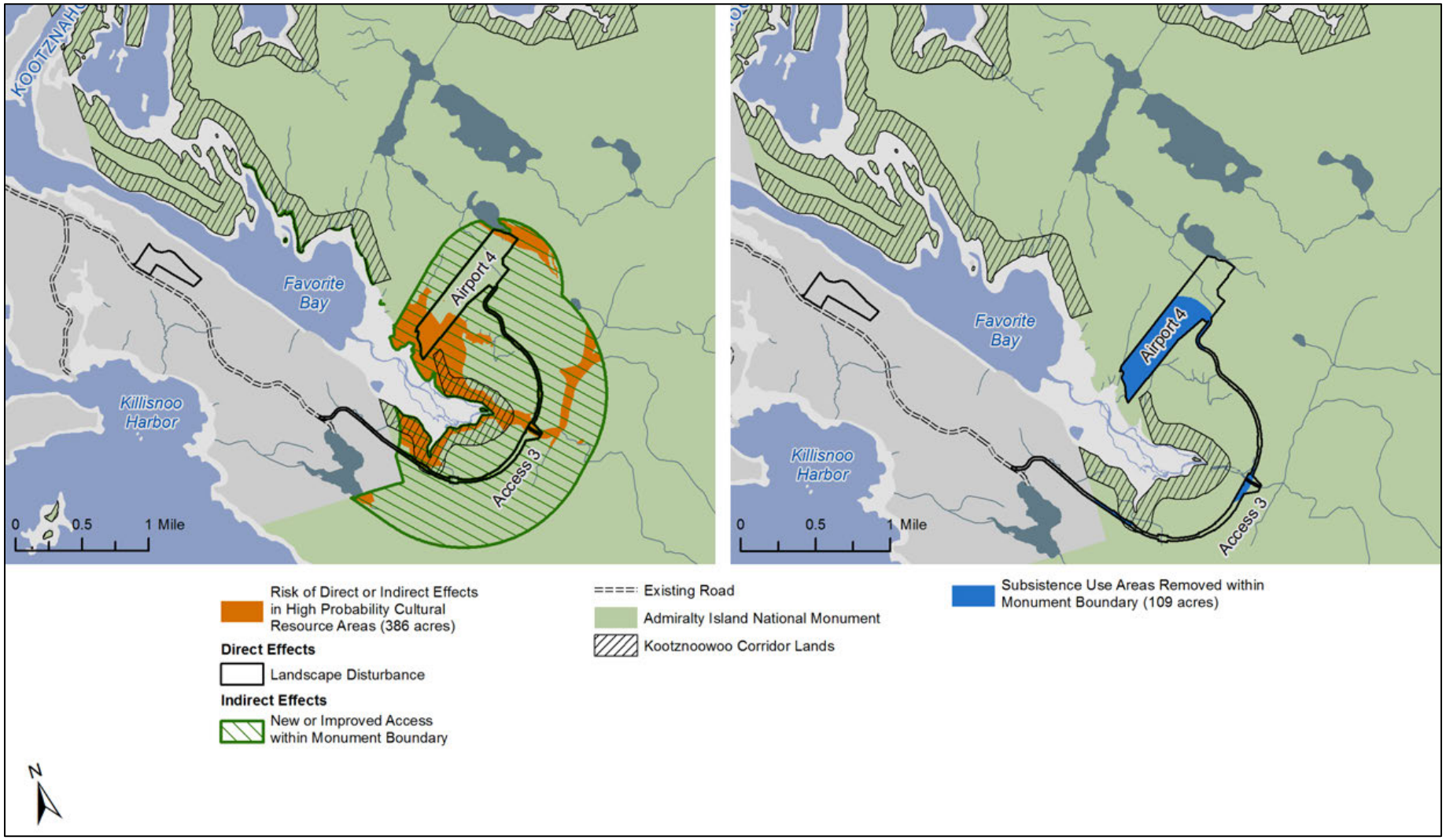

Figure MNT12. Effects from Airport 4 with Access 3 to the cultural history of the Tlingit Indians and archaeological and historical sites. *Note*: These areas were calculated based on the analysis in Section 4.8. Cultural Resources and Section 4.13 Subsistence Resources and Uses.

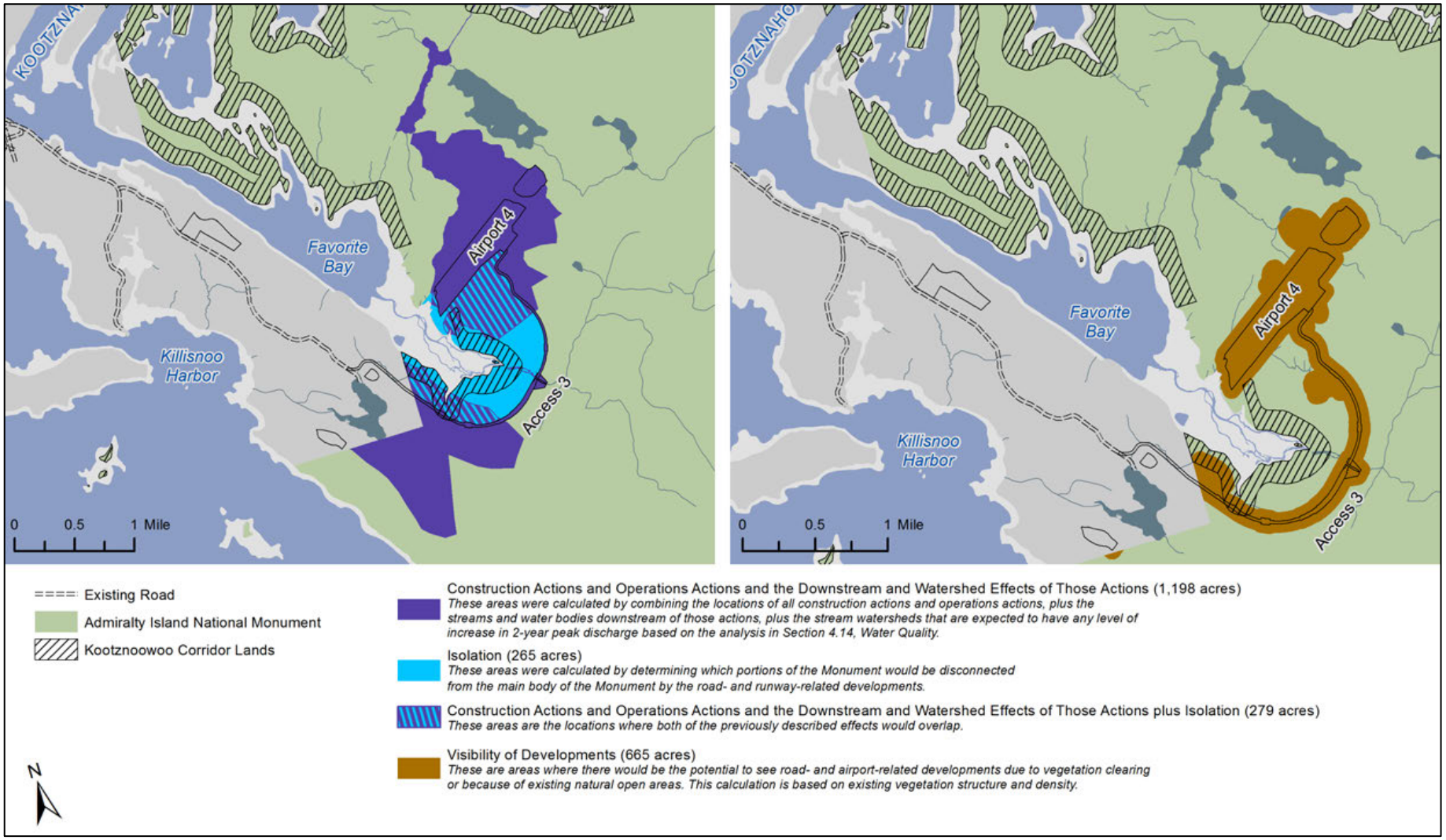

Figure MNT13. Effects from Airport 4 with Access 3 to the unspoiled coastal island ecosystem, including brown bears and bald eagles.

Airport 4 with Access 3 effects to federal reserved rights

Table MNT12 and Figure MNT14 summarize the potential effects to federal reserved rights.

Table MNT12. Source and measure of effects to federal reserved rights for Airport 4 with Access 3

Federal reserved right	Action causing the effect	Measure of effect
Right of public access and use	• Presence of perimeter fence (restricting access)	• There would be no portions of the Kootznoowoo Corridor Lands where non-airport-related public access and use could no longer occur.
Right of quiet enjoyment	• Noise* from aircraft	• For up to 30 additional minutes in a 24-hour period, aircraft noise related to the proposed Angoon Airport would exceed ambient noise levels. • In 4,542 acres (or all) of the Kootznoowoo Corridor Lands, aircraft noise above ambient could be heard for 1 minute or longer in a 24-hour period.
	• Noise* from construction equipment and motor vehicles	• During construction, there would be temporary increases in noise level in localized areas from construction equipment and worker vehicles.
	• Noise* from motor vehicles and maintenance equipment	• During airport operations, there would be permanent increases in noise level in localized areas from motorized equipment, including aircraft on the ground, equipment for vegetation maintenance, snow removal and pavement maintenance, private vehicles, and generators.
Development rights	• Presence of developments	• 3 acres where developments are present.

* Effects analysis assumes that any sound level above ambient (DNL 27 dBA) would be noticeable and could affect the right of quiet enjoyment for the time those sound levels are above ambient. It should be noted that some users are more sensitive to unnatural sounds and may hear additional unnatural sounds that exist below ambient sound levels. See section 4.11 Noise for additional information on the ways noise was analyzed.

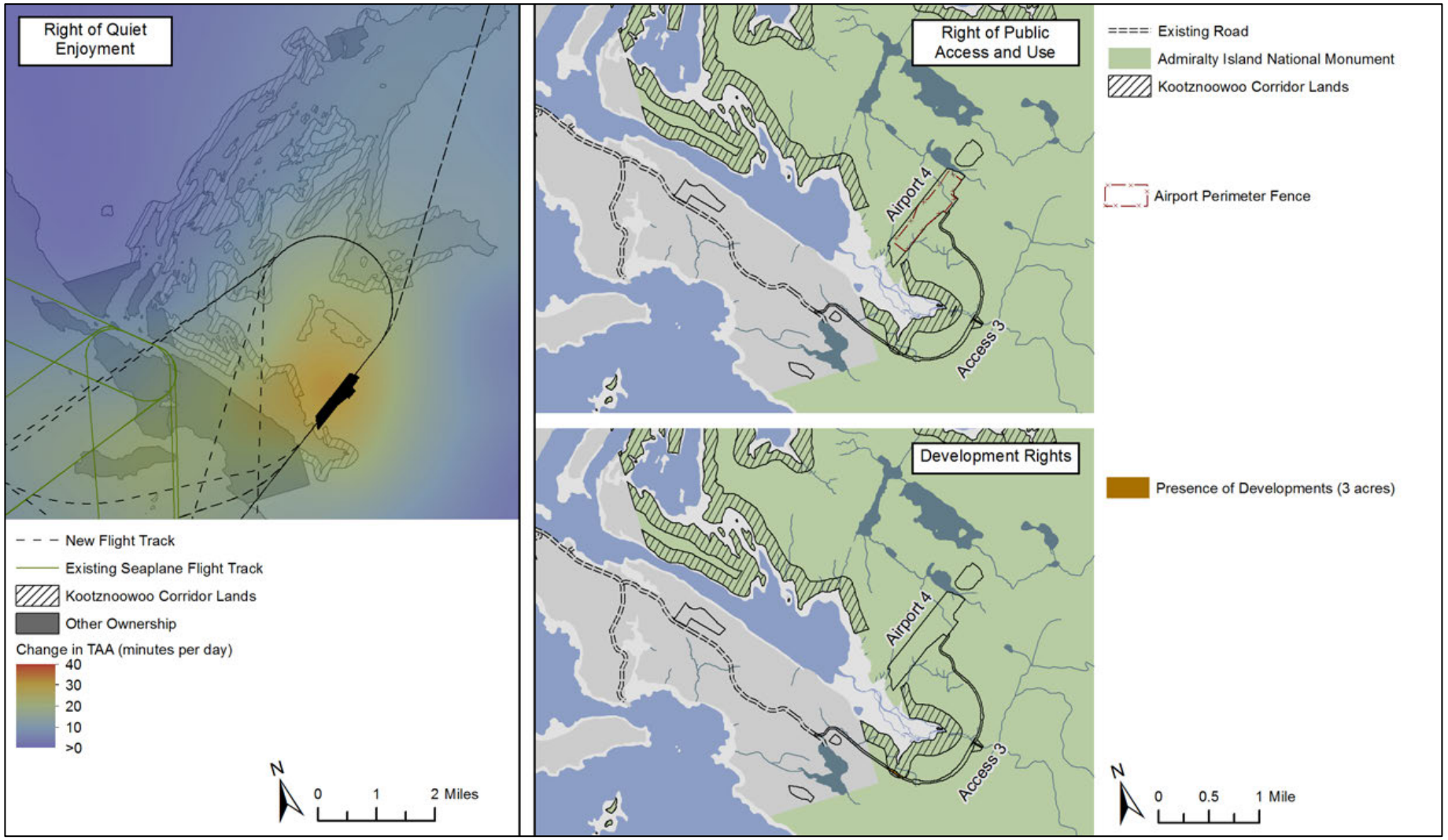

Figure MNT14. Effects from Airport 4 with Access 3 to federal reserved rights.

4.19.3.2.6. Airport 12a with Access 12a (preferred alternative)

Airport 12a with Access 12a effects to monument purposes

Airport 12a with Access 12a would not occupy any part of the monument. However, there would be effects to the scenic purposes of the monument as a result of skyglow, as described in Table MNT13.

Table MNT13. Source and measure of effects to monument purposes for Airport 12a with Access 12a

Resource contributing to monument purposes **EIS sections where effects to this resource are analyzed**	**Effects to the contributing resource**	**Monument purposes degraded**
Unspoiled coastal island ecosystem, including brown bears and bald eagles Section 4.9 Light Emissions and Visual Resources	• Construction areas and some equipment would be illuminated at night and during daytime low-light conditions (for example, dense clouds or fog) with high-intensity lighting, creating visible skyglow throughout the monument near the runway and access road for up to three construction seasons. The skyglow would be intensified by any local low-lying clouds, fog, rain, and high humidity. These effects would cease when construction ended. • At night and during daytime low-light conditions (for example, dense clouds or fog), intermittent, brief, and low-intensity skyglow caused by the airport's upward-directed runway lights and navigational aids would be visible in the immediate vicinity of the runway during approaches and takeoffs, and headlights from vehicle traffic could be seen near the road.	• Scenic purposes

Airport 12a with Access 12a effects to federal reserved rights

Airport 12a with Access 12a would not occupy any part of the Kootznoowoo Corridor Lands. However, there could be effects to the right to quiet enjoyment, as shown in Table MNT14 and Figure MNT15.

Table MNT14. Source and measure of effects to federal reserved rights for Airport 12a with Access 12a

Federal reserved right	Action causing the effect	Measure of effect
Right of quiet enjoyment	• Noise* from aircraft	• For up to 31 additional minutes in a 24-hour period, aircraft noise related to the proposed Angoon Airport would exceed ambient noise levels. • In 4,542 acres (or all) of the Kootznoowoo Corridor Lands, aircraft noise above ambient could be heard for 1 minute or longer in a 24-hour period.

* Effects analysis assumes that any sound level above ambient (DNL 27 dBA) would be noticeable and could affect the right of quiet enjoyment for the time those sound levels are above ambient. It should be noted that some users are more sensitive to unnatural sounds and may hear additional unnatural sounds that exist below ambient sound levels. See section 4.11 Noise for additional information on the ways noise was analyzed.

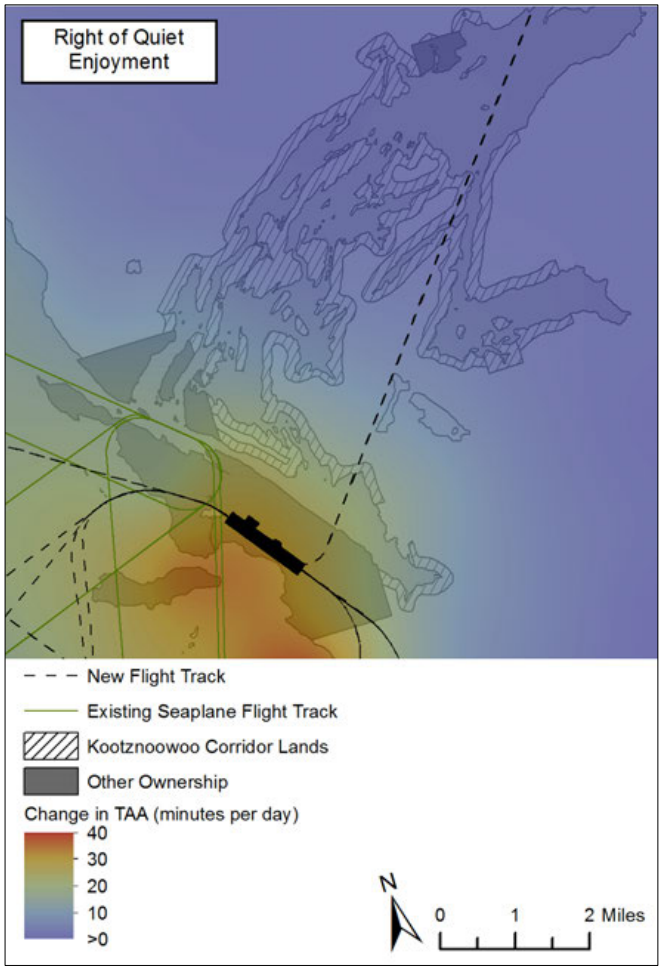

Figure MNT15. Effects from Airport 12a with Access 12 to federal reserved rights.

How do the effects to monument purposes and federal reserved rights compare?

4.19.3.2.7. Monument purposes

Table MNT15 compares the ways each action alternative would degrade the resources that contribute to monument purposes.

Table MNT15. Comparison of effects to monument purposes

Resource contributing to monument purposes	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12
Cultural history of the Tlingit Indians Archaeological and historical resources	• 575 acres (cultural) • 203 acres (subsistence)	• 635 acres (cultural) • 171 acres (subsistence)	• 377 acres (cultural) • 127 acres (subsistence)	• 386 acres (cultural) • 109 acres (subsistence)	• No effects
Unspoiled coastal island ecosystem, including brown bears and bald eagles	• 923 acres (actions, watershed, and downstream) • 288 acres (isolation) • 718 acres (scenery) • Night and lowlight skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.	• 925 acres (actions, watershed, and downstream) • 945 acres (isolation) • 802 acres (scenery) • Night and lowlight skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.	• 1,473 acres (actions, watershed, and downstream) • 347 acres (isolation) • 624 acres (scenery) • Night and lowlight skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.	• 1,477 acres (actions, watershed, and downstream) • 544 acres (isolation) • 665 acres (scenery) • Night and lowlight skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.	• Night and lowlight skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.

4.19.3.2.8. Federal reserved rights

Table MNT16 lists the potential effects to federal reserved rights on Kootznoowoo Corridor Lands from the action alternatives.

Table MNT 16. Comparison of effects to federal reserved rights on Kootznoowoo Corridor Lands

Federal reserved right	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12
Right of public access and use	• 3 acres enclosed by perimeter fence	• 3 acres enclosed by perimeter fence	• 0 acres enclosed by perimeter fence	• 0 acres enclosed by perimeter fence	• No effect
Right of quiet enjoyment	• Up to 26 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer	• Up to 26 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer	• Up to 30 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer	• Up to 30 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer	• Up to 31 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer
	• Temporary localized increases from construction and vehicles	• Temporary localized increases from construction and vehicles	• Temporary localized increases from construction and vehicles	• Temporary localized increases from construction and vehicles	• No effect
	• Permanent localized increases from motorized equipment	• Permanent localized increases from motorized equipment	• Permanent localized increases from motorized equipment	• Permanent localized increases from motorized equipment	• No effect
Development rights	• 55 acres of developments	• 22 acres of developments	• 23 acres of developments	• 3 acres of developments	• No effect

4.19.3.3. Would any effects be irreversible or irretrievable?

All effects to monument purposes and federal reserved rights described above for each of the action alternatives would be both irreversible and irretrievable during construction and continued operation of the airport and access road.

4.19.3.4. How did the FAA determine the significance of the potential effects from the alternatives?

Neither the FAA nor the U.S. Forest Service has established significance thresholds for effects to monument purposes or federal reserved rights.

ANILCA Title XI, which outlines the process by which a transportation or utility system could be authorized in a national monument in Alaska, requires agency decision-makers to assess the compatibility of the proposed actions with the purposes for which it was established (as outlined under any establishing legislation). However, neither ANILCA Title XI nor the enabling legislation for the monument provides specific guidance on determining the compatibility of project *effects* with the monument purposes and federal reserved rights, or whether an effect that is found to be incompatible is automatically considered to be significant.

Because the U.S. Forest Service is a cooperating agency assisting the FAA with this assessment of potential effects to monument purposes and federal reserved rights, and because the U.S. Forest Service has management jurisdiction over the federal lands of the Tongass National Forest, the FAA consulted with the U.S. Forest Service and used their guidance to make determinations of significance of project effects to monument purposes and federal reserved rights. Significance is evaluated relative to the following two factors:

- The compatibility of the project effects with the management goals for and desired conditions of the monument purposes and federal reserved rights, as outlined in the land management plan (U.S. Forest Service 2008a)
- The compatibility of the project effects with the provisions and desired conditions for federal reserved rights as outlined in the enabling legislation

Incompatibility with either the land management plan (U.S. Forest Service 2008a) or the enabling legislation constitutes significance in this EIS. The effect need not be incompatible with both the plan and the legislation to be considered significant.

4.19.3.4.1. Management goals and desired conditions for monument purposes

The land management plan (U.S. Forest Service 2008a) indirectly addresses desired conditions for the monument purposes through its stated desired conditions for the resources that contribute to the monument purposes. Table MNT17 lists the monument purposes, their contributing resources, and the management goals and desired conditions of those resources.

Table MNT17. Admiralty Island National Monument purposes and related management goals and desired conditions

Resources contributing to monument purpose	Monument purposes	Management goals and desired conditions
Cultural history of the Tlingit Indians Archaeological and historical resources	• Scientific and historic study purposes	• Protect and study Tlingit cultural resources and other historical resources. • Appropriate research is encouraged and supported and contributes to both the purposes of the monument and improved management of other forest lands.
	• Educational purposes	• Protect and study of Tlingit cultural resources and other historical resources. • Appropriate interpretive and educational efforts to allow the public to better understand the resources and appreciate how they fit into the context of geology, ecology, and human history.
	• Cultural purposes	• Protect and study Tlingit cultural resources and other historical resources. • Manage significant and suitable heritage resource sites to realize their recreational and educational values to the public.
	• Historical and prehistorical purposes	• Protect and study Tlingit cultural resources and other historical resources. • Manage significant and suitable heritage resource sites to realize their recreational and educational values to the public.
	• Subsistence purposes	• Allow access for subsistence uses as provided for in ANILCA.
Unspoiled coastal island ecosystem, including brown bears and bald eagles	• Scientific and historic study purposes • Ecological purposes • Preservation purposes	• Inventory, research, protect, and interpret monument resources as directed by monument designations. • Protect and study brown bear and eagle populations. • Protect and study of Tlingit cultural resources and other historical resources.
	• Fish and wildlife purposes • Ecological purposes	• Protect and study brown bear and eagle populations. • Emphasize management for indigenous wildlife species and natural habitat. • Provide the abundance and distribution of habitat necessary to maintain viable populations. • Prevent habituation of brown bears. • Maintain habitat to support long-term nesting, perching, and winter roosting habitat capability for bald eagles. • Characterized by extensive, unmodified natural environments; ecological processes and natural conditions are not measurably affected by past or current human uses or activities.
	• Forestry purposes	• Characterized by extensive, unmodified natural environments; ecological processes and natural conditions are not measurably affected by past or current human uses or activities. • Commercial timber sales and harvesting are prohibited in the monument.

Table MNT17. Admiralty Island National Monument purposes and related management goals and desired conditions

Resources contributing to monument purpose	Monument purposes	Management goals and desired conditions
	• Recreational purposes	• Provide a spectrum of wildland recreation opportunities that reflect the existing ecological, historical, and sociological conditions found in the monument. • Manage significant and suitable heritage resource sites to realize their recreational and educational values to the public.
	• Subsistence purposes	• Allow access for subsistence uses as provided for in ANILCA.
	• Educational purposes	• Protect and study of Tlingit cultural resources and other historical resources. • Protect and study brown bear and eagle populations. • Appropriate interpretive and educational efforts to allow the public to better understand the resources and appreciate how they fit into the context of geology, ecology, and human history.
	• Wilderness purposes	• All designated wilderness on the Tongass National Forest is characterized by extensive, unmodified natural environments. • Ecological processes and natural conditions are not measurably affected by past or current human uses or activities. • Users have the opportunity to experience independence, closeness to nature, and solitude and remoteness, and may pursue activities requiring self-reliance, challenge, and risk. • Motorized and mechanized use is limited to the minimum needed for the administration of the wilderness. • Allow for access to state and private lands, subsistence uses, and public access and other uses to the extent provided for by ANILCA.
	• Historical and prehistorical purposes	• Protect and study Tlingit cultural resources and other historical resources. • Manage significant and suitable heritage resource sites to realize their recreational and educational values to the public.
	• Cultural purposes	• Protect and study Tlingit cultural resources and other historical resources. • Manage significant and suitable heritage resource sites to realize their recreational and educational value.
	• Scenic purposes	• Natural-appearing landscape. • Management activities are not visible to the casual observer. • Roads, facilities, and other structures are not visually evident or are subordinate to the landscape.

Source: U.S. Forest Service (2008a).

4.19.3.4.2. Provisions and desired conditions for federal reserved rights

As with the monument purposes, the land management plan (U.S. Forest Service 2008a) indirectly addresses desired conditions for the resources that contribute to federal reserved rights. Table MNT18 lists the federal reserved rights and the desired conditions of those rights.

Table MNT18. Kootznoowoo Corridor Lands federal reserved rights and their desired conditions

Federal reserved right	Desired conditions
Right of public access and use	• Provide a spectrum of wildland recreation opportunities that reflects the existing ecological, historical, and sociological conditions found within the Kootznoowoo Corridor Lands. • Manage significant and suitable heritage resource sites to realize their recreational and educational values to the public.
Right of quiet enjoyment	• The land management plan does not identify any desired condition for the provision in ANILCA Section 506 for quiet enjoyment by Kootznoowoo, Inc. The FAA and U.S. Forest Service have evaluated effects to quiet enjoyment through changes in noise compared to existing ambient conditions. However, because the enabling legislation has not defined "quiet enjoyment," no determinations of compatibility can be made.
Development rights	• Allow structures needed and authorized for specially authorized activities, and for the protection of monument values (purposes) • Construct only those facilities essential to operations and in a rustic manner to blend into the natural character of the area. • In accordance with ANILCA Title XI, transportation and utility system corridors may be located within the monument only after an analysis of potential transportation and utility system corridors has been completed and no feasible and prudent alternative exists outside the monument.

4.19.3.5. Would any of the action alternatives be compatible with the management goals and desired conditions for monument purposes and federal reserved rights?

4.19.3.5.1. Monument purposes

For the cultural history of the Tlingit Indians and for archaeological and historical resources, the effects of the monument alternatives would be compatible with desired conditions shown in Table MNT17; however, the monument alternatives would increase the challenge of managing Tlingit cultural sites and other historical sites. Some subsistence use areas would be adversely affected by the monument alternatives, but these alternatives would not limit the ability of subsistence users to access subsistence resources, nor would the overall abundance and availability of subsistence resources be reduced.

For the unspoiled coastal island ecosystem and its contributions to all monument purposes, all effects from the monument alternatives would be incompatible with the desired conditions shown in Table MNT17.

Airport 12a with Access 12a would not affect any of the resources within the boundaries of the monument, and its effects would therefore be compatible with the desired conditions of the related monument purposes.

4.19.3.5.2. Federal reserved rights

Based on the analysis presented in Tables MNT4, MNT6, MNT8, MNT10, and MNT12, all effects from the monument alternatives would be incompatible with the desired conditions shown in Table MNT17 for federal reserved rights.

Airport 12a with Access 12a would not affect any of the federal reserved rights within the boundaries of the Kootznoowoo Corridor Lands, and its effects would therefore be compatible with the provisions and desired conditions as outlined in the enabling legislation.

4.19.3.5.3. Summary finding of incompatibility and significance

Based on the findings of incompatibility discussed above, the FAA finds that both Airport 3a and Airport 4 with either access road would be incompatible with the desired conditions set forth in the enabling legislation and the land management plan (U.S. Forest Service 2008a). By extension, the FAA therefore finds that the effects from any of the monument alternatives to monument purposes and federal reserved rights would be significant.

Airport 12a with Access 12a would be compatible with the desired conditions of the monument and with the provisions and desired conditions for the Kootznoowoo Corridor Lands, and would therefore have no significant effect on monument purposes and federal reserved rights.

It is the position of the USFS that in general, national monuments are not threatened by large-scale projects that would degrade large proportions of their acreages. Rather, national monuments are threatened by the cumulative effect of small incremental changes over time and by new precedents allowing previously incompatible uses. These incremental changes and new uses together could add up to significant development, modification, and occupation of conservation system units, including national monuments, over time. In this light, the monument alternatives for the proposed Angoon Airport indirectly affect the public's appreciation that this undeveloped place is protected by national monument designation. Members of the public who may never visit Admiralty Island support the national monument for its intrinsic values, including opportunities for scientific study, historic study, and preservation; its objects of ecological, cultural, historical, prehistorical, and scientific interest; and its fish and wildlife, forestry, recreational, subsistence, educational, wilderness, historical, cultural, and scenic values. These values reflect the national interest expressed in President Carter's 1978 monument proclamation, ANILCA Section 503(c), and the Admiralty Island National Monument Land Management Act of 1990.

The precedent of constructing an airport in the national monument when there is a viable alternative outside but nearby the monument could increase concerns about the preservation of the Admiralty Island National Monument, the Kootznoowoo Wilderness Area, and other Alaskan national interest lands that could be subjected to ANILCA Title XI projects.

4.19.3.6. How could the effects described above be avoided, minimized, or mitigated?

Placement of either Airport 3a or Airport 4 in the monument would affect all monument purposes in the immediate area of the monument alternatives and the federal reserved rights in portions of the Kootznoowoo Corridor Lands; none of these effects could be entirely avoided or mitigated. Airport 12a with Access 12a would avoid direct use of monument lands and Kootznoowoo Corridor Lands; its only effects would be to the scenic purposes of the monument from skyglow and to the right of quiet enjoyment on Kootznoowoo Corridor Lands during those times when noise levels rise above ambient conditions.

The FAA has assumed that the best management practices and mitigation measures discussed in Chapter 7: Mitigation would be implemented for any selected alternative with the exception of the compensatory mitigation plan. This plan has been developed specifically for Airport 12a with Access 12a, the FAA's preferred alternative.

Effects from the visibility of permanent structures to the unspoiled coastal island ecosystem can be reduced by using natural color schemes incorporating green, brown, and tan, as well as natural materials such as wood for any aboveground structures or equipment.

4.19.3.7. How effective would these minimization and mitigation measures be, and what effects would remain if they were implemented?

The measures discussed above would help minimize effects from the action alternatives to monument purposes and federal reserved rights. However, most effects would remain and are unavoidable for Airport 3a and Airport 4 with either access road.

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5. Requirements of the Alaska National Interest Lands Conservation Act (ANILCA)

5.1. What information is provided in Chapter 5?[1]

In this chapter, the reader will find a general overview of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 (Public Law [PL] 96-487), a discussion of the ANILCA Title XI process, and the Federal Aviation Administration's (FAA's) findings as required under ANILCA.

5.2. What is ANILCA?

ANILCA is a federal law enacted in 1980 to create and set aside national parks and other public lands for conservation and protection in Alaska. More than 100 million acres of federal lands in Alaska were designated as new or expanded conservation system units. These lands are typically withdrawn from economic development, although public access is permitted for recreation and traditional activities, such as subsistence use.

What is discussed in Chapter 5?

[1] This chapter does not contain "Terms to Know" boxes to provide definitions for terms related to things such as aviation, regulations, and resources. Instead, the reader is referred to the glossary or related chapters and sections for definitions.

5.3. Why is ANILCA relevant to the Angoon Airport project?

As discussed in Chapter 1: Project Background – Planning for a Land-Based Airport at Angoon, when Congress passed ANILCA they recognized that many Alaskans, particularly those living in remote areas, depend on access across conservation system units to meet their socioeconomic and public safety needs. As such, Congress established Title XI of ANILCA to allow consideration of transportation and utility systems across these units. Title XI establishes a process in ANILCA to allow for the placement of transportation and utility systems in a conservation system unit. Approval for this is not automatic; a series of steps called the ANILCA Title XI process is required before a final determination can be made to authorize the transportation and utility system (see section 5.4). This process requires a finding that there are no feasible and prudent alternatives outside of the conservation system unit, a weighing of effects and benefits at local, state and national scales, an assessment as to how the proposed corridor would affect the legislated purposes and values of the area, and mitigation measures to reduce impacts. Title XI ensures a measured assessment that may result in a recommendation for or against allowing a transportation or utility corridor across a conservation system unit.

Under either Airport 3a or Airport 4, the location of the airport and access road (considered under ANILCA to be a transportation and utility system) would be in the Admiralty Island National Monument and Kootznoowoo Wilderness Area (referred to in this environmental impact statement [EIS] as the "Monument–Wilderness Area"), which is considered under ANILCA to be a conservation system unit. The airport would improve transportation accessibility and reliability for Angoon residents, whose current transportation options are limited to ferry and seaplane (see Chapter 2: Purpose of and Need for a Land-Based Airport at Angoon for more information on the project's purpose and need). For this reason, the Angoon Airport project conforms to the underlying purpose of Title XI to address critical transportation needs of Alaska residents.

5.4. What is the ANILCA Title XI process?

The process for placing a transportation and utility system in a conservation system unit is outlined in ANILCA Title XI Sections 1104, 1106, and 1107, and clarified in U.S. Department of the Interior regulations at 43 Code of Federal Regulations (CFR) 36. Section 1104 of ANILCA outlines the initial process for placement of a transportation and utility system, including summarizing the application process and establishing National Environmental Policy Act (NEPA) analysis timelines.

The State of Alaska is authorized by ANILCA Title XI to submit an application to build and operate an airport and access road in the Monument–Wilderness Area. The Alaska Department of Transportation and Public Facilities (DOT&PF), the project sponsor, submitted an ANILCA application to the FAA, the U.S. Forest Service, and the U.S. Army Corps of Engineers on January 9, 2015, for their proposed action, Airport 3a with Access 2. The DOT&PF, who would be the owner and operator of the airport, is considered the applicant in the Title XI process.

Because this application has been submitted, all involved federal agencies must comply with the requirements in ANILCA and go through the Title XI process. ANILCA Section 1103 states that other applicable laws shall continue to apply during the ANILCA Title XI process. These applicable laws can be superseded only by action from the President and Congress under ANILCA Title XI, as further detailed in this section below.

ANILCA Section 1102(3) defines a "federal agency" as "any Federal department or agency that has any function or duty under applicable law." For this EIS, these agencies are the FAA, the U.S. Forest Service, and the U.S. Army Corps of Engineers. The FAA is the lead federal agency with statutory authority over airports and airways in the United States. The FAA administers the Airport Improvement Program, through which the DOT&PF applied for approval of the airport layout plan and for a grant to fund design and construction (see section 1.7 in Chapter 1 for more information about the FAA's role). The U.S. Forest Service manages the Monument–Wilderness Area, which is the location of the DOT&PF's proposed action, Airport 3a with Access 2. Because the U.S. Forest Service manages these lands, the agency would need to issue a decision under NEPA to approve a special use authorization permit for this alternative in the Monument–Wilderness Area. The U.S. Army Corps of Engineers would need to issue a permit under Section 404 of the Clean Water Act of 1972 (PL 107-303) for Airport 3a with Access 2 because it would require that fill be placed in wetlands.

ANILCA Sections 1104(c) and (d) outline the ANILCA application process. Further clarification of the application requirements are described in 43 CFR 36. Federal land management agencies have adopted the Standard Form 299 *Application for Transportation and Utility Systems and Facilities on Federal Lands* as the application form. Supporting documentation needed by the agencies to determine whether they approve or disapprove the application is typically attached to Standard Form 299; for this project, this EIS serves as supporting documentation.

ANILCA Section 1106(b) outlines the process for approving or disapproving an application for a transportation and utility system in a conservation system unit, as follows:

- Within 4 months after the issuance of the final EIS, all federal agencies forward their tentative approval or disapproval with all supporting information to the President of the United States.
- Within 4 months of receiving this tentative approval or disapproval, the President decides whether to approve or deny the application.
- If the President approves, the ANILCA application is forwarded to Congress with a recommendation for approval.
- If Congress issues a joint resolution approving the application, the federal agencies are required to issue appropriate authorizations in accordance with applicable law.
- If the President denies the application, the ANILCA application process terminates. However, the DOT&PF would have the option of challenging the President's denial by filing a lawsuit with the judicial branch.

ANILCA Section 1107(a) outlines the terms and conditions federal agencies with permitting authority can impose on an approved transportation and utility system to minimize effects to resources and uses. The federal agencies for this EIS have provided initial draft terms and conditions that would be imposed on the project should the President and Congress approve the ANILCA application. The agencies' terms and conditions can be found in section 5.6.

5.5. What are the FAA's findings for tentative approval or disapproval under ANILCA's criteria?

ANILCA Section 1104(g) requires that each federal agency make a tentative approval or disapproval for the transportation and utility system. The tentative approvals or disapprovals will be based on detailed findings for the following eight ANILCA criteria.

1. The need for, and economic feasibility of, the transportation or utility system
2. Alternative routes and modes of access, including a determination on whether there is any economically ***feasible and prudent*** alternative to avoid the conservation system unit and, if not, whether there are alternative routes or modes that would result in fewer or less-severe adverse effects on the conservation system unit
3. The feasibility and effects of including different transportation or utility systems in the same area
4. Short- and long-term social, economic, and environmental effects of national, state, or local significance, including effects on fish and wildlife and their habitat and on rural, traditional lifestyles
5. The effects, if any, on the national security interests of the United States that may result from approval or denial of the application for a transportation or utility system
6. Any effects related to the purposes for which the federal unit or area concerned was established
7. Measures that should be instituted to avoid or minimize negative effects
8. The short- and long-term public values that would be affected by approval of the transportation and utility system versus the short- and long-term public benefits that may accrue from approval

What is discussed in this section?

The FAA's findings for these criteria are reported throughout this EIS and are summarized in sections 5.5.1 through 5.5.8 below. Because the DOT&PF's ANILCA Title XI application is specifically for Airport 3a with Access 2 (the DOT&PF's proposed action), this section reports the FAA's findings that are specific to Airport 3a with Access 2. Analysis for the other alternatives can be found throughout Chapter 4: Existing Conditions and Project Effects.

5.5.1. What is the need for this project? Is Airport 3a with Access 2 economically feasible?

ANILCA 1104(g)(2)(A) requires an assessment of the need for the project and the economic feasibility of the alternatives. The Angoon Airport project's stated purpose and need is as follows:

> Current transportation service to and from Angoon is solely by seaplane and ferry. These options do not provide sufficient availability and reliability in transportation to and from Angoon. A land-based airport will improve the availability and reliability of transportation services to and from Angoon.

Supporting information for this purpose and need is in Chapter 2 as well as *Alternatives Eliminated from Detailed Analysis* (SWCA 2014a, included as Appendix B). The FAA finds that a land-based airport would meet Angoon's unmet transportation needs by improving aviation availability and reliability. A land-based airport with runway lights, instrument approach procedures, and a fixed threshold would improve the availability of aviation service to Angoon. Airport 3a with Access 2 would allow flights during approximately 94% of the total hours in a given year. This more than doubles the 44% of hours per year that seaplane service is currently availabile (see section 2.3.1.1 in Chapter 2).

Estimated construction costs for Airport 3a with Access 2, based on estimates of labor, materials, and costs to purchase rights-of-way (in other words, to obtain land for airport and road facilities) and estimates for operation and maintenance costs are provided in Table ANILCA1, and further details are provided in section 3.5.3 of Chapter 3: Alternatives. The FAA would provide a portion of the funding for airport construction through its Airport Improvement Program (see section 1.7 in Chapter 1). The DOT&PF would provide the rest of the construction funding through its various funding programs, and would allocate funds in its annual budget for ongoing operation and maintenance of the airport. Fees charged for long-term apron or future hangar space for aircraft based at the airport would also contribute to operation and maintenance of the airport and access road.

Table ANILCA1. Estimated construction and operation costs for Airport 3a with Access 2

Alternative	Construction Costs	Operation and Maintenance Costs – Option 1	Operation and Maintenance Costs – Option 2
Airport 3a with Access 2	$57,098,911	$242,000/year One-time cost to procure equipment: $500,000	$110,000/year

Funding sources for Access 2 to Airport 3a remain uncertain. Due to the high cost of the access road relative to the cost of airport construction, and due to limited funding available in the Airport Improvement Program, the FAA has determined that it cannot fund the construction of this access road. The DOT&PF would be responsible for providing the funding necessary to construct the access road under this alternative. If the DOT&PF could secure funding for the access road, the FAA finds that Airport 3a with Access 2 could be economically feasible.

5.5.2. Is there an economically feasible and prudent alternative to an airport and access road in the Monument–Wilderness Area?

Under ANILCA Section 1104(g)(2)(B), the FAA must consider alternatives outside of the Monument–Wilderness Area. Airport 12a with Access 12a is not located in the Monument–Wilderness Area, and the FAA finds that this alternative is an economically feasible and prudent alternative. As shown in Table ANILCA2, Airport 12a with Access 12a is the most cost-effective alternative, costing approximately $22 million dollars less to construct than Airport 3a with Access 2, and $19,000 less (under Option 1) or $15,000 less (under Option 2) to operate and maintain per year.

Table ANILCA2. Comparison of costs

Alternative	Construction Costs	Operation and Maintenance Costs – Option 1	Operation and Maintenance Costs – Option 2
Airport 3a with Access 2	$57,098,911	$242,000/year One-time cost to procure equipment: $500,000	$110,000/year
Airport 12a with Access 12a	$34,571,000	$223,000/year One-time cost to procure equipment: $500,000	$95,000/year

Prudence findings for Airport 12a with Access 12a have been made based on the guidance provided in *Order 5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b). These findings are summarized in Table ANILCA3.

Table ANILCA3. Prudence criteria and findings for Airport 12a with Access 12

FAA Order 5050.4B Guidance	FAA Finding
Does the alternative meet the project's purpose and need?	Airport 12a with Access 12a would meet the purpose and need for improving aviation availability and reliability. Airport 12a would increase the availability of aviation service to Angoon by 89%. In comparison, Airport 3a with Access 2 would increase the availability of aviation service to Angoon by 94%.
Does the alterative cause extraordinary safety or operational problems?	Airport 12a with Access 12a would not cause extraordinary safety or operational problems, nor would any of the other action alternatives.
Are there unique problems or truly unusual factors present with the alternative?	There are no unique problems or unusual factors present at Airport 12a with Access 12a. In comparison, Airport 3a with Access 2 would require the placement of an airport and access road within the Monument–Wilderness Area. Although this placement is allowed under ANILCA Title XI, the process has never been used for a wilderness area. The Angoon Airport would be the first if an alternative to build in the Monument–Wilderness Area is approved at all stages in the ANILCA Title XI and NEPA processes. The impacts to the Monument–Wilderness Area could not be avoided or entirely mitigated, and are incompatible with the desired conditions for the area, as detailed in section 4.16 Wilderness Character and section 4.19 Admiralty Island National Monument.
Does the alternative cause unacceptable and severe adverse social, economic, or other environmental impacts?	The only impacts identified as significant at Airport 12a with Access 12a is to wetlands, but these impacts can be fully mitigated as described in Chapter 7: Mitigation. Therefore, Airport 12a with Access 12a does not cause unacceptable and severe adverse social, economic, or other environmental impacts. In comparison, Airport 3a with Access 2 would have significant impacts to the Monument–Wilderness Area, to Section 4(f) resources (see section 4.4 U.S. Department of Transportation Act Section 4(f) Evaluation Summary), and to visual resources (see section 4.9 Light Emissions and Visual Resources). These significant effects could not be completely mitigated, and would therefore cause unacceptable environmental impacts.
Does the alternative cause extraordinary community disruption?	Airport 12a with Access 12a would require acquisition of 37 (6%) of the area's available home sites, and therefore its effects would be too small to result in large-scale shifts in population or to influence the pattern of growth (see evaluation of these effects in section 4.12.3.3.6 of Chapter 4: Existing Conditions and Project Effects). Therefore, this alternative would not cause extraordinary community disruption. Airport 3a with Access 2 is not close to the town core and would also not cause extraordinary community disruption.
Does the alternative result in added construction, maintenance, or operational costs of an extraordinary magnitude?	Airport 12a with Access 12a is the most cost-effective alternative, costing approximately $22 million dollars less to construct that Airport 3a with Access 2 and $19,000 less (under Option 1) or $15,000 less (under Option 2) to operate and maintain per year. (Discussion of the operations options are in section 3.5.3.2 of Chapter 3: Alternatives.)
Does the alternative result in an accumulation of factors that collectively, rather than individually, have adverse impacts that present unique problems or reach extraordinary magnitudes?	None of the alternatives would result in an accumulation of factors that collectively have unique adverse impacts or reach extraordinary magnitudes.

5.5.3. What are the FAA's findings regarding the feasibility and effects of including different transportation or utility systems in the same area?

Per ANILCA Section 1104(g)(2)(C), the FAA must assess the feasibility and effects of including different transportation or utility systems in same area that Airport 3a with Access 2 would occupy. The FAA knows of two possible improvements in the area—a new water source for the community of Angoon and a power line, which are described and assessed here.

The community of Angoon is considering a new water source, an improvement that would be considered a utility system under ANILCA. Different water sources in the area, including Favorite Creek, which is in the Monument–Wilderness Area east of the location of Airport 3a with Access 2, could be considered. However, specific plans, designs, or applications are insufficiently developed at the time of this EIS for the FAA to assess the feasibility and effects of including such a water facility in the same location as Airport 3a with Access 2.

Airport 3a with Access 2 would be powered by a diesel generator at the airport. Electricity for the community of Angoon is also currently provided by diesel generators, but concrete steps have been taken toward developing hydroelectricity for the community. Should such a system be established, the DOT&PF reserves the right to connect to that electrical grid via an aboveground transmission line that would be located in the airport access road right-of-way. The size of the access road right-of-way has been designed to allow for the installation of aboveground transmission lines, and the potential effects from this action are disclosed in the EIS.

Because the water source project is currently in the early development stages, and because the potential effects of a power line are already disclosed in this EIS as part of Airport 3a with Access 2, the FAA finds that there are no other transportation or utility systems that could be located in the same area at this time.

5.5.4. What are the FAA's findings for the short- and long-term social, economic, and environmental effects of significance from Airport 3a with Access 2?

ANILCA Section 1104(g)(2)(D) requires that federal agencies take into account "the short- and long-term social, economic, and environmental impacts of national, State, or local significance, including impacts on fish and wildlife and their habitat, and on rural, traditional lifestyles." This EIS details the potential social, economic, and environmental effects

from Airport 3a with Access 2 in the "project effects" subsection of each resource section in Chapter 4. Table ANILCA4 provides a summary of these effects and their significance.

Table ANILCA4. Summary of effects and significance for Airport 3a with Access 2

Resource affected (location of supporting effects analysis and significance discussions)	FAA finding
Air quality (section 4.2.3)	Not significant • Construction-related emissions would be temporary and would be minimized through best management practices. All operations-related emissions would be below *de minimis* thresholds.
Compatible land use (section 4.3.3)	Not significant • There would be no noise-sensitive areas within the day-night average sound level (DNL) 65 A-weighted decibels (dBA) contour for Airport 3a. • Airport 3a would be considered a compatible land use because the ANILCA process could allow for an airport and access road to be placed on Monument–Wilderness Area lands.
U.S. Department of Transportation Act Section 4(f) evaluation (section 4.4.3)	Significant • Section 4(f) does not use the wording "significant." Instead, it makes a determination of whether there would be use of historic properties or recreation properties. Airport 3a with Access 2 would result in physical use of Section 4(f) resources. According to *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a), a significant effect occurs pursuant to NEPA when a proposed action either involves more than *de minimis* use of a Section 4(f) property or is deemed a "constructive use" substantially impairing the Section 4(f) property, and mitigation measures do not eliminate or reduce the effects of the use below the threshold of significance. Because Airport 3a with Access 2 would result in physical use of a Section 4(f) property, this use would be considered significant under FAA thresholds.
Terrestrial habitats and associated species (section 4.5.1.3)	Not significant • Airport 3a with Access 2 would not remove or alter existing habitat to the extent that the population dynamics, sustainability, reproduction, mortality, or minimum population size needed to sustain a species would be adversely affected. The effects would not reduce the habitat supporting species below that needed to maintain self-sustaining populations. Maintenance of natural systems would not be adversely affected. The action would be consistent with applicable state natural resources management strategies.
Aquatic habitats and associated species (section 4.5.2.3)	Not significant • Airport 3a with Access 2 would not remove or alter existing habitat to the extent that the effects would reach the significance thresholds described in section 4.5.2.3.5. • Airport 3a with Access 2 would not cause any of the unacceptable adverse effects to non-wetland waters of the U.S. using the Section 404(b)(1) guidelines identified in section 4.5.2.1.2.

Table ANILCA4. Summary of effects and significance for Airport 3a with Access 2

Resource affected (location of supporting effects analysis and significance discussions)	FAA finding
Special status species (section 4.5.3.3)	Not significant • There would be no long-term direct effects to federally listed species, candidate species, or species protected under the Marine Mammal Protection Act. None of the action alternatives would "jeopardize a species' continued existence or destroy or modify a species' critical habitat." o The potential for collisions between barges and marine mammals is a temporary effect that would cease at the end of construction. The likelihood of ship strikes to marine mammals as a result of the airport project would be very low, and ship strikes are not expected to affect marine mammal populations in Southeast Alaska. Because Airport 12a with Access 12a is the preferred alternative, the FAA prepared the *Biological Assessment of Listed Species for the Angoon Airport Project* (SWCA 2014c, included in this EIS as Appendix R), determining that this alternative may affect but is not likely to adversely affect humpback whales and Steller sea lions. The National Marine Fisheries Service concurred with this determination. • The total habitat affected under Airport 3a with Access 2 is such a small proportion of the available habitat in the study area (less than 6%) that no species would be jeopardized at the population level. • The effects would not be so extensive as to alter the population dynamics, sustainability, reproduction, mortality, or minimum population size needed to sustain a species. The effects would not reduce the habitat supporting species below that needed to maintain self-sustaining populations. Maintenance of natural systems would not be adversely affected. The action would be consistent with applicable state natural resources management strategies.
Floodplains, stream geomorphology, and hydrology (section 4.6.3)	Not significant • Airport 3a with Access 2 would change the floodplain in the locations of bridge piers, causing limited and localized effects on the floodplain's natural and beneficial functions, such as flood storage and filtration. The limited area of the piers would not endanger human lives or reduce floodplain capacity enough to measurably increase flood risk, and therefore effects would not be considered significant. *Note: The FAA does not have established significance thresholds for stream geomorphology and hydrology, and does not set them in this EIS.*
Hazardous materials, pollution prevention, and solid waste (section 4.7.3)	Not significant • Airport 3a with Access 2 would not involve a property on or eligible for the Environmental Protection Agency's National Priority List; the project sponsor would not have difficulty meeting applicable local, state, or federal laws and regulations on hazardous materials; and there are no unresolved issues regarding hazardous materials.
Cultural resources (section 4.8.3)	Not significant • No significant effects to cultural resources were identified for Airport 3a with Access 2. Significant effects could occur if currently buried or hidden cultural resources are uncovered during construction. As detailed in section 7.4.2 of Chapter 7: Mitigation, cultural resources monitors would be used during construction to watch for the exposure of buried cultural resources hidden by dense vegetation. Standard protocol for reporting the discovery to the proper agencies and consulting with agencies and other consulting parties about the best way to address the discovery would be followed. If Airport 3a with Access 2 is approved at all stages in the ANILCA Title XI and NEPA processes, cultural resources field surveys would be completed and concurrence on determinations of effect will be received from the State Historic Preservation Office as required by 36 CFR 800.

Table ANILCA4. Summary of effects and significance for Airport 3a with Access 2

Resource affected (location of supporting effects analysis and significance discussions)	FAA finding
Light emissions and visual resources (section 4.9.3)	Significant • Vegetation clearing for Airport 3a would be visible from Viewpoint 2 to the Favorite Bay shoreline, producing clearly observable deviations from the designated "High" scenic integrity in the U.S. Forest Service–administered Monument–Wilderness Area. The contrasts would not repeat the surrounding form, line, color, and texture, and would exceed the planning objectives for the area. Mitigation of visual contrasts within the airport site would not sufficiently reduce the contrasts below the significance threshold.
Energy supply, natural resources, and sustainable design (section 4.10.3)	Not significant • Given the FAA threshold for effects to energy supplies and natural resources, Airport 3a with Access 2 is not expected to have significant effects. It would not create demands for energy and natural resources that would exceed available or future natural resources or energy supplies in the Angoon area. The materials that would be barged in for this project are in sufficient supply in other locations in Southeast Alaska (see section 3.4.2.1 for further description of potential materials source sites).
Noise (section 4.11.3)	Not significant • There would be no noise-sensitive areas within the DNL 65 dBA contour for Airport 3a with Access 2. Therefore, per FAA orders, there would be no significant effect from noise to noise-sensitive areas.
Socioeconomic conditions (section 4.12.3)	Not significant • Direct effects related to business relocation, traffic patterns, and tax base would not be significant because they would fall below the FAA's significance thresholds • For indirect effects, construction of the proposed airport and access road would result in short-term positive economic and employment effects for the Angoon community, but these effects would not be significant. All other indirect effects—including changes in transportation costs, public service demand, subsistence, and population movement and growth—would also not be significant.
Subsistence resources and uses (section 4.13.3)	Not significant • There would be no major reductions in abundance or availability of subsistence resources because less than 7% of land mammal and upland bird use areas would be affected by Airport 3a with Access 2, which is assumed to directly correlate to less than an 8% reduction in total harvest for terrestrial species. Based on the significance criteria outlined in this EIS, a significant effect to abundance and availability would only occur if project-related effects resulted in a reduction of more than 16% in the total harvest of a resource. In addition, there would be no substantial interference in access of subsistence use sites, and, in the case of Access 2, access to surrounding use areas would increase. Finally, although there would be some increase in nonlocal use of the Angoon area predominantly for recreational fishing and marine invertebrate harvest, reported visitor levels are low and not likely to substantially rise above existing nonlocal use levels. *Note: The FAA does not have established significance thresholds for subsistence, and does not set them in this EIS. For this EIS, significance has been determined based on criteria used by the U.S. Forest Service, developed by the Bureau of Land Management, and confirmed by the U.S. District Court in Alaska.*

Table ANILCA4. Summary of effects and significance for Airport 3a with Access 2

Resource affected (location of supporting effects analysis and significance discussions)	FAA finding
Water quality (section 4.14)	Not significant • As stated in section 4.14.3.6 of Water Quality, Airport 3a with Access 2 would not threaten a public drinking water supply, sole source aquifer, or waters of national significance, and no difficulty is expected in obtaining a Storm Water Construction General Permit. In this EIS, the significance of water quality effects is therefore based on the State of Alaska's standards and beneficial uses of the surface water affected. As described in section 4.14.3.2.1, construction best management practices would be implemented to avoid turbidity increases in excess of 5 nephelometric turbidity units, thereby protecting beneficial uses. Through proper application of best management practices and spill prevention measures during construction, operation, and maintenance, there would be no significant effects to water quality.
Wetlands (section 4.15.3)	Significant • Development of Airport 3a with Access 2 would convert wetlands to uplands, and result in the loss of all wetland functions and services in areas where wetlands were filled. • Reductions in wetland functions and services would occur as a result of wetland alteration due to vegetation clearing and tree felling. • Wetland functions and services would be reduced in areas where the loss of a portion of a wetland or of adjacent wetlands resulted in modifications to wetland hydrology and associated wetland functions and services. • The magnitude and extent of activities under Airport 3a with Access 2 is considered significant under NEPA according to the significance criteria described in section 4.15.3.5 of Wetlands.
Wilderness character (section 4.16)	Significant • Airport 3a with Access 2 would be incompatible with the desired conditions set forth in the Wilderness Act and the *Tongass National Forest Land and Resource Management Plan* (U.S. Forest Service 2008a). By extension, the FAA therefore finds that the effects from any of the wilderness alternatives to wilderness qualities and public purposes would be significant. *Note: The FAA does not have established significance thresholds for wilderness character and does not set them in this EIS. Because Airport 3a and Airport 4 are on lands managed by the U.S. Forest Service, the FAA consulted with them and used their guidance to make determinations of significance.*
Climate change and greenhouse gas emissions (section 4.17)	Not significant • Although the FAA does not have established significance thresholds for climate change and greenhouse gas emissions, it should be noted that greenhouse gas emissions would be short in duration and negligible in quantity during construction. Operation and maintenance of a land-based airport would reduce greenhouse gas emissions by approximately 50%, as compared to the no action alternative.
Environmental justice and children's health and safety (section 4.18)	Not significant • There would be no disproportionately high and adverse effects to low-income or minority residents as a result of the proposed project. For this reason, none of the action alternatives would have a significant effect on the environmental justice population. • There would be no disproportionately high and adverse health and safety risks to children from any of the action alternatives.

Table ANILCA4. Summary of effects and significance for Airport 3a with Access 2

Resource affected (location of supporting effects analysis and significance discussions)	FAA finding
Admiralty Island National Monument (section 4.19)	Significant • Airport 3a with Access 2 would be incompatible with the desired conditions set forth in the enabling legislation and the *Tongass National Forest Land and Resource Management Plan* (U.S. Forest Service 2008a). By extension, the FAA therefore finds that the effects from any of the monument alternatives to monument purposes and federal reserved rights would be significant. *Note: The FAA does not have established significance thresholds for monument purposes and federal reserved rights and does not set them in this EIS. Because Airport 3a and Airport 4 are on lands managed by the U.S. Forest Service, the FAA consulted with them and used their guidance to make determinations of significance.*

Note: Gray shading denotes a significant effect.

5.5.5. Has the FAA found that there would be any effects on the national security interests of the United States from approval or denial of the application for Airport 3a with Access 2?

Under ANILCA Section 1104(g)(2)(E), the FAA must assess the potential effects on national security interests from the proposed project. There are no universally accepted definitions of "national security," and ANILCA does not provide one. Most definitions offered by the federal government over the past 30 years refer to the following elements as key components of national security: military defensibility, economic independence, political stability and international power, environmental viability, and access to energy and natural resources important to maintaining or growing national political or economic power.

The FAA finds that the national security interests of the United States would not be affected by the approval or denial of the application for Airport 3a with Access 2 for the following reasons:

- The project would not introduce new or unsecured means of foreign access into the country, nor would it provide new or unsecured access to sensitive military or economic establishments of national interest.
- The project would not weaken the political stability or the international standing of the United States, nor would it result in environmental degradation or contamination that could threaten the existence of the United States.
- The project would not provide or limit access to energy sources or natural resources such as water, land, or minerals that are important to national defense or political or economic power.

5.5.6. Did the FAA find any effects from Airport 3a with Access 2 to the purposes for which the Monument–Wilderness Area was established?

ANILCA Section 1104(g)(2)(F) requires that federal agencies consider any effects to the purposes for which the federal unit or area concerned was established. In the case of the Angoon Airport project, two overlapping but distinct federal units are involved: the Kootznoowoo Wilderness Area and the Admiralty Island National Monument. Additionally, Section 506(a)(3)(C) of ANILCA conveyed the rights, title, and interest in lands in parts of the national monument from mean high tide to approximately 660 feet inland to Kootznoowoo, Inc., the local Alaska Native corporation. Known as the Kootznoowoo Corridor Lands, these lands are still also considered part of the monument, and the federal government has

reserved certain rights, called in this section "federal reserved rights." The following sections summarize the effects to these federal units and provide the FAA's findings regarding the compatibility of Airport 3a with Access 2 with existing land management. This information is based on the analysis contained in section 4.16 Wilderness Character and section 4.19 Admiralty Island National Monument.

5.5.6.1. Kootznoowoo Wilderness Area

As described in section 4.16 Wilderness Character, wilderness areas serve the purpose of maintaining the qualities that contribute to the overall character of wilderness. These are the untrammeled quality, the natural quality, the undeveloped quality, and opportunities for solitude and primitive and unconfined recreation (see section 4.16.1.2 in Wilderness Character). Additionally, Section 4(b) of the Wilderness Act of 1964 (PL 88-577) describes wilderness areas as being "devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use." Table ANILCA5 lists the qualities that contribute to the area's wilderness character; the airport construction, operation, and maintenance actions that could cause effects; and a summary of the effects. Table ANILCA6 lists the public purposes and the acreages with those purposes that would be degraded by Airport 3a with Access 2. Further details and analysis can be found in section 4.16 Wilderness Character.

Construction and operation actions that could result in changes to wilderness qualities and public purposes are as follows:

Construction actions	Operations actions
Vegetation removal	Arrivals and departures of airplanes
Terrain disturbance	Maintenance of cleared areas (vegetation clearing)
Pavement	Maintenance of road and airport pavement
Tree felling	Vehicles traveling on access road
Bridge construction	Increased presence and activities of humans
Rerouting of streams	Noxious weed treatments, as required
Culverting of streams	Operation of radio-controlled lights during flight arrival and departure
	Airport generator refueling and aircraft refueling

Table ANILCA5. Effects to wilderness qualities from Airport 3a with Access 2

Quality	Specific action causing effects	Effect
Untrammeled	• Construction actions and operations actions	• Seven construction actions and eight operations actions
Natural	• Construction actions and operations actions, and the downstream or watershed effects of those actions	• 791 acres degraded
	• Isolation of wilderness	• 126 acres isolated from the main Kootznoowoo Wilderness Area
Undeveloped	• Presence of developments	• Eight types of developments introduced • 22 acres of developments introduced • Visibility of vehicles and maintenance equipment
	• Presence of motorized equipment	• Motorized equipment for maintenance of vegetation, pavement, snow removal, aircraft operations, public vehicular access, and for electrical generation
Opportunities for solitude	• New or improved access to the wilderness area	• 1,713 acres of new or improved access
	• Light emissions from construction	• Skyglow visible in the wilderness area near the runway and access road for up to three construction seasons
	• Light emissions during operation	• Intermittent, brief, and low-intensity skyglow from the airport's upward-directed runway lights and navigational aids in the immediate vicinity of the runway during approaches and takeoffs • 502 acres where headlights would be visible during night or daytime low-light conditions
	• Presence of developments and motorized equipment	• 502 acres where developments or motorized equipment would be visible • Exceedance of recommended encounter rates for recreational opportunity spectrum classes • Unquantifiable use of access road for subsistence, recreation, and maintenance
	• Noise from aircraft	• Maximum of 26 additional minutes per day time above ambient (TAA) from existing conditions in wilderness boundary • 186,551 acres of wilderness where aircraft noise above ambient could be heard by wilderness users for 1 minute or longer in a 24-hour period
	• Noise from construction equipment • Noise from vehicles and maintenance equipment	• Temporary increases in noise from construction equipment and worker vehicles in localized areas near this alternative only during construction • During operation, unquantifiable noise from vehicles and maintenance equipment
Opportunities for primitive and unconfined recreation	• Presence of perimeter fence (restricting access) or pavement (hindering primitive and unconfined recreation)	• 101 acres where primitive and unconfined recreation could no longer occur

Table ANILCA6. Effects to the wilderness public purposes from Airport 3a with Access 2

Resource contributing to public purposes	Acres degraded
Unspoiled natural ecosystem	893
Brown bears	306
Eagles	180
Cultural resources	342
Customary and traditional subsistence uses	148
Visual resources	502

Note: For details on the effects to the wilderness purposes, see Table WC6 in Wilderness Character.

Effects to wilderness qualities would be incompatible with the desired condition of the Kootznoowoo Wilderness Area as set forth by the Wilderness Act and the *Tongass National Forest Land and Resource Management Plan* (U.S. Forest Service 2008a). All effects to public purposes would be incompatible with desired conditions for brown bear and eagle habitat, natural ecological processes as they relate to hydrology and stream function, visual (scenic) resources, and subsistence resources and uses. No specific effects on known cultural sites were identified for either Airport 3a with Access 2; therefore, effects would be compatible with desired conditions for cultural resources, although this alternative would increase the challenge of managing Tlingit cultural sites and other historical sites.

5.5.6.2. Admiralty Island National Monument and Kootznoowoo Corridor Lands

As described in section 4.19 Admiralty Island National Monument, the monument's purposes and values (hereafter referred to in this chapter as "monument purposes") are based on three pieces of legislation, as follows:

- From President Jimmy Carter's Proclamation 4611 under the Antiquities Act of 1906 (16 United States Code [USC] 431): Scientific study, historic study, and preservation
- From ANILCA Section 503(c): Objects of ecological, cultural, geological, historical, prehistorical, and scientific interest
- From Admiralty Island National Monument Land Management Act of 1990 (PL 101-378): Fish and wildlife, forestry, recreational, subsistence, educational, wilderness, historical, cultural, and scenic values

Table ANILCA7 shows the ways Airport 3a with Access 2 would affect the resources that contribute to these monument purposes. Further details and analysis can be found in section 4.19 Admiralty Island National Monument.

Table ANILCA7. Comparison of effects to monument purposes

Resource contributing to monument purposes	Effects to monument purposes
Cultural history of the Tlingit Indians Archaeological and historical resources	• 575 acres (cultural) • 203 acres (subsistence) • *Note*: These areas were calculated based on the analysis in section 4.8. Cultural Resources, and section 4.13 Subsistence Resources and Uses.
Unspoiled coastal island ecosystem, including brown bears and bald eagles	• 923 acres (actions, watershed, and downstream) • 288 acres (isolation) • 718 acres (scenery) • *Note*: For an explanation of how these areas were calculated, see Figure MNT4 in Admiralty Island National Monument. • Night and lowlight skyglow during three seasons of construction and during approach and takeoff. Headlights from vehicle traffic.

The federal reserved rights for the Kootznoowoo Corridor Lands are as follows:

- All timber rights are reserved subject to subsistence uses consistent with Title VIII of [ANILCA].
- The right of public access and use within such area, subject to regulation by the Secretary of Agriculture to ensure protection of the resources, and to protect the rights of quiet enjoyment of Kootznoowoo, Inc., granted by law, including subsistence uses consistent with Title VIII of ANILCA.
- The subsurface estate.
- The development rights, except that the Secretary of Agriculture is authorized to permit construction, maintenance, and use of structures and facilities on said land which he determines to be consistent with the management of the Admiralty Island National Monument: *Provided*, That all structures and facilities so permitted shall be constructed of materials which blend and are compatible with the immediate and surrounding landscape. (ANILCA Section 506(a)(3)(C))

Table ANILCA8 lists these federal reserved rights and summarizes the effects to them. Further details and analysis can be found in section 4.19 Admiralty Island National Monument.

Table ANILCA8. Effects to federal reserved rights on Kootznoowoo Corridor Lands from Airport 3a with Access 2

Federal reserved right	Airport 3a with Access 2
Right of public access and use	• 3 acres enclosed by perimeter fence
Right of quiet enjoyment	• Up to 26 additional minutes per day • 4,542 acres where noise above ambient could be heard for 1 minute or longer
	• Temporary localized increases from construction and vehicles
	• Permanent localized increases from motorized equipment
Development rights	• 55 acres of developments

Note: Effects to resources related to timber rights are discussed in sections 4.5 Biological Resources, and 4.15, Wetlands. The possibility of effects to the subsurface estate are dismissed in section 3.4.2.2.2 of Chapter 3: Alternatives, and Appendix C. Therefore, effects to these two federal reserved rights are not included in this section.

For the cultural history of the Tlingit Indians and for archaeological and historical resources, the effects from Airport 3a with Access 2 would be compatible with the desired conditions of the Admiralty Island National Monument; however, this alternative would increase the challenge of managing Tlingit cultural sites and other historical sites. Some subsistence use areas would be adversely affected by Airport 3a with Access 2, but would not limit the ability of subsistence users to access subsistence resources, nor would the overall abundance and availability of subsistence resources be reduced. For the unspoiled coastal island ecosystem and its contributions to all monument purposes, all effects from Airport 3a with Access 2 would be incompatible with the desired conditions.

All effects from Airport 3a with Access 2 would be incompatible with the desired conditions for the federal reserved rights of the Kootznoowoo Corridor Lands.

Based on the findings of incompatibility discussed above, the FAA finds that Airport 3a with Access 2 would be incompatible with the desired conditions set forth in the enabling legislation and the U.S. Forest Service's land management plan (U.S. Forest Service 2008a).

5.5.7. Did the FAA find that certain measures should be instituted to avoid or minimize negative effects to Monument–Wilderness Area lands?

ANILCA Sections 1104(g)(2)(G) and 1107(a)(2-6) require federal agencies for the Angoon Airport to consider avoidance, minimization, and mitigation measures for negative effects to the Monument–Wilderness Area. A comprehensive discussion about avoidance, minimization, and mitigation measures can be found in Chapter 7: Mitigation. It should be noted that the compensatory mitigation plan presented in Chapter 7 has been developed for Airport 12a with Access 12a, the FAA's preferred alternative. However, this plan could be used to offset significant impacts to wetlands for Airport 3a with Access 2. Chapter 7 also includes specific minimization measures that would be required for Airport 3a with Access 2.

The FAA finds that mitigations and minimization measures would need to be developed for impacts to visual resources, wilderness character, and the national monument's purposes and federal reserved rights if the application for Airport 3a with Access 2 is approved at all stages in the ANILCA Title XI and NEPA processes.

5.5.8. What are the FAA's findings regarding effects to short- and long-term public values versus the short- and long-term public benefits that may accrue as a result of approval of the application for Airport 3a with Access 2?

ANILCA Title XI does not define the term "public values" as used in ANILCA Section 1104(g)(2)(H). The U.S. Forest Service and the Department of Agriculture have no regulations implementing the provisions of ANILCA Title XI, and U.S. Forest Service policies and manuals do not define the term. However, the U.S. Department of the Interior ANILCA access regulations at 43 CFR 36 define "public values" as "those values relating to the purposes for which the area was established as defined by the enabling legislation for the area." Because the U.S. Forest Service and the Department of Agriculture have no guidance on this criterion, this EIS uses U.S. Department of the Interior regulations to provide guidance on this provision in ANILCA Title XI.

Because the public values are linked to the public purposes, the findings for the short- and long-term effects to the public values are the same as those discussed in section 5.5.6. In general, Airport 3a with Access 2 would have significant effects to these public values because the airport is incompatible with the desired conditions for the public purposes.

Public benefits would result from Airport 3a with Access 2. As discussed in Chapter 2, the project would provide a long-term public benefit by meeting residents' need for improved availability and reliability of transportation services to and

from Angoon. Other public benefits would include improved and new access to subsistence resources and additional revenue and jobs for the community of Angoon. Under Airport 3a with Access 2, access would be improved to 2,021 acres of subsistence use areas, and new access would be opened to as many as 725 acres of subsistence use areas (see section 4.13.3.4.3 in Subsistence Resources and Uses). Airport 3a with Access 2 would generate $1,382,780 in economic benefit, $23,403 in sales taxes, and approximately 15 new jobs during airport construction and operation (see Table SO5 in Socioeconomic Conditions).

5.6. What terms and conditions could be imposed on Airport 3a with Access 2?

ANILCA Section 1107(a) outlines the terms and conditions federal agencies with permitting authority can impose on an approved transportation and utility system to minimize effects to resources and uses. These terms and conditions include the following:

- Requirements to ensure that, to the maximum extent feasible, the right-of-way is used in a manner compatible with the purposes for which the affected conservation system unit…was established or is managed.
- Requirements for restoration, revegetation, and containment or prevention of erosion of the surface of the land.
- Requirements to ensure that activities in connection with the right-of-way will not violate applicable air and water quality standards and related facility siting standards established pursuant to law.
- Requirements, including the minimum necessary width, designed to control or prevent
  - damage to the environment (including damage to fish and wildlife habitat),
  - damage to public or private property, and
  - hazards to public health and safety.
- Requirements to protect the interests of individuals living in the general area of the right-of-way who rely on the fish, wildlife, and biotic resources of the area for subsistence purposes.
- Requirements to employ measures to avoid or minimize adverse environmental, social, or economic effects.

The FAA and the cooperating agencies have developed the following list of preliminary terms and conditions. These terms and conditions would be imposed if the application for Airport 3a with Access 2 is approved by the President and Congress. It should be noted that these terms and conditions are preliminary, and further stipulations will be required if Airport 3a with Access 2 is approved at all stages in the ANILCA Title XI and NEPA processes.

- Field surveys for cultural resources will be completed and concurrence on determinations of effect will be received from the state historic preservation officer as required by 36 CFR 800.
- Information regarding proposed avoidance, minimization, and compensatory mitigation will be developed per 33 CFR 325.1(d)(7).

- To satisfy the Endangered Species Act of 1973, the biological assessment conducted for Airport 12a with Access 12a will be supplemented with information about Airport 3a with Access 2 before the U.S. Forest Service issues the right-of-way permit.
- To comply with the Magnuson-Stevens Fishery Conservation and Management Act, an essential fish habitat assessment would be completed for all affected anadromous streams before the U.S. Forest Service issues the right-of-way permit.
- Mitigation measures must be developed for impacts to wetlands, floodplains, visual resources, wilderness character, and the national monument's purposes and federal reserved rights.
- A wetlands delineation and identification of waters of the U.S. will be completed and jurisdictional determinations will be received from the U.S. Army Corps of Engineers before the U.S. Forest Service issues the right-of-way permit. Information regarding proposed avoidance, minimization, and compensatory mitigation will be developed per 33 CFR 325.1(d)(7).
- In addition to the best management practices identified in the EIS to control, detect, and monitor for invasive species, an invasive plant management plan would be developed and control measures would be implemented to comply with Executive Order 13112.
- All best management practices listed in Chapter 7 of the final EIS relevant to Airport 3a with Access 2 will be included as terms and conditions to comply with Executive Order 11988; Executive Order 11990; the Bald and Golden Eagle Protection Act of 1940 (as amended); Executive Order 12962; Clean Water Act Sections 319(b)(2)(f), 319(k), and 313; and Executive Order 12088.
- Substantial changes to the proposed action would be subject to additional NEPA review.
- If major steps toward implementation of the proposed action have not commenced within 3 years of approval of the final EIS, a written reevaluation must be prepared in accordance with Paragraph 9-2 of FAA Order 1050.1F unless a decision has been made to prepare a new or supplemental EIS.
- The DOT&PF would be required to meet conditions to receive grant-in-aid funding from the FAA's Airport Improvement Program for a new runway, including but not limited to, an Airport Layout Plan, cost benefit analysis, and land acquisitions, as necessary.

6. CONSTRUCTION EFFECTS

6.1. What information is provided in Chapter 6?

This chapter discusses temporary effects that would occur during construction of a land-based airport and access road. The Federal Aviation Administration (FAA) requires that construction activities be conducted in accordance with the Standards for Specifying Construction of Airports (Advisory Circular 150/5370-10F [FAA 2011a]). Additional permits (for example, an Alaska Pollutant Discharge Elimination System permit) and certain best management practices (for example, erosion control measures) are required during construction. These are discussed in Chapter 7: Mitigation.

What is discussed in Chapter 6?

6.2. What are construction effects?

In this environmental impact statement (EIS), a construction effect is one that is temporary and that ends as soon as construction ceases. Construction effects should not be confused with the construction actions discussed throughout this EIS. For example, during construction of the airport there would be terrain disturbance, including blasting of bedrock. The noise from this construction action would have the temporary effect of disturbing or displacing animals. Once blasting ceases, it is assumed animals would return to the area.

For this EIS, the construction season is assumed to run from May through October. Because Airport 12a with Access 12a would be closer to town and have a shorter access road, the construction period is assumed to be two seasons. Airport 3a and Airport 4 with either access road would be farther from town and require more materials; the construction period for these alternatives is assumed to be three seasons. Actual construction seasons would be determined after a build alternative is selected in the record of decision, the airport is designed, and a construction bid is accepted. Due to the mild climate in Angoon, construction could occur year-round, depending on weather conditions.

6.3. Which resources would experience temporary construction effects?

The following resources would experience temporary construction effects:

- Air Quality
- Terrestrial Habitats and Associated Species
- Aquatic Habitats and Associated Species
- Special Status Species
- Floodplains, Stream Geomorphology, and Hydrology
- Hazardous Materials, Pollution Prevention, and Solid Waste
- Light Emissions and Visual Resources
- Energy Supply, Natural Resources, and Sustainable Design
- Noise
- Socioeconomic Conditions
- Subsistence Resources and Uses
- Water Quality
- Wilderness Character
- Climate Change and Greenhouse Gas Emissions
- Admiralty Island National Monument/Kootznoowoo Corridor Lands

Summaries of construction effect relevant to these sections appear in the subsections that follow.

6.3.1. Air quality

Estimated construction-related emissions associated with all action alternatives are summarized in Table CON1 and broken out by type of criteria pollutant. The Environmental Protection Agency does not provide heavy-duty non-road engine emission standards for all criteria pollutants; only those with standards are reported and discussed in this EIS.

Compared to the no action alternative, any of the action alternatives would increase construction-related emissions for carbon monoxide, nitrogen oxides and non-methane hydrocarbon, and particulate matter. However, construction emissions from any action alternative would be temporary and end immediately upon the completion of airport and access road construction. Minimization measures would also be employed during the construction period to reduce emissions; such measures include preventing vehicles from idling during periods of inactivity, and implementing soil erosion or stabilization controls (see Chapter 7: Mitigation).

Table CON1. Air emissions for airport construction

	Carbon monoxide (tons)	Nitrogen oxides and non-methane hydrocarbon (tons)	Particulate matter (tons)
No action alternative	0	0	0
Any action alternative	57.04*	107.55*	3.25*

*Calculations based on emissions rates and sources listed in Table AQ1. Emissions calculations assume 907,184.7 grams/ton and an average 300-horsepower (224-kilowatt) diesel engine on construction equipment for 50 construction vehicles during the two to three construction seasons.

6.3.2. Terrestrial habitats and associated species

There would be increased human activity during construction in areas where terrestrial wildlife is generally unaccustomed to humans. Terrestrial wildlife would be disturbed and displaced by this increased human presence for two or three construction seasons, depending on the alternative. Disturbance or displacement of terrestrial species would also occur from noise from vehicles, construction equipment, blasting, and installation of bridge piers, or from lighting used during construction. However, because suitable habitat for terrestrial species is abundant in and around the Angoon area, individual animals near construction noise are expected to be able to find alternate locations, and therefore measurable species-wide effects are not expected.

Existing traffic patterns on Kootznahoo Road and the Bureau of Indian Affairs (BIA) Road would be affected throughout the construction period, most heavily when construction begins and when the construction vehicles and equipment are first offloaded from the barge area. Although the speed limit and volume of traffic on roads would be low, there could be an increase in the number of animals injured or killed by vehicles as a result of the additional access road and increased traffic on existing roads.

6.3.3. Aquatic habitats and associated species

Under the Access 2 or Access 3 alternatives, pile driving during the installation of bridge piers in Favorite Creek would generate sound in the water. Pile driving may produce harmful sound levels that could disrupt, displace, injure, or kill fish. The magnitude of the sound effects from pile driving to aquatic species is evaluated using the number of piers that would be installed (Table CON2).

This analysis assumes temporary habitat removal within the entire in-stream temporary use area at Favorite Creek because the exact quantity and locations of piers would not be determined until the design phase of the project. Through coordination with the Alaska Department of Fish and Game, in-stream construction activities would not be conducted during the typical salmon migratory or spawning periods, approximately May 15 to September 15 (U.S. Forest Service 2001b). The temporary stream habitat removal that would occur in Favorite Creek would be a direct temporary effect for up to three construction seasons, depending on the length of construction, because the habitat would return to its existing condition once construction ceased (Table CON2).

Table CON2. Summary of construction effects to habitats and species

Potential construction effect	No action	Airport 3a with Access 2	Airport 3a with Access 3	Airport 4 with Access 2	Airport 4 with Access 3	Airport 12a with Access 12a
Acres of stream habitat removal:						
Temporary (percentage of Favorite Creek stream habitat in the study area)	None	0.6 (15%)	0.3 (8%)	Same as Airport 3a with Access 2	Same as Airport 3a with Access 3	N
Behavioral change, injury, or mortality from pier installation in Favorite Creek:						
Permanent bridge (number of piers)	None	2	None	2	None	None
Temporary bridge (number of piers)	None	3–10	2–5	3–10	2–5	None

During bridge construction at Favorite Creek, individual fish could be injured by in-stream equipment, especially with the illuminated active work area potentially attracting prey insects and aquatic species to this area during dark hours.

6.3.4. Special status species

Barging of construction materials and equipment to and from Angoon could affect individual marine mammals through increased barge traffic and the resulting increase in potential for collisions between barges and individual animals. The potential for ship strikes on marine mammals would be minimized or avoided by adhering to a general marine mammal "code of conduct" such as vigilantly scanning the water's surface and remaining at least 100 yards from any sighted marine mammals (Neilson et al. 2012). The potential for collisions between barges and marine mammals is evaluated in the Biological Assessment, included as Appendix R, *Biological Assessment of Listed Species for the Angoon Airport Project* (SWCA 2014c). The potential for this temporary effect would cease at the end of construction. The number of ship strikes to marine mammals as a result of the airport project would be very low and is not expected to affect marine mammal populations in Southeast Alaska.

Increased human presence during construction in areas where special status species are generally unaccustomed to humans would disturb and displace individual animals for two or three construction seasons. Disturbance or displacement of animals would also occur from noise from vehicles, construction equipment, blasting, and installation of bridge piers. Installation of bridge piers would cause temporary in-stream habitat removal. However, suitable habitat for these species is abundant in and around the Angoon area, and individuals near construction noise are expected to be able to find alternate locations. Therefore, measurable adverse effects are not expected.

6.3.5. Floodplains, Stream Geomorphology, and Hydrology

The movement of large wood would likely be restricted by in-stream bridge piers from the temporary bridge. These effects to Favorite Creek stream geomorphology would end once the temporary bridge was removed.

6.3.6. Hazardous materials, pollution prevention, and solid waste

Solid waste in the form of construction debris, sewage, and general trash would be generated, and hazardous waste (such as from leaking gasoline) could be generated. Hazardous materials would be barged into Angoon, offloaded at a barge landing in Killisnoo Harbor, and stored for use. Batching of asphalt on site would be a temporary occurrence during construction. Solid waste and used hazardous materials (including hazardous waste) would be handled according to applicable laws and guidelines until they are removed from the island by barge.

All construction activities associated with the airport and access road would be subject to the conditions of a Storm Water Pollution Prevention Plan, a spill prevention and response plan, and other best management practices to minimize the risk of spills and the potential for hazardous materials to enter the environment directly or indirectly.

6.3.7. Light emissions and visual resources

Construction of any alternative would involve lighting of construction areas and some equipment during nighttime or low-light daytime conditions. Skyglow created from these actions would be visible from all viewpoints. Temporary effects to visual resources would be caused by 1) the movement of heavy equipment and construction vehicles along roads; 2) the presence of construction activity and equipment in work areas, including bridge construction equipment that may be taller than the surrounding trees; 3) the barging of construction materials to the island; and 4) the unloading of barged materials at the ferry terminal.

6.3.8. Energy supply, natural resources, and sustainable design

Energy supply and natural resources that would be used for this project include asphalt and concrete, building supplies, construction aggregate, electricity, fill, fuel for aircraft and vehicles, the land and its resources, and water. The use or removal of these things represents a permanent effect because once used, they would no longer be available. The exception to this is temporary stream habitat removal; such habitat would restore itself as soon as construction ceased.

6.3.9. Noise

Construction activities associated with any of the action alternatives would generate measurable temporary increases in daytime and nighttime noise levels in localized areas. However, because noise levels decrease as distance increases and because terrain and homes block it (see the note in Table NO6 of section 4.11 Noise), some construction activities would likely not be audible to residents in Angoon or to users of the greater Monument–Wilderness Area, depending on their location relative to construction activity.

6.3.10. Socioeconomic conditions

Construction of any action alternative would cause a temporary 13% increase in average daily traffic from truck trips during construction. Airport 4 with Access 3 would result in the greatest temporary increase in daily truck traffic. The other effects to socioeconomic conditions would be likely to continue beyond the construction period.

6.3.11. Subsistence resources and uses

Construction effects to subsistence resources and uses would come from increased noise, increased vehicle traffic, and increased human presence in the area, and loss of access to construction areas for subsistence users. Because wildlife would be displaced during construction, the availability of wildlife as a subsistence resource would be diminished in the immediate area of construction, and subsistence users would have to seek these resources elsewhere. In addition, subsistence users would be displaced from areas during construction. However, because suitable wildlife habitat is abundant in and around the Angoon area, and individuals near construction noise are expected to be able to find alternate locations, measurable adverse effects are not expected.

6.3.12. Water quality

Construction of bridges and ***culverts*** in streams could result in temporary turbidity increases.

Although there would be an increase in sedimentation and turbidity during construction, best management practices required by the Alaska Department of Environmental Conservation and incorporated into the Storm Water Pollution Prevention Plan would be designed to prevent and reduce water quality violations and impairment to waters, including sedimentation and turbidity. These best management practices include, for example, silt fences, silt bags, straw bale filters, coffer dams, or other barriers or filters, if necessary.

6.3.13. Wilderness character

Based on construction equipment noise levels reported in Table NO6 in Noise, construction of any action alternative would generate measurable temporary increases in noise in localized areas. This construction noise would be audible in the vicinity of the construction area but not throughout the greater Kootznoowoo Wilderness Area. This is because noise decreases as distance increases and because hills and vegetation block it. Construction of Airport 3a or Airport 4 with

Terms to know

Carbon dioxide equivalent: A unit of measurement that allows the effects of different greenhouse gases to be compared using carbon dioxide as a standard unit for reference.

Culvert: A drain or pipe that allows water to flow under a road, runway, or similar structure.

Emission: The release of a substance (usually a gas when referring to climate change) into the atmosphere.

either access road would have greater temporary noise effects than would construction of Airport 12a with Access 12a by virtue of those alternatives being located directly in the wilderness area.

Construction areas and some equipment would be illuminated at night and during low-light daytime conditions with high-intensity lighting, creating visible skyglow in parts of the wilderness area for up to three construction seasons. The skyglow would be intensified by any local low-lying clouds, fog, rain, and high humidity.

6.3.14. Climate change and greenhouse gas emissions

Under all action alternatives, use of fuel-burning construction machinery and vehicles would generate new ***carbon dioxide equivalent emissions*** for the duration of the two-to-three-season construction period. These emissions would be temporary (only occurring during construction), however, and negligible in quantity compared to U.S. and world greenhouse gas emissions.

6.3.15. Admiralty Island National Monument/Kootznoowoo Corridor Lands

Based on construction equipment noise levels reported in Table NO6 in Noise, construction of any action alternative would generate measurable temporary increases in noise in localized areas. This construction noise would be audible in the vicinity of the construction area but not throughout the greater Monument or Kootznoowoo Corridor lands. This is because noise decreases as distance increases, and because hills and vegetation block it. Construction of Airport 3a or Airport 4 with either access road would have greater temporary noise effects than would construction of Airport 12a with Access 12a by virtue of those alternatives being located directly in the Monument or on Corridor lands.

Construction areas and some equipment would be illuminated at night and during low-light daytime conditions with high-intensity lighting, creating visible skyglow in parts of the Monument and Corridor lands for up to three construction seasons. The skyglow would be intensified by any local low-lying clouds, fog, rain, and high humidity.

6.4. What are the significance thresholds for construction effects?

Discussion of significance thresholds is provided for each resource in the resource sections of Chapter 4: Existing Conditions and Project Effects. As noted in FAA Order *1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a), construction effects alone are rarely significant pursuant to the National Environmental Policy Act.

6.5. Would any construction effects be significant?

Although effects would occur during construction of any action alternative, they would be temporary and not significant. Contractors would be required to comply with all applicable regulations related to construction activity, as well as FAA guidance contained in FAA Advisory Circular 150/5370-10F, Standards for Specifying Construction of Airports (FAA 2011a); FAA Advisory Circular 150/5320-15A (including Change #1), Management of Airport Industrial Waste (FAA 2008b); FAA Advisory Circular 150/5320-5C (including Change #1), Surface Drainage Design (FAA 2006c); and FAA Item P-156, Temporary Air and Water Pollution, Soil Erosion, and Siltation Control (FAA 2011b).

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7. MITIGATION

7.1. What information is provided in Chapter 7?

This chapter discusses the ***mitigation*** measures developed by the Federal Aviation Administration (FAA) to avoid, minimize, or remedy adverse effects to the social and natural environment that would result from any of the action alternatives. A brief description of regulatory considerations is followed by a discussion of the mitigation measures that the Alaska Department of Transportation and Public Facilities (DOT&PF) would implement for any action alternative. The last section of this chapter (section 7.6) describes the steps taken for the compensatory mitigation plan that could be implemented by the DOT&PF for the selected action alternative. The FAA may require mitigation as a condition of the ***record of decision,*** and mitigation may also be required as a result of permit processes. In addition, the FAA and the U.S. Forest Service have included terms and conditions that would be implemented should Airport 3a with Access 2 receive Presidential and Congressional approval. These terms and conditions can be found in Chapter 5: Requirements of the Alaska National Interest Lands Conservation Act.

What is discussed in Chapter 7?

Terms to know

Mitigation: Used here, a process involving steps to avoid, minimize, rectify, reduce, or compensate for adverse project effects.

Record of decision: A concise document that states an agency's final decision for a proposed project; identifies the alternatives considered, including the environmentally preferred alternative; and discusses mitigation plans, including any enforcement and monitoring commitments.

7.2. What regulatory requirements and authorities guide mitigation for this environmental impact statement?

Terms to know

Practicable: Capable of being done considering cost and existing technology.

Waters of the U.S.: A federal regulatory term referring to surface waters, rivers, lakes, estuaries, coastal waters, and wetlands that are used or can be used for interstate or foreign commerce.

Under the National Environmental Policy Act (NEPA) of 1969 (Public Law [PL] 91-190), the FAA is required to identify and disclose appropriate mitigation measures for significant adverse effects (40 Code of Federal Regulations [CFR] 1502.14(f) and 1502.16(h)). As the lead federal agency for this EIS, the FAA is also obligated under its own orders to provide

> an EIS [that] describes mitigation measures considered or planned to minimize harm from the proposed action. The following types of mitigation measures will be considered: design measures that reduce impacts; management actions that reduce impacts during operation of the facility; and replacement, restoration (reuse, conservation, preservation, etc.), and compensation measures. (Section 506(h)(1)) of FAA *Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* [FAA 2006a])

Other federal and state agencies involved in consultation and coordination for the Angoon Airport project will have input on the mitigation measures that are adopted in the FAA's record of decision as well as in permits allowing implementation of the selected alternative. For example, U.S. Army Corps of Engineers (USACE) guidelines implementing Section 404(b)(1) of the Clean Water Act of 1972 (PL 107-303) require that all ***practicable*** measures have been taken to reduce effects from placement of dredged or fill material into wetlands or other ***waters of the U.S.*** (40 CFR 230).

Requirements for mitigation of impacts from filling wetlands and other waters of the U.S. are set forth in regulations issued by the USACE and the U.S. Environmental Protection Agency (EPA) under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 (see 33 CFR 320 and 325; 40 CFR 230). Under these regulations, the USACE can only permit the least environmentally damaging practicable alternative. Additionally under these regulations, all appropriate and practicable steps must be taken to first avoid and then minimize adverse impacts to the aquatic ecosystem. If there are still unavoidable impacts, then compensatory mitigation may be required.

Compensatory mitigation is addressed in regulations issued by the USACE and EPA on April 10, 2008 (73 *Federal Register* 19594-705, codified at 33 CFR 332 and 40, as well as CFR 230, subpart J). The compensatory mitigation regulations establish a mitigation hierarchy that generally encourages the use of ***mitigation banks*** first because they "typically involve larger, more ecologically valuable parcels, and more rigorous scientific and technical analysis, planning and implementation than ***permittee-responsible mitigation***" (33 CFR 332.3(b)(2)). The regulations also state that "***in-lieu fee mitigation***, if available, is generally preferable to permittee-responsible mitigation" in areas serviced by an approved program that has sufficient credits (33 CFR 332.3(b)(3)).

In addition to the reasons stated above regarding mitigation banks, the regulations note that in-lieu fee mitigation projects "devote[s] significant resources to identifying and addressing high-priority resource needs on a watershed scale" (33 CFR 332.3(b)(3). If approved mitigation bank or in-lieu fee program credits are not available, then permittee-responsible mitigation is the only option.

The compensatory mitigation regulations state that when compensatory mitigation is necessary to offset unavoidable impacts to aquatic resources, the amount of required compensatory mitigation must be, to the extent practicable, sufficient to replace lost aquatic resource functions. In cases where appropriate functional or condition assessment methods or other suitable metrics are available, these methods should be used where practicable to determine how much compensatory mitigation is required (33 CFR 332.3(f)).

Terms to know

Compensatory Mitigation: Amount of mitigation required by the US Army Corps of Engineers to replace the unavoidable loss of wetland, stream, or other aquatic resource functions.

Mitigation Banks: A wetland, stream or other aquatic resource area that has been restored, created, enhanced, or, in certain circumstances, preserved. This resource area is then set aside to compensate for future conversions of aquatic resources for development activities. The value of a bank is determined by quantifying the aquatic resource functions restored or created in terms of "credits." Permittees, upon approval of regulatory agencies, can acquire these credits to meet their requirements for compensatory mitigation. A permit applicant may purchase credits from a mitigation bank.

Permittee-Responsible Mitigation: When a permit applicant implements compensatory measures at the impact site (i.e., on-site mitigation) or at another location usually within the same watershed as the permitted impact (i.e., off-site mitigation). The permittee retains responsibility for the implementation and success of the mitigation.

In-lieu fee mitigation: Mitigation that occurs when a permittee provides funds to an in-lieu fee sponsor (a public agency or non-profit organization) who has an approved compensatory mitigation instrument. Usually, the sponsor collects funds from multiple permittees to pool the financial resources necessary to build and maintain the mitigation site. The in-lieu fee sponsor is responsible for the success of the mitigation. Like banking, in-lieu fee mitigation is also "off-site," but unlike mitigation banking, it typically occurs after the permitted impacts.

Title XI of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 (PL 96-487) applies to the Angoon Airport project because two of the airport alternatives and their access alternatives (considered in ANILCA to be a ***transportation and utility system***) would be located in the Admiralty Island National Monument and Kootznoowoo Wilderness Area (referred to in this EIS as the "Monument–Wilderness Area," and considered in ANILCA to be a ***conservation system unit***). Under ANILCA, these alternatives must be considered for mitigation planning (see Chapter 5 for additional information). Section 1104(g)(2)(G) of ANILCA requires decision-makers to consider mitigation measures, terms, and conditions when recommending whether or not to approve a Title XI application. The terms and conditions can also be found in Chapter 5.

Section 1107(a) of ANILCA states that any permit or other measure allowing project construction on wilderness lands should include, among other factors, the following requirements:

- Land restoration, revegetation, and containment or prevention of ***erosion***.
- The minimum necessary right-of-way width to control or prevent damage to the environment (including damage to fish and wildlife habitat), damage to public or private property, and hazards to public health and safety.
- Measures to avoid or minimize adverse environmental, social, or economic effects.

Similarly, because the federally managed Monument–Wilderness Area and other ***publicly owned*** lands or ***historic properties*** could be affected, the FAA is required under Section 4(f) of the Department of Transportation Act of 1966 (as amended, 49 United States Code [USC] 303) to determine that 1) there is no ***feasible and prudent*** alternative to using those lands, and 2) the action includes all possible planning to minimize harm to the property from that use. Properties that require these considerations under Section 4(f) are known as "Section 4(f) properties."

Terms to know

Conservation system unit: Per ANILCA (Section 102(4)), "any unit in Alaska of the National Park System, National Wildlife Refuge System, National Wild and Scenic Rivers System, National Trails System, National Wilderness Preservation System, or a National Forest Monument."

Erosion: A process in which sediment detaches from the earth's surface and is transported by surface water or wind. Sediment itself can be of concern for water quality, and can also aid in the transport of bacteria and other contaminants into water bodies.

Feasible and prudent: In an ANILCA context and per 43 CFR 36.2, this term describes a route either within or outside an area that is based on sound engineering practices and is economically practicable, but does not necessarily mean the least costly alternative route.

Historic properties: Archaeological, cultural, or historical sites that are listed on or eligible for the National Register of Historic Places.

Publicly owned: Owned by a local, state, or federal governmental agency, and available to the general public most of the time.

Transportation and utility system: As defined in Alaska National Interest Lands Conservation Act (ANILCA) Section 1102(4)(A), the term "transportation or utility system" is any system—such as roads, transmission lines, or airports, as defined in ANILCA 1102(4)(B)—where any portion of that system is located in a conservation system unit.

7.3. What order does the mitigation process follow?

What is discussed in this section?

The FAA and other federal agencies use a sequential approach in assessing possible ways to mitigate for adverse effects. The Council on Environmental Quality's regulations for implementing NEPA (at 40 CFR 1508.20) have defined mitigation to include the following steps, considered in this order:

- Avoiding the effects by not taking a certain action or parts of an action; for example, routing a road to avoid wetlands.
- Minimizing effects by limiting the degree or magnitude of the action; for example, varying the right-of-way width to minimize use of lands and clearing of vegetation.
- Remedying the effects by repairing, rehabilitating, or restoring the affected environment; for example, replanting vegetation or reestablishing the flow pattern of a stream.
- Reducing or eliminating the effects over time through preservation and maintenance operations during the life of the action; for example, conducting weed treatments along roads to minimize the spread of invasive or non-native species.
- Compensating for the effects by replacing or substituting resources or environments; for example, investing in the cost of reconstructing, preserving, or rehabilitating wetlands elsewhere to offset the loss of wetlands in a given project area.

7.4. What mitigation measures were incorporated into the alternatives?

This section describes the mitigation measures incorporated into one or more of the alternatives to avoid, minimize, or reduce environmental effects. A number of potential mitigation measures are identified below, but their adoption into any of the alternatives would be dependent on a more refined analysis conducted during development of designs for the permitting process. Any such analysis would include further examination of the benefit of each mitigation measure relative to the cost and effort of implementing it.

7.4.1. Measures to avoid environmental effects

The FAA has attempted to avoid environmental effects in two ways. Avoidance was considered as the FAA developed and refined alternatives to the proposed action. For example, early in the planning process, an alternative was developed that would have included constructing a bridge across Favorite Bay. The bridge across Favorite Bay was eliminated when it was determined to have significantly greater adverse effects on high-value intertidal areas and wetlands where Angoon residents practiced ***subsistence use*** than other access alternatives.

The second method by which the FAA sought to avoid effects was through adherence to stipulations and protocols put in place by resource management agencies. These include, but are not limited to, the bulleted list below.

- Avoid vegetation clearing in forest or woodland habitats during the ***migratory bird*** and ***raptor*** breeding season (April 15 through July 15). If construction were to occur during this time period, clearance surveys would be conducted, and active nests would be avoided (U.S. Fish and Wildlife Service 2009a).
- Avoidance buffers around bald eagle nests would be established after consultation with the U.S. Fish and Wildlife Service. Appropriate permits would be acquired as necessary.
- Maintain a 600-foot no-construction buffer around active Queen Charlotte goshawk nests during breeding season (March 15 to August 15) (U.S. Forest Service 2008a). Time construction to minimize effects to aquatic species by complying with timing windows established through consultation with the Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, and National Marine Fisheries Service.

Terms to know

Migratory bird: A type of bird that travels from one place to another at regular times, often over long distances.

Raptor: Bird of prey.

Subsistence use: According to Section 803 of ANILCA, "the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade." See section 4.13 Subsistence Resources and Uses for more information.

7.4.2. Measures to reduce or minimize environmental effects

Terms to know

Take: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect wildlife or to attempt to engage in any such conduct.

During the airport planning and preliminary design process, the FAA developed many measures to either reduce or minimize project effects. These measures are incorporated into all action alternatives. Key measures incorporated into the analysis of project effects are as follows:

- Where fill would be necessary for the airport and access road, the fill footprint would be minimized to the extent practicable. Fill slopes would be constructed for stability based on material type to meet FAA and DOT&PF slope standards.
- Conduct a wildlife hazard assessment and, if necessary, implement an airport wildlife hazard management plan (WHMP) to minimize bird and wildlife hazards to airplanes. The WHMP would describe operations involving the harassment or taking of animals. The DOT&PF would obtain permits from the Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service referred to as Public Safety and Depredation permits, respectively. WHMP such as these, along with fencing around the airport operations area, would reduce the potential for wildlife hazards to airplanes. These plans also include hazing efforts that would discourage wildlife from being in the vicinity of the airport and therefore avoid strike potential. The WHMP would be subject to NEPA review by the FAA.
- Use pilot-activated runway lights: The use of runway lights that are on only when needed would minimize fuel needs and fuel consumption for airport operation.
- Maintain natural vegetation wherever possible without impairing sight distances: Keeping natural vegetation near the road and runway as much as possible would enhance natural filtration of pollutants contained in runoff.
- All fish-bearing stream crossings or re-routes would be made fish-passable per the *Memorandum of Agreement Between the Alaska Department of Fish and Game and DOT&PF for the Design, Permitting, and Construction of Culverts for Fish Passage* (2001:Exhibit A).
- Where feasible, and to the extent practicable, steeper than average side slopes would be used to minimize impacts. Where fill would be necessary for the airport and access road, use of steeper than average side slopes would reduce the total area of direct effect from fill (Figure MIT1). In all cases, FAA and DOT&PF slope standards would be met.

- During the design phase of this project, materials sources would be tested for acid rock drainage (ARD) potential, and during construction the areas of terrain disturbance for the runways would be tested. If the potential for ARD was identified, precautions would be taken that include not using that particular source rock as fill or for surfacing. It is important to keep rock with the potential for ARD away from the water table. If materials sources are shown to have potential for ARD, they would not be used near water. *Alaska Storm Water Guide* (DEC 2011b) Section 3.4.4 – Mining Considerations touches on this, but is not as detailed about what to do with ARD.
- The DOT&PF would develop an Erosion and Sediment Control Plan as a foundation for the development of the construction contractors' Storm Water Pollution Prevention Plan (SWPPP) to comply with the Alaska Pollutant Discharge Elimination System (APDES) Construction General Permit.
- The DOT&PF would revegetate, rehabilitate, or restore temporary work sites when they are no longer necessary for construction or long-term maintenance.

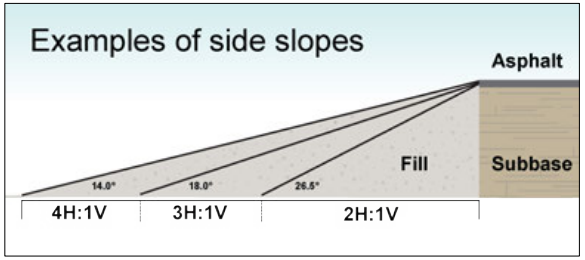

Figure MIT1. Average side slopes are often described as 4H (horizontal) to 1V (vertical), which means the width of the slope is 4 times longer than it is high. This proportion makes the slope very stable. However, side slopes of 3H:1V or 2H:1V can also be made stable and reduce the overall footprint affected by fill.

- Cultural resource monitors would be used during construction to watch for the exposure of buried cultural resources hidden by dense vegetation. Standard protocols for reporting the discovery to the proper agencies and consulting with agencies and other consulting parties about the best way to address the discovery would be followed.

7.4.2.1. Measures to reduce or minimize environmental effects – Alternative 12a

During the airport planning and preliminary design process, the FAA developed additional measures to either avoid or minimize project effects for Alternative 12a. Key measures incorporated into the analysis of project effects are as follows:

- The access road to Alternative 12a would be designed to avoid the headwaters for the stream at 12a (Stream 10).
- To minimize and avoid additional impacts to the surrounding wetlands and upland habitat in the vicinity of the airport footprint, DOT&PF would route the north tributary of Stream 10 around the proposed apron to a site upstream of the existing confluence with the south tributary. Stream 10 will then remain within its existing streambed and pass beneath the Airport RSA/Runway via a bottomless arch to protect the natural substrate.

7.4.2.2. Measures to reduce or minimize environmental effects – Alternatives 3a and 4

During the airport planning and preliminary design process, the FAA developed additional measures to either avoid or minimize project effects for Alternatives 3a and 4. Key measures incorporated into the analysis of project effects are as follows:

- On lands managed by the U.S. Forest Service, develop stream course protection plans at all access road crossings of fish-bearing streams (U.S. Forest Service 2001b).
- The pier placement of the Favorite Creek bridge should be designed so that encroachment on floodplains is minimized and passage of large wood is ensured.
- The bridge would be designed according to applicable design standards that minimize scour and erosion.
- Where clearing creates a significant visual effect, contrasts can be reduced by allowing natural, low-growing revegetation to take place, and feathering edges to provide a more natural transition between forest and cleared areas.
- Design features would be used to minimize impacts to sensitive resources. Design features could include rehabilitating/restoring temporary work sites or installing guard rails or concrete traffic barriers at susceptible locations (waysides, rock pits, or temporary access corridors for construction).
- The Region 10 *Soil and Water Conservation Handbook* (FSH 2509.22) (U.S. Forest Service 2006) would be applied to construction activities on U.S. Forest Service–managed lands where applicable.
- Natural color schemes incorporating green, brown, and tan, as well as natural materials such as wood for any aboveground structures or equipment, would be used to offset the impacts to visual resources.
- On U.S. Forest Service–managed lands, contractors would be required to use a U.S. Forest Service–preferred seed mix for erosion control.

7.4.3. Best management practices during construction and operations

The following best management practices, or similar, would be employed during construction. Best management practices are relatively common activities in construction and are intended to prevent pollution, minimize environmental harm, and assure that appropriate response action is taken if unacceptable environmental effects occur. This list was developed based on experience with measures that have been implemented and shown to be successful on other projects. The State of Alaska Department of Environmental Conservation (DEC) has assumed responsibility for the EPA's National Pollutant Discharge Elimination System program under the APDES. The DOT&PF will follow best management practices outlined in the DEC's *Alaska Storm Water Guide* (DEC 2011b) to best comply with the APDES Construction General Permit within the right-of-way. When there is no conflict, the DOT&PF will employ U.S. Forest Service best management practices, which appear in numerous handbooks, including *FSH 2090.21 – Aquatic Habitat Management Handbook* and *FSH 2509.22 – Soil and Water Conservation Handbook* and *National BMPs for Water Quality Management on NFS Lands (Publication FS-990a, 2012c).* If an airport alternative on U.S. Forest Service–managed lands is selected in the record of decision, the specific best management practices from U.S. Forest Service handbooks would be incorporated. Additionally, the DOT&PF has standard practices they employ in the design and construction of roads and airports. These are detailed in the *Alaska Department of Transportation and Public Facilities Standard Specifications for Airport Construction* (DOT&PF 2014) and the *Alaska Department of Transportation and Public Facilities Standard Specifications for Highway Construction* (DOT&PF 2015).

- Conduct all on-site construction activities in accordance with *FAA Advisory Circular 150/5370-10F, Standards for Specifying Construction of Airports* (FAA 2011a).
- Follow FAA policies for complying with pollution control statues and other best management practices during ongoing operations, including policies for fueling and cleaning airplanes and airport vehicles, and a hazardous waste management plan.
- Implement invasive species control per DOT&PF Southcoast Region Invasive Species Specification 201-3.07, Control of Invasive Plants.
- In-water bridge construction activities would occur within timing windows established through consultation with the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service, and National Marine Fisheries Service.

- In wetland areas, use protective matting or slash to minimize destruction or removal of vegetation by heavy equipment, and to limit ***soil compaction*** where practicable.
- The DOT&PF would develop an Erosion and Sediment Control Plan as a foundation for the development of the construction contractors' SWPPP to comply with the Alaska Pollutant Discharge Elimination System Construction General Permit. Best management practices described in the *Alaska Storm Water Guide* (DEC 2011b) would be used for construction to best comply with the Construction General Permit.
- Reduce the use of deicers along roadways or runways during ongoing operations where possible.
- Use the minimum light intensities practicable during construction.
- Apply shielding to lights needed for construction so that light is directed downward and onto the work area where practicable.

Terms to know

Soil compaction: The reduction in space between grains of soil by removal of air. This process typically occurs in areas where heavy equipment operates. Soil compaction can make it more difficult to revegetate disturbed areas.

7.5. What compensatory mitigation measures could be used if effects could not be otherwise mitigated?

Compensatory mitigation is a method used to offset effects that cannot be avoided or minimized. It involves the replacement of a lost resource, often at a different site than the one originally affected. It can consist of funding the preservation of at-risk resources similar to those affected, or carrying out other types of environmental mitigation that the involved parties agree are suitable compensation.

An example of compensatory mitigation planning and approval is one done in concert with and through the USACE, which has permit authority over waters of the U.S. under Section 404 of the Clean Water Act, or under Section 10 of the Rivers and Harbors Act or both. Mitigation requirements are generally applied as conditions for permit approval. The FAA may also assign mitigation requirements in its record of decision.

The FAA's preferred alternative was selected because it would have the least environmental impact of all the practicable alternatives. The avoidance and minimization measures identified above in sections 7.4.1, 7.4.2, and 7.4.3 are the result of careful consideration by project planners and design staff, and represent input from numerous state and federal agencies with resource management responsibilities. Even with these measures, however, the preferred alternative would still have adverse impacts, most notably to wetlands (177 acres) and waters of the U.S. (1.13 acres).

In developing the mitigation plan, the FAA has carefully considered all relevant comments, including specific mitigation suggestions, provided by the agencies and the public during the comment period and public hearings on the draft EIS. It was suggested that the FAA fund a watershed enhancement project in the area to provide increased ecological functions and values. The FAA reached out to several stakeholders, tribes, and agencies in an attempt to identify an enhancement project that could be done within either the community of Angoon or on Admiralty Island. The FAA looked for projects in the community, on and around the island, and on other surrounding islands. Specific projects identified are discussed below. Being that most of Admiralty Island is a national monument and wilderness area, there are few opportunities to do meaningful wetland enhancement due to their inherent pristine nature. The following is a discussion of specific mitigation proposals the FAA received:

> **Removal of Abandoned Boats in Favorite Bay –** Approximately 20 to 25 abandoned boats have been identified in a small bay within Favorite Bay. The boats are scattered over approximately 2 acres. Boat types include sailboats, commercial fishing boats, and sport fishing boats constructed of wood, fiberglass,

and other non-decomposable materials. Many detrimental effects to water quality and shoreline functionality have resulted from the presence of these stationary boats, including leaking oil from older boats and leaching of anti-corrosion or anti-fouling hull paint coatings (for example, biocides, tributyltin, and heavy metals). Because of the tidal influence on where these boats are located, the area affected by the leaking and leaching far exceeds the areal coverage by boats. Removal of these boats would improve water quality, aquatic habitat, and shorebird habitat. Subsistence resources and access to these resources would also be improved because improvement of fish and invertebrate living conditions could ultimately lead to higher yields with a lower concentration of pollutants within organism tissues.

Removal of Boat Batteries – A beach dumping site of used boat batteries, pipes, plastic, steel rods, and miscellaneous garbage was reported to the Statewide Harvest Survey from a 2015 Alaska sport fishing license holder. The site is adjacent to the Whaler's Cove Lodge on Killisnoo Island. Barnacles and other organisms have already begun to colonize on these items. The majority of marine batteries are lead-acid, using lead plates to conduct charges of electrolyte solution (sulfuric acid or "battery acid"). Beach sediments and water quality are impacted by discarded batteries from contamination with lead, lead oxides, sulfuric acid, and other chemicals. The thick plastic battery casing, pipes, rods, and other dumped materials are not easily decomposed or biodegradable, and will persist in the environment for the foreseeable future until physically removed. Clearing garbage, removing debris, and cleaning contaminated soils would remove unnatural chemicals and prevent further leakage of chemicals into the beach and near-shore waters, improving aquatic habitat water quality and shorebird habitat. Subsistence resources and access to these resources would also be improved because improvement of fish and invertebrate living conditions could ultimately lead to higher yields with a lower concentration of pollutants within organism tissues.

Empire Mine Reclamation and Anadromous Stream Enhancement – Empire Mine, a once-active goldmine and prospecting site in the early to mid-1900s, is located off Hawk Inlet at the north end of Admiralty Island. The site is currently managed by the U.S. Forest Service under the Comprehensive Environmental Response, Compensation, and Liability Act, as well as the Alaska Department of Environmental Conservation's Contaminated Sites Program. The mine and processing mill are located upstream at a higher elevation, while the processed product was transported to a downstream location near the beach of Hawk Inlet. Dilapidated and collapsed buildings, a dock, tailings piles, fuel tanks, waste

piles, and other materials are located on-site. Preliminary assessments and site inspections completed in 1994, 1995, and 2014 identified that soil, marine sediments, and water samples had elevated concentrations of the following: mercury, bromine, arsenic, lead, silver, barium, selenium, and total petroleum hydrocarbon. Clams and mussels that were collected from near the creeks, collapsed buildings, and dock pilings were found to have respective concentrations of mercury and selenium that exceed the average concentrations of the DEC. Elevated metal concentrations were also found in Dolly Varden char. Certain metal concentrations exceed water quality standards for aquatic life. Reclamation of the mine, cleanup of contaminated soils and marine sediments, and containment of tailings on-site would improve water quality, aquatic habitat, shorebird habitat, aquatic invertebrate habitat, anadromous fish habitat, and resident and other fish habitat, among other restorative functions and values.

East Ohmer and Lump Creek Anadromous Fish and Floodplain/Riparian Restoration – East Ohmer and Lump Creeks, located on Mitkof Island in between Kupreanof Island and the Alaska mainland, are proposed to undergo instream and floodplain restoration by the U.S. Forest Service. The stream channel and floodplain of East Ohmer Creek and Lump Creek have been heavily damaged by harvesting of trees, soil, and gravels within the floodplain, in addition to road construction. Restorative actions would involve the addition of large wood in the creeks and floodplains, as well as the creation of micro-topography within the floodplain to promote conifer growth. Identified goals of the restoration project include restoring anadromous fish and resident fish habitat, stabilizing streambanks, and creating micro-sites within the floodplain. This project would restore functions and values of improving terrestrial habitat, amphibian habitat, hydrology, and subsistence uses. This project would also restore forested wetland.

South Fork Saginaw and Shorty Creeks Anadromous Fish and Floodplain/Riparian Restoration – South Fork Saginaw and Shorty Creeks, located within the north end of Kuiu Island, are proposed to undergo instream, floodplain, and riparian restoration by the U.S. Forest Service. Current issues the creeks face include over-widened channels, lack of pools within the floodplain and instream, and streambank instability. These conditions are primarily a result of road construction and past tree harvest within the floodplain. Goals include streambank stabilization, restoration of anadromous fish and resident fish habitat, and improvement of micro-topography within the floodplain. These goals are in line with mitigation goals, and would restore functions and values of improving terrestrial habitat, amphibian habitat, hydrology, and subsistence uses. This project would restore forested wetland.

Creek Flow Maintenance and Anadromous Fish Habitat Enhancement – Donahue Creek, located north of Blind Slough on Mitkof Island, is proposed to undergo flow maintenance by the U.S. Forest Service in 2017. Since an inlet to a manmade pond (Manmade Hole) was created in approximately 1962, which diverted part of Donahue Creek into the pond, the creek has had issues with bedload deposition in the creek bend between the main channel and the pond at the mouth of the inlet. This deposition has blocked flow through the inlet to the pond, used by anadromous and resident fish. This segment of Donahue Creek is proposed to be narrowed, with a pool being constructed above the creek bend to reduce energy flows, preventing deposition buildup. This project would benefit anadromous and resident fish habitat in addition to bettering water quality and aquatic invertebrate habitat. The project would also improve stream flow support, sediment and toxicant retention and stabilization, anadromous fish habitat, and resident and other fish habitat.

Cube Creek Wilderness Protection and Enhancement Project – The U.S. Forest Service is proposing to acquire the largest private land holding within the Monument–Wilderness Area from Shee Atikà, Inc. The U.S. Forest Service would acquire approximately 22,890 acres in phases over the next 5 years, beginning in 2016. These parcels lie within the Cube Cove region, and are approximately 25 miles north of Angoon. The acquisition would include three major watersheds (Lake Kathleen, Lake Florence, and Ward Creek Drainage). Approximately 4,175 acres of the area are wetlands. Goals of the acquisition are to protect wilderness from development after inclusion in the national monument while enhancing and conserving scenic, recreation, cultural, and wildlife/plant resources. Timber harvest has previously occurred, including harvest on about 1,996 acres of wetlands. The U.S. Forest Service proposes to restore these previously harvested areas to support and maintain a healthy coastal ecosystem and improve wildlife connectivity. Acquiring, restoring, and maintaining this parcel and the watersheds for wildlife and public use would offset impacts by restoring impacted wetlands. The restoration would improve functions and values such as public use and recreation, anadromous fish habitat, resident and other fish habitat, aquatic invertebrate habitat, terrestrial habitat, and water quality.

Chuck River Wilderness Protection and Enhancement Project – The U.S. Forest Service is proposing to acquire the Wigger property, a 133-acre parcel in the Chuck River Wilderness. The property was actively mined in 1897 and from 1901 to 1902. Approximately 3,000 ounces of gold were removed

during that time. Goals of the acquisition are to protect wilderness from development while enhancing and conserving scenic, recreation, cultural, and wildlife and plant resources. The U.S. Forest Service proposes to restore these previously impacted areas to support and maintain a healthy coastal ecosystem. Acquiring, restoring, and maintaining this parcel for wildlife and public use would offset impacts from Alternative 12a by improving functions and values such as public use and recognition, anadromous fish habitat, resident and other fish habitat, aquatic invertebrate habitat, terrestrial habitat, and water quality.

Purchase Mitigation Bank Credits or Make In-Lieu Payment – The project is within the service area of Sealaska Corporation's wetland mitigation bank. The mitigation bank has about 200 credits available. The project is also within the service area of the Conservation Fund and the Southeast Alaska Land Trust in-lieu fee programs. Both of these organizations have approved in-lieu fee instruments with the USACE, and have several credits available. Purchasing credits at the mitigation bank or an in-lieu fee payment would meet the Final Compensatory Mitigation Rules as well as the project's mitigation plan objectives.

7.6. What is the compensatory mitigation plan for the Angoon Airport?

The compensatory mitigation has specifically been developed for the FAA's preferred alternative, Airport 12 with Access 12a. However, the mitigation described below could be applied to any of the action alternatives.

Development of compensatory mitigation for the Angoon Airport project has involved a number of state and federal agencies (see Chapter 9, Coordination and Consultation) because of specific and overlapping regulatory authorities, as described above. Mitigation planning for loss of wetlands and other waters of the U.S. has been done to comply with the compensatory mitigation regulations of the USACE and EPA because the USACE has permit authority over wetlands and waters of the U.S. that would be affected by the project. Agency coordination on mitigation has included the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the EPA because they are commenting agencies on the Section 404 permit application. The Alaska Department of Fish and Game has also been included in the mitigation discussions because a Fish Habitat Permit is required for the work on Stream 10 at Airport 12a with Access 12a. All of the projects in section 7.5 were discussed and vetted with the agencies.

The objectives for the mitigation for wetland and waters of the U.S. impacts include the following:

- Developing mitigation that complies with the Final Compensatory Mitigation Rules
- Design the stream at 12a (Stream 10) to maintain fish passage and minimize and avoid additional impacts to the surrounding wetlands and upland habitat in the vicinity of the airport footprint.
- Replacement of wetland functions and values that would be lost as a result of the project
- Finding mitigation that would benefit the community of Angoon
- Finding mitigation that is in close proximity to where the impacts would occur, ideally on Admiralty Island

Terms to know

Associated buffer: A setback area around a stream, river, lake, or wetland that maintains the natural vegetation cover along the wetland or waterway, which is an essential part of the aquatic ecosystem.

Compensatory mitigation would consist of three components:

1. Providing the U.S. Forest Service with adequate funding to acquire an equal number of acres of wetlands and/or waters of the U.S. and ***associated buffer*** that would be impacted by the project to be incorporated into the Tongass National Forest
2. Design the stream at 12a (Stream 10) to maintain fish passage and minimize and avoid additional impacts to the surrounding wetlands and upland habitat in the vicinity of the airport footprint.
3. Provide $60,000 toward the removal of abandoned boats in Favorite Bay

As compensatory mitigation for the unavoidable impact of wetlands, the FAA would provide the U.S. Forest Service with adequate funding to acquire the same area of wetlands and/or waters of the U.S. and associated buffers from private parties to be incorporated into the Tongass National Forest. The purpose of the acquisition is to satisfy compensatory mitigation to offset unavoidable impacts to waters of the U.S. authorized through the USACE's issuance of Department of Army permits pursuant to the Clean Water Act. The acquired lands would consist of previously impacted wetlands or waters of the U.S. in need of restoration or enhancement. The goal of the mitigation would be to restore hydrology and enhance an equal amount of degraded wetlands and/or waters of the U.S. and associated buffers that were impacted by the project. The Forest Service has two property acquisition opportunities at the writing of this EIS that could satisfy the compensatory mitigation requirements for the Angoon Airport project: Cube Cove and Chuck River. If funding for design and construction of this project is available within the next 5 years, the FAA may be able to provide the U.S. Forest Service with funding to assist with the Cube Creek or Chuck River acquisitions.

Restoring and enhancing wetlands will improve wildlife habitat for bird, amphibian, and reptile species; increase floodplain storage; and improve water quality through sedimentation, filtration, microbial degradation, volatilization, and adsorption. At the discretion of the USACE, compensatory mitigation requirements associated with Department of Army permits may be satisfied by cooperating third-parties, including, but not limited to Department of Army permit holders, by 1) restoring or enhancing aquatic resources located on suitable lands comprising the National Forest System, and/or 2) contributing to the National Forest System by conveying to the U.S. Forest Service suitable lands within and adjacent to the boundaries of units of the National Forest System.

After the lands are acquired, the U.S. Forest Service would evaluate and assess the restoration needs and develop a plan for restoration and habitat enhancement. The lands acquired as compensatory mitigation shall be managed for the purposes of preserving streams, creeks, wetlands, and their buffers to the extant consistent with laws, rules, and regulations applicable to the administration and management of National Forest System lands. Further, upon acquisition, the land acquired would not be utilized again as mitigation for any future Department of Army permit.

The FAA, DOT&PF, and U.S. Forest Service agree that the U.S. Forest Service is an appropriate recipient of properties acquired as compensatory mitigation associated with the USACE's issuance of Department of Army permits. As the lead federal agency in natural resource conservation, the U.S. Forest Service provides leadership in the protection, management, and use of the nation's forest, rangeland, and aquatic ecosystems. Through implementation of land and resource management plans, the U.S. Forest Service ensures sustainable ecosystems by restoring and maintaining species diversity and ecological productivity that helps provide recreation, water, timber, minerals, fish, wildlife, wilderness, and aesthetic values for current and future generations of people.

The land acquired for compensatory mitigation would be managed by the U.S. Forest Service and administered as "National Forest System lands" subject to all the applicable laws, rules, and regulations, including, but not limited to the following: the Weeks Act of 1911, the Multiple Use Sustained Yield Act of 1960, the National Forest Management Act of 1976, the Endangered Species Act, the Clean Water Act, and NEPA. The land would be administered and managed as an area of multiple use as defined by the Multiple Use Sustained Yield Act of 1960 (16 USC 528–531), which defines watershed and wildlife and fisheries as among the several national forest uses. The land would be administered and managed in accordance with all applicable Executive Orders, including Executive Order 11988 pertaining to floodplain management, and Executive Order 11990 pertaining to protection of wetlands. The lands would also be administered and managed pursuant to a national forest land and resource management plan, which among other things, would provide for coordination of watersheds, wildlife, and fish (16 USC 1604(e)(1)); and ensure consideration of watersheds, wildlife, and fish (16 USC 1604(g)(3)(A)).

The FAA would provide $60,000 toward removal of some of the abandoned boats in Favorite Bay. The DOT&PF would work with the community of Angoon to develop a removal plan. Removal of any boats would improve water quality, aquatic habitat, and shorebird habitat. Subsistence resources and access to these resources would also be improved because improvement of fish and invertebrate living conditions could ultimately lead to higher yields with a lower concentration of pollutants within organisms. The FAA determined the funding amount based on the areal coverage of the boats and the comparative cost of purchasing a credit at a mitigation bank. The abandoned boats cover about 2 acres along the shore of Favorite Bay. The cost to acquire a credit at a mitigation bank is about $30,000 per acre.

During the final design of the project, to minimize and avoid additional impacts to the surrounding wetlands and upland habitat in the vicinity of the airport footprint, DOT&PF would route the north tributary of Stream 10 around the proposed apron to a site upstream of the existing confluence with the south tributary. Stream 10 will then remain within its existing streambed and pass beneath the Airport RSA/Runway via a bottomless arch to protect the natural substrate. DOT&PF has committed to working with ADF&G and USFWS during final design to ensure appropriate measures are developed to protect the existing riparian habitat and general health of the stream. The design would take into consideration wildlife attraction, and would be designed to avoid conflicts with aircrafts. The DOT&PF would develop a stream realignment work plan that would contain information on actual implementation, including timing, engineering drawings, measures to avoid creating adverse effects during implementation/construction, and a monitoring plan with the Alaska Department of Fish and Game.

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8. CUMULATIVE EFFECTS

8.1. What information is provided in Chapter 8?

This chapter builds on the descriptions of the existing conditions and project effects for each resource analyzed in Chapter 4: Existing Conditions and Project Effects, and describes any additional effects on those resources that could result from the implementation of other actions when combined with the Angoon Airport project.

8.2. What does the term "cumulative effects" mean?

The Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) define cumulative effects as

> the impact on the environment which results from the incremental impact of the action when added to other past, present, and ***reasonably foreseeable future actions*** regardless of what agency (Federal or non-federal) or person undertakes such other actions. (40 Code of Federal Regulations [CFR] 1508.7)

The intention of a cumulative effects assessment is to determine if the combination of the Angoon Airport project with other, unrelated actions could cause significant effects even if the Angoon Airport alone would not. Simply put, even if the potential effects from the Angoon Airport project would not be significant, the effects could become significant when combined with other ***cumulative actions***.

What is discussed in Chapter 8?

Terms to know

Cumulative actions: Past, present, and reasonably foreseeable future actions unrelated to the project but occurring in and around the same area and potentially having combined effects on the same environmental resources.

Reasonably foreseeable future action: For this EIS, an action is considered reasonably foreseeable if it has been or will be analyzed in a NEPA document or plan; has a federal, state, local, or tribal government permit application or approval; would occur in the same time frames as the proposed airport action; or has had a funding source identified.

8.3. How did the Federal Aviation Administration assess cumulative effects?

What is discussed in this section?

To determine if the Angoon Airport project and other actions, combined, would have significant cumulative effects, the Federal Aviation Administration (FAA) took these steps:

- Step 1: Identify which of the resources affected by the Angoon Airport project (as disclosed in Chapter 4) could also be affected by other actions.
- Step 2: Define the cumulative effects assessment areas that matter for the identified resources.
- Step 3: Identify the time frame for the cumulative effects assessment.
- Step 4: Identify other past, ongoing, or reasonably foreseeable future actions that could also affect the environment in the cumulative effects assessment areas and in the time frame identified in steps 2 and 3.
- Step 5: Assess how the Angoon Airport project would affect the resources identified in step 1, when combined with other past, present, or reasonably foreseeable future actions.

8.3.1. Step 1: Identify resources

Each of the resources analyzed in Chapter 4 has already been or could also be affected by other past, present, or reasonably foreseeable future actions in the Angoon area. Therefore, all the resources identified in Chapter 4 will be included in the cumulative effects assessment.

8.3.2. Step 2: Define the assessment areas used for cumulative effects

For the effects analysis specific to the Angoon Airport project (presented in Chapter 4), it was sufficient to use an area around the action alternatives determined per resource. However, for a cumulative effects assessment, a larger area was sometimes necessary to capture potential or existing effects from other actions.

For this reason, seven assessment areas were identified, and the reasons they apply to a given resource are described in the sections that follow. Most of the land in all seven assessment areas is managed by federal agencies or the State of Alaska, but there are also private lands owned by Kootznoowoo, Inc., the City of Angoon, and private individuals. The assessment areas are presented from largest to smallest. All are contained in the boundaries of the largest—the Admiralty Island assessment area—and with each successively smaller area the focus tightens on the Angoon area.

Because the area is generally remote, and because each assessment area is largely, if not completely, made up of lands in the federally designated Kootznoowoo Wilderness Area (referred to in this chapter as the "Kootznoowoo Wilderness") and Admiralty Island National Monument (referred to in this section as "the Monument"), the assessment areas are similar in that they are all relatively undeveloped and in a natural condition. Further discussion of these federally designated areas is included in section 4.16 Wilderness Character and section 4.19 Admiralty Island National Monument.

Terms to know

Subsistence use: According to Section 803 of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 (Public Law [PL] 96-487), "the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade." See section 4.13 Subsistence Resources and Uses for more information.

8.3.2.1. Admiralty Island assessment area

The Admiralty Island assessment area (Figure CU1) covers all of Admiralty Island. Of this, approximately 89% is in the Kootznoowoo Wilderness and 91% is the Monument. The community of Angoon is the only permanent settlement. The Greens Creek Mine, an underground silver, gold, zinc, and lead mine, is located on the northwest end of the island. Logging has occurred in various parts of the island, and could continue on private lands on the island's west side. The island also has several high-use areas: the Pack Creek bear-viewing area on the east side, the Admiralty Island Cross-Island Canoe Route, and several trails, private and public-use cabins, and shelters throughout the island. Apart from these developments and use areas, this assessment area as a whole has seen minimal human-caused disturbance; the area is relatively undeveloped and in natural condition. Natural processes such as flooding, mass wasting (for example, snow avalanches and landslides), and wind have and will likely continue to be the major influences shaping the condition of resources in this assessment area.

This assessment area is used for cumulative effects related to air quality and climate change (section 8.3.5.1.1) and for socioeconomic conditions, environmental justice, and children's health and safety (section 8.3.5.1.2).

8.3.2.2. Admiralty Island National Monument assessment area

The Monument (see Figure CU1) encompasses approximately 91% of Admiralty Island. The Monument assessment area is in the same condition as the Admiralty Island assessment area described above, but does not include the current or future logging areas, private lands, or the community of Angoon. Some of the Greens Creek Mine subsurface operations are split estate, with the U.S. Forest Service managing the surface lands and the subsurface being privately owned. Evidence of historical logging is visible in certain portions of this assessment area as stands of second-growth forest compared to unlogged primary-growth forest. (This does not include the current logging on private lands adjacent to the Monument, shown as the Shee Atiká timber harvest in Figure CU1.)

This assessment area is used for cumulative effects related to the Monument (section 8.3.5.2.1).

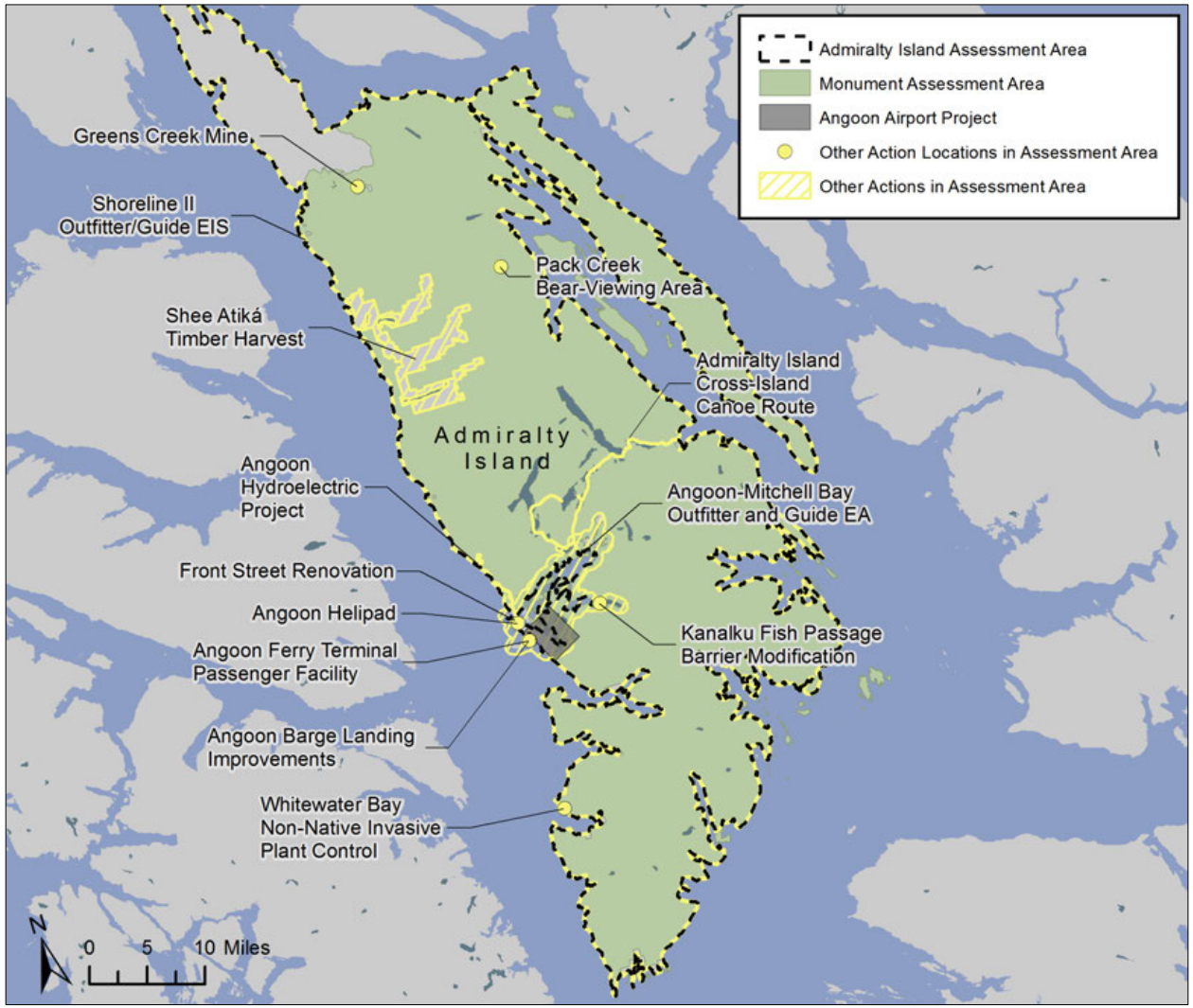

Figure CU1. Admiralty Island assessment area and Kootznoowoo Wilderness assessment area showing other actions in them.

8.3.2.3. Kootznoowoo Wilderness assessment area

The Kootznoowoo Wilderness (see Figure CU2) encompasses approximately 89% of Admiralty Island. The Kootznoowoo Wilderness assessment area (established for the purposes of this EIS and based on the Kootznoowoo Wilderness) is in the same condition as the Admiralty Island assessment area described above, but does not include the current or future logging areas, private lands, the community of Angoon, or the Greens Creek Mine. Evidence of historical logging is visible in certain portions of this assessment area as stands of second-growth forest compared to unlogged primary-growth forest. (This does not include the current logging on private lands adjacent to the wilderness, shown as the Shee Atiká timber harvest in Figure CU2.)

This assessment area is used for cumulative effects related to wilderness character (section 8.3.5.3.1).

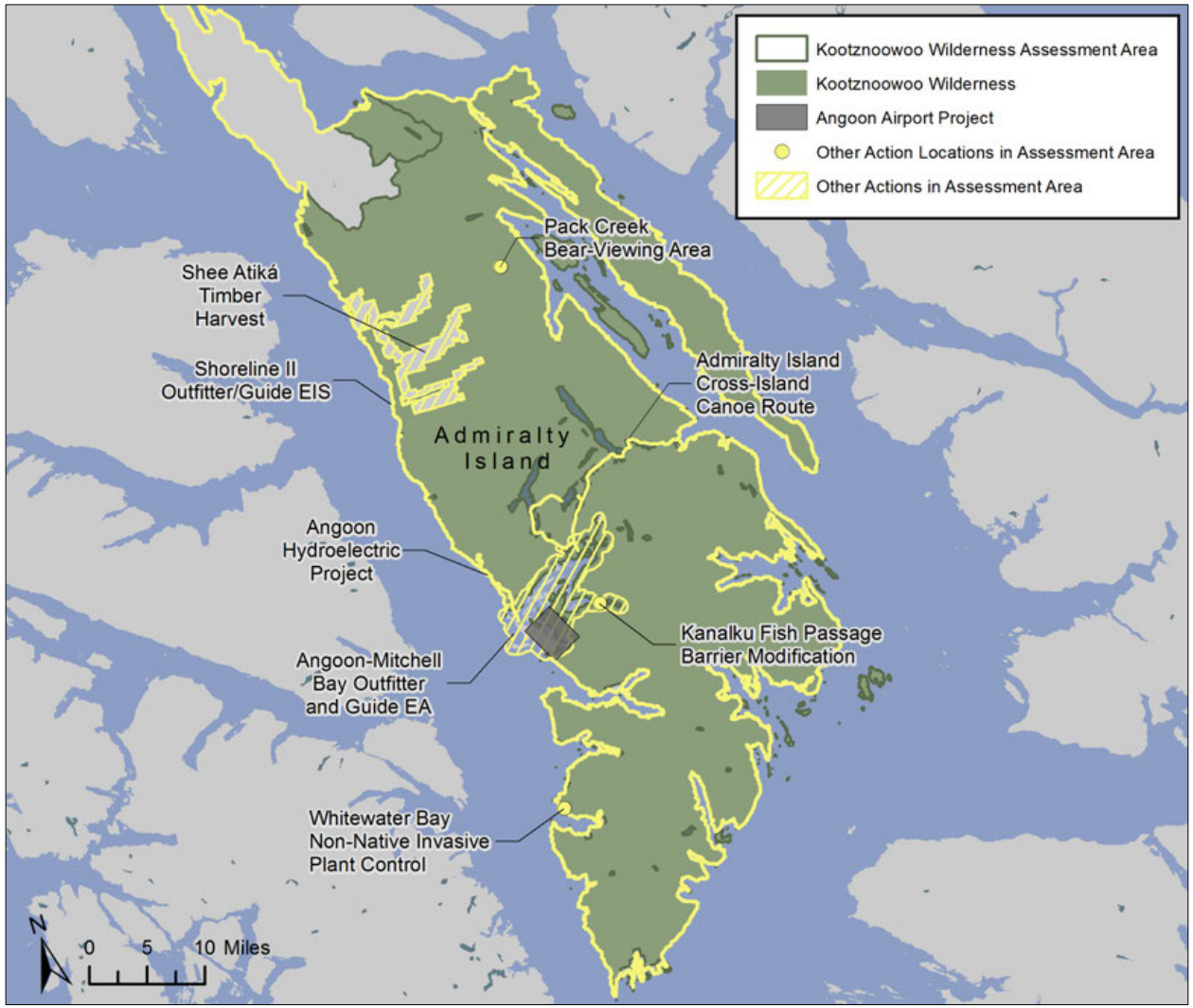

Figure CU2. Kootznoowoo wilderness assessment area and other actions in it.

8.3.2.4. Modified Mitchell Bay assessment area

As defined in the *Mitchell Bay Watershed Landscape Assessment* (U.S. Forest Service 2002), the original Mitchell Bay assessment area encompasses the watershed that drains into Kootznahoo Inlet, including Mitchell, Kanalku, and Favorite bays. This boundary has been modified to include Killisnoo Harbor, Killisnoo Island, and Kanalku Lake (Figure CU3).

As with the Admiralty Island assessment area, most of this area has seen minimal human-caused disturbance, and because of this, it is in relatively undeveloped and natural condition. There are limited recreational, commercial, and subsistence uses of the resources in this area by residents of Angoon and by non-residential commercial and recreational users. Areas in the immediate vicinity of Angoon and closer to access corridors such as rivers, roads, or marine waters tend to be visited more by humans and have seen more disturbance than more remote areas. The areas of higher subsistence use are still in relatively natural condition because of the small population in Angoon; 2010 Census data show a population of 459 individuals.

This assessment area is used for cumulative effects related to compatible land use and noise (section 8.3.5.4.1), terrestrial habitats and species (section 8.3.5.4.2), special status species (section 8.3.5.4.3), cultural resources (section 8.3.5.4.4), and wetlands (section 8.3.5.4.5).

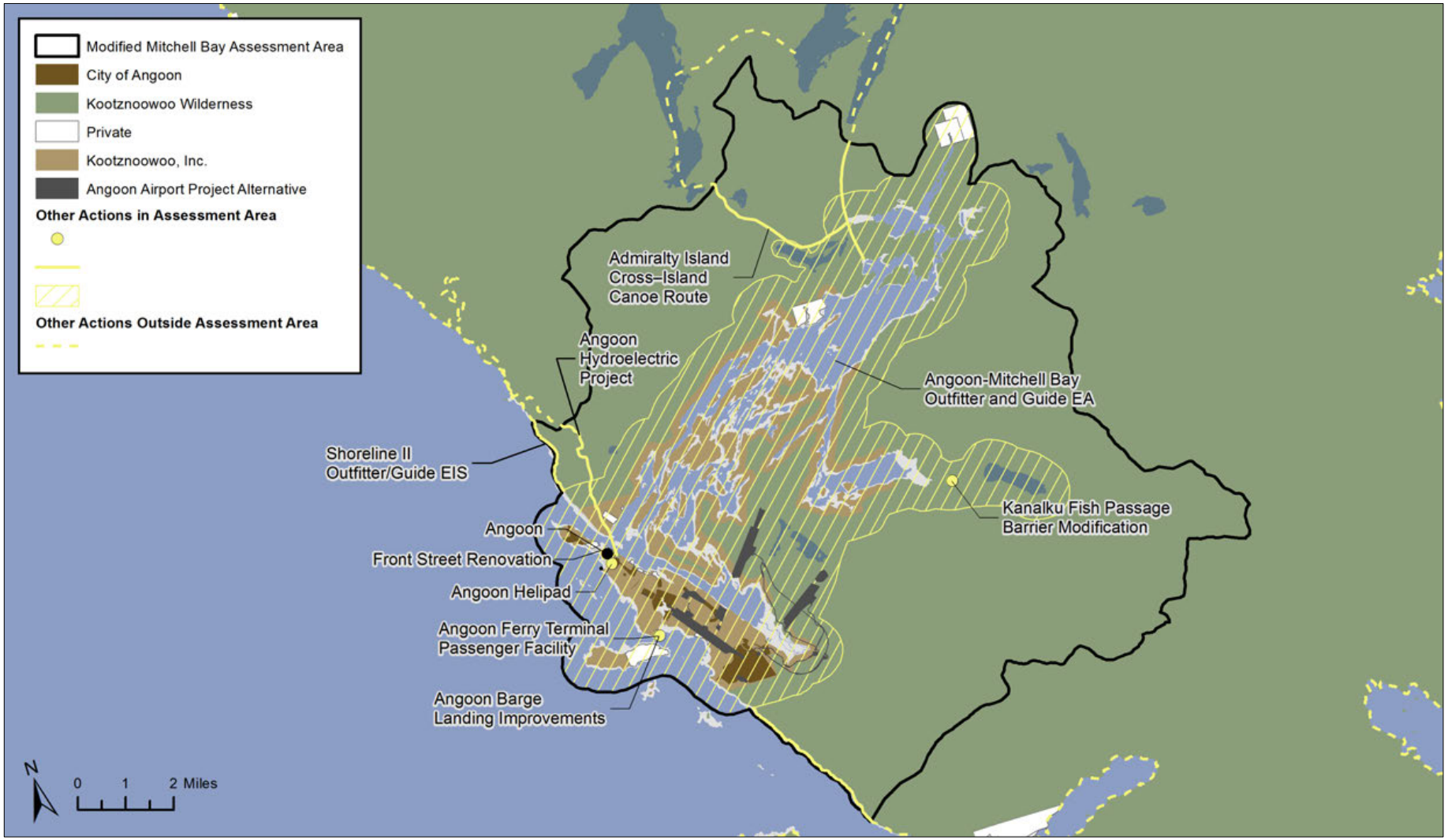

Figure CU3. Modified Mitchell Bay assessment area and other actions in it.

8.3.2.5. Modified watershed assessment area

The modified watershed assessment area (Figure CU4) contains 24,467 acres, and is a subset of the modified Mitchell Bay assessment area. This assessment area has similar characteristics to each of the above assessment areas, and is largely undeveloped because much of the land is in the Monument–Wilderness area. However, when compared to the larger assessment areas discussed above, it has proportionately more human-caused development and disturbance in and around the community of Angoon.

The fresh and marine water bodies in the Kanalku watershed are not included in this assessment area because none of the Angoon Airport action alternatives are anticipated to affect resources in the Kanalku watershed's fresh or marine water bodies.

This assessment area is used for cumulative effects related to floodplains, stream geomorphology, and hydrology (section 8.3.5.5.1); water quality (section 8.3.5.5.2); and aquatic habitats and associated species (section 8.3.5.5.3).

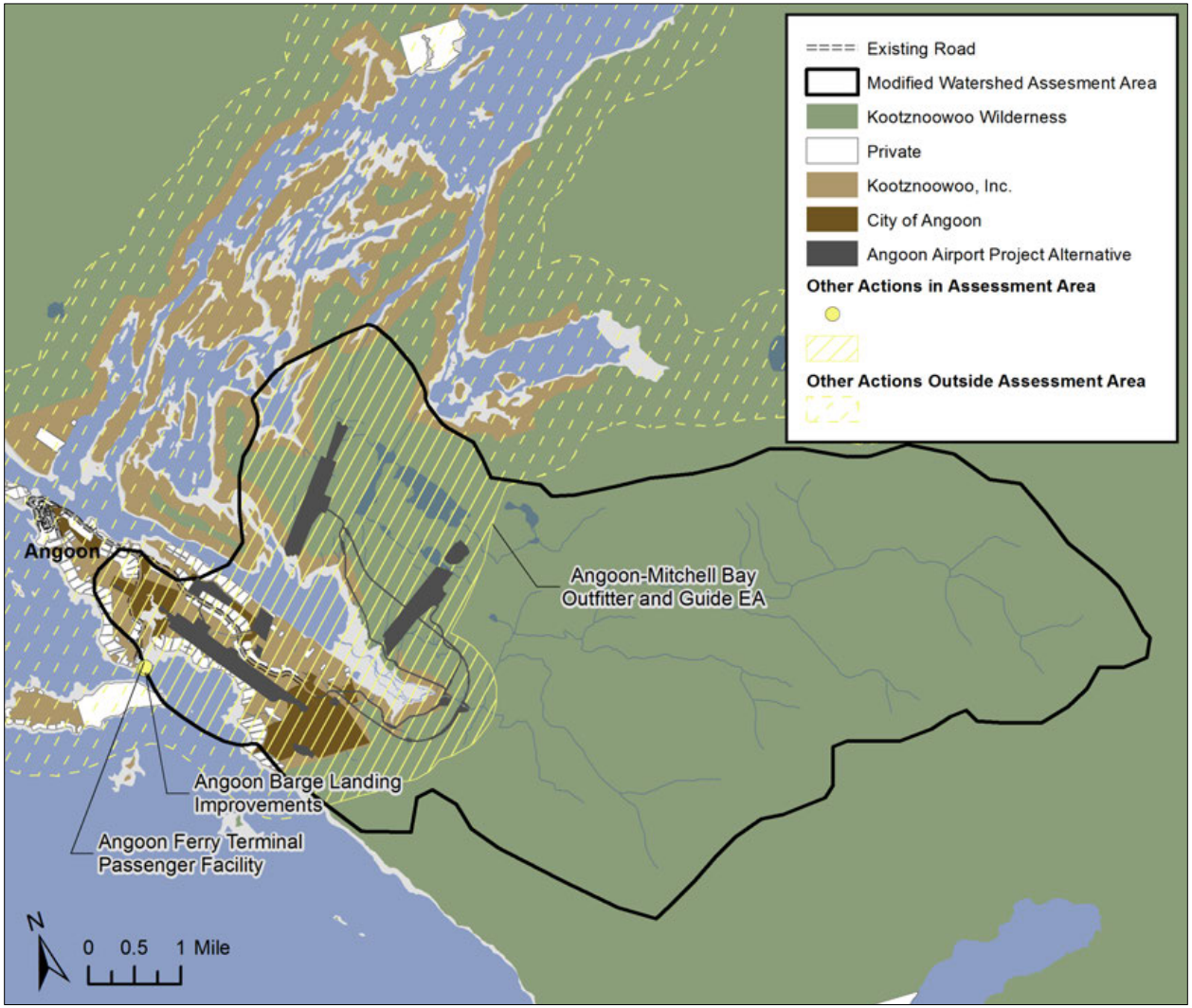

Figure CU4. The modified watershed assessment area and other actions in it.

8.3.2.6. Resource-specific assessment areas

For some resources, a resource-specific cumulative assessment area is necessary. In general, these areas parallel the areas assessed in the resource-specific project effects sections in Chapter 4. These areas, along with other past, present, and reasonably foreseeable future actions are shown on individual maps below. The smaller area is appropriate because a larger area does not have any possibility to add effects to those from the Angoon Airport project. These areas may include portions of the developed Angoon community and portions of the Monument–Wilderness Area.

8.3.3. Step 3: Identify the assessment time frame

To define a time frame for assessing cumulative effects, the FAA considered past actions and reasonably foreseeable future actions. The time frame begins with past actions that still have an effect, as described in section 8.3.4.2. Projects that are reasonably foreseeable within the next 5 years are examined because enough information is available for them to allow for meaningful disclosure of their potential effects.

8.3.4. Step 4: Identify other actions

This section identifies the past, present, and reasonably foreseeable future actions occurring in each assessment area that have the potential to result in cumulative effects when combined with the Angoon Airport project.

8.3.4.1. How did the FAA determine other actions?

To determine what other past, present, and reasonably foreseeable future actions have occurred or are occurring in the assessment areas, the FAA consulted the following sources:

- The *Mitchell Bay Watershed Landscape Assessment* (U.S. Forest Service 2002)
- Kootznoowoo, Inc. representatives (through meetings and discussions)
- City of Angoon representatives (through meetings and discussions)
- State of Alaska online public notices (State of Alaska 2013, 2015)
- The State of Alaska Statewide Transportation Improvement Program (Alaska Department of Transportation and Public Facilities 2013, 2015b)

- The U.S. Forest Service schedule of proposed actions for the Tongass National Forest (U.S. Forest Service 2013b, 2015)
- The *Kanalku Fish Passage Barrier Modification Environmental Assessment* (U.S. Forest Service 2011)
- The *Angoon Hydroelectric Project Final Environmental Impact Statement* (U.S. Forest Service 2009)
- The *City of Angoon Favorite Creek Hydrology Study* (CRW and Golder 2010)
- The City of Angoon Capital Improvements Resolution (City of Angoon 2012b)
- The *Greens Creek Mine Tailings Disposal Facility Expansion Draft Environmental Impact Statement [EIS]* (U.S. Forest Service 2012b)
- *The Greens Creek Mine Tailings Disposal Facility Expansion Final Environmental Impact Statement and Record of Decision* (U.S. Forest Service 2013a)
- The *Whitewater Bay Wilderness Stewardship Trip Report* (Southeast Alaska Conservation Council 2012)

8.3.4.2. Which past actions have caused or are still causing effects in the assessment areas?

Each of the identified assessment areas has experienced some level of effect from past actions. Past actions in these assessment areas have included logging, mining and other resource extraction; installation of temporary wind monitors; trails (both formal and informal); subsistence use; and development of high-use areas. Most of the activity has occurred in the following places:

- Around the community of Angoon, including actions such as landfill improvement, improvement of the existing seaplane base, and upgrades to the existing power plant and water plant and the recently improved ferry terminal.
- Around the Greens Creek Mine area, where mining has occurred and will continue to occur.
- Around the Shee Atiká private lands, where timber harvest has occurred and will continue to occur.

Effects from these actions continue to be present on the landscape, and have influenced the existing conditions described for each resource in Chapter 4. For this reason, the effects from past actions are already accounted for as part of the existing condition of each resource, and are not further added to the cumulative effects.

8.3.4.3. Which actions are ongoing or reasonably foreseeable?

From the sources listed in section 8.3.4.1, the FAA identified present and reasonably foreseeable future actions occurring in the assessment areas. Table CU1 lists and briefly describes these actions and indicates the assessment areas in which the actions occur. These actions are not to be considered part of the Angoon Airport project, and their inclusion in this EIS does not imply a decision on those actions.

Table CU1. Present and reasonably foreseeable future actions

Action	Description and anticipated dates	Admiralty Island assessment area	Monument assessment area	Kootznoowoo Wilderness assessment area	Modified Mitchell Bay assessment area	Modified watershed assessment area	Subsistence use assessment area	Resource-specific assessment areas
Kanalku fish passage barrier modification (present)	• Improve sockeye salmon passage over a partial fish-passage barrier on the outlet stream from Kanalku Lake. • The environmental assessment was completed in 2011 and the project's first phase completed in the summer of 2013. Monitoring is currently occurring to determine if Phase II is needed.	In	In	In	In	Out	Out	Out
Pack Creek bear-viewing area L (present)	• Ongoing nature-based viewing, outfitting, and guiding activities.	In	In	In	Out	Out	Out	Out
Admiralty Island Cross-Island Canoe Route (present)	• This canoe route crosses the center of Admiralty Island National Monument and Kootznoowoo Wilderness.	In	In	In	Out	Out	Out	Out
Angoon barge landing improvements (future)	• Improve the barge landing area for the City of Angoon. Includes an upland staging area trestle or causeway leading to a heavy load-out dock with mooring dolphins on each side. • Currently under design, funding has been secured. Completion estimated by 2016.	In	Out	Out	In	In	In	In

Table CU1. Present and reasonably foreseeable future actions

Action	Description and anticipated dates	Admiralty Island assessment area	Monument assessment area	Kootznoowoo Wilderness assessment area	Modified Mitchell Bay assessment area	Modified watershed assessment area	Subsistence use assessment area	Resource-specific assessment areas
Angoon Hydroelectric Project (future)	• Hydroelectric dam to be constructed on Thayer Creek with power delivered to Angoon. The project includes a diversion dam, intake, structure, marine facility, three access roads, two staging areas, transmission lines, a power plant, a surge tank, 6,100 feet of 42-inch diameter pipeline, and 510 feet of 36-inch diameter pipe. An underwater cable would be installed under Favorite Bay. • The EIS is complete for this project. Funding sources are still being sought. • Since completion of the EIS, consultation with the U.S. Department of Energy has led to a refocus on a small but scalable project of up to 1.2-megawatt capacity. Remaining activities for the project include conducting a feasibility study for completed design, and obtaining the necessary permits required to begin construction.	In	In	In	Partially in (transmission line only)	Out	Partially in (transmission line only)	Out
Angoon helipad (future)	• Helicopter landing pad for health and safety emergencies when seaplanes are not available. • A location has been chosen and funding secured for this project. Completion estimated by 2016.	In	Out	Out	In	In	In	In
Greens Creek Mine exploration, geotechnical, and operations (present)	• Continuation of the exploration and operation of the mine.	In	In	Out	Out	Out	Out	Out
Greens Creek 2016-2021 Surface Exploration (ongoing, EA in progress)	• A surface exploration program is planned for 2016. Activities include reconnaissance and geological mapping, geochemical sampling, and drilling. A maximum of six drill pads will be utilized. • Scoping for this project began in fall 2015, with a decision to authorize the project made in early February 2016.	In	In	Out	Out	Out	Out	Out

Table CU1. Present and reasonably foreseeable future actions

Action	Description and anticipated dates	Admiralty Island assessment area	Monument assessment area	Kootznoowoo Wilderness assessment area	Modified Mitchell Bay assessment area	Modified watershed assessment area	Subsistence use assessment area	Resource-specific assessment areas
Greens Creek Mine tailings expansion (present)	• Development of additional tailings disposal capacity. Would not increase the current size of the mine. • The final EIS for this project was completed in 2013. • As of summer 2015, expansion is currently underway, with construction activities including vegetation clearing and land development to address storm water runoff.	In	Out	Out	Out	Out	Out	Out
Whitewater Bay non-native invasive plant control (present)	• Removal of invasive plants along a remote bay shoreline of Admiralty Island. • This project has occurred for the last few summers and is planned for the summers of 2016 and 2017.	In	In	In	Out	Out	Out	Out
Angoon ferry terminal passenger facility (future)	• Replacement of the existing passenger terminal facility for Alaska Marine Highway System passengers at Angoon. Design would include a new building and parking area. • Funding for construction has been secured, and design has been completed. As of fall 2015, bids for construction were requested, with an anticipated completion of fall 2016.	In	Out	Out	In	In	In	In
Regularly scheduled trail/cabin/shelter maintenance (present)	• The U.S. Forest Service maintains trails, cabins, and shelters on a routine basis.	In	In	In	Out	Out	Out	Out
Angoon Front Street Renovation (future)	• Renovation of Front Street to upgrade the retaining wall and stabilize the roadbed. • Funding has been secured and preliminary design completed. The city estimates that construction will begin in August 2016.	In	Out	Out	In	Out	In	In

Table CU1. Present and reasonably foreseeable future actions

Action	Description and anticipated dates	Admiralty Island assessment area	Monument assessment area	Kootznoowoo Wilderness assessment area	Modified Mitchell Bay assessment area	Modified watershed assessment area	Subsistence use assessment area	Resource-specific assessment areas
Angoon-Mitchell Bay Outfitter and Guide Environmental Assessment (future)	• The Forest Service proposes to allocate 16% of the overall visitor capacity (in service days) of Mitchell, Kanalku, and Favorite Bays to outfitter and guide use for non-motorized, recreation activities. The project purpose includes cooperative land management of Kootznoowoo Corridor Lands with an ecotourism focus. The project proposal would increase visitor service days from the current commercial allocation. • The environmental assessment process is underway, with an expected decision in May 2017.	In	In	In	In	In	In	In
Shoreline II Outfitter/Guide EIS (future)	• The update to the 2004 *Shoreline Outfitter/Guide Record of Decision and EIS* will allocate recreation use levels for saltwater-based outfitters and guides at the Admiralty Island National Monument. • The EIS is in progress, and the U.S. Forest Service proposes to allocate 13% of the overall visitor capacity (in service days) to outfitter and guide use. This would be an increase from the current commercial allocation.	In	In	In	Partially in	Out	Partially in	Out

8.3.4.4. Are there other proposed actions that are not reasonably foreseeable?

During the process of identifying other past, ongoing, or reasonably foreseeable future actions, the FAA identified several other actions in each assessment area currently being discussed by the Angoon community or other agencies. These other potential actions (Table CU2) are not considered reasonably foreseeable in this cumulative effects analysis because there are no concrete plans to construct or develop these projects.

Table CU2. Other proposed actions

Action	Description
Landfill relocation (future)	• The City of Angoon plans to relocate the current landfill but is awaiting a decision about the airport before moving forward.
Shee Atiká timber harvest (past and future)	• Timber harvesting has occurred and could occur in the future on private lands south of the mine. • There are no concrete plans from Shee Atiká to log these lands.
Favorite Creek community water source (future)	• This project would include development of a gravity water system at Favorite Creek, a discharge pipe leading to the existing water treatment plant, and an access road for maintenance. • A feasibility study has been conducted, and the next step is to secure funding for the EIS. At this time, there are no funding identified and no concrete plans to implement this project.
Potential future airport buildout for a 4,000-foot runway at the proposed Angoon Airport	• The current plan for the proposed Angoon Airport includes a 3,300-foot runway. However, when the FAA and the Alaska Department of Transportation and Public Facilities developed aviation plans and looked at demand for travel, it was determined that a 4,000-foot runway may be needed in the future.
Additional infrastructure at the proposed Angoon Airport	• Additional infrastructure such as hangars, terminals, and fueling facilities could be built at the proposed Angoon Airport.

8.3.5. Step 5: Assess cumulative effects by resource

The following sections disclose the cumulative effects to each resource from the Angoon Airport project when combined with other actions in a given assessment area. Each subsection describes the following:

- Which assessment area is used for the resource and why it was chosen
- The existing condition of the resource that includes effects from past actions and that forms the baseline condition for that resource
- A discussion of how the present and reasonably foreseeable future actions could also affect the existing condition of that resource
- A determination whether those actions, when combined with the Angoon Airport project, would have a significant cumulative effect
- A discussion about possible mitigation measures and responsible parties (if a significant cumulative effect is determined)

Considerations of significance for cumulative effects rely on the same thresholds used in identifying significant effects from the Angoon Airport project. These significance thresholds can be found in the project effects subsections of each resource section in Chapter 4.

8.3.5.1. Admiralty Island assessment area

8.3.5.1.1. Air quality and climate change

The Admiralty Island assessment area (see Figure CU1) was chosen for air quality and climate change because, based on local weather and wind patterns, it is the most likely place where effects to air quality from the Angoon Airport project and other actions would overlap and lead to increased concentrations of air pollutants. Because climate change is a global phenomenon, it was not used to determine the assessment area.

The State of Alaska does not monitor air quality on Admiralty Island; however, as disclosed in section 4.2 Air Quality, most places in Alaska, including Admiralty Island, currently meet air quality standards. Sources of air pollutants and greenhouse gas emissions do exist on the island, mostly in the areas around the community of Angoon and around Greens

Creek Mine, but they are limited to 1) emissions from resident cars and occasional seaplane and ferry activity, 2) emissions from residential and commercial electrical generation and heating, 3) open-pit burning at the Angoon landfill, and 4) dust from the mine tailings and vehicles traveling on unpaved roads.

Construction of any of the reasonably foreseeable projects would result in temporary, localized increases in air pollutants and greenhouse gases due to diesel fuel combustion and dust from construction equipment and the vehicles used by construction crews. Of the reasonably foreseeable future actions in this assessment area, only the Angoon Hydroelectric Project has the potential to create additional, long-term effects to air quality and to greenhouse gases. This is because the remaining projects would not alter current uses or levels of activity in a way that could increase or decrease emissions. For example, construction of the Angoon helipad would not result in increased air pollutant emissions because Angoon is already serviced by helicopters for emergencies, and the amount of helicopters is not expected to change.

Operation of the Angoon Hydroelectric Project would generate negligible emissions of air pollutants or carbon dioxide because no fuels are burned in the generation of hydropower. Therefore, the addition of these actions combined with the effects from any of the action alternatives of the Angoon Airport project would not result in significant cumulative effects to air quality or to climate change.

8.3.5.1.2. Socioeconomic conditions, environmental justice, and children's health and safety

The Admiralty Island assessment area was chosen for socioeconomics, environmental justice, and children's health and safety because, due to the limited socioeconomic opportunities available on the island, any economic opportunity would have an effect in the community of Angoon. Figure CU1 shows the assessment area and the ongoing and reasonably foreseeable future actions that fall in this area.

Angoon is the only permanent community on Admiralty Island. According to the 2010 U.S. Census, the community had a population size of 459 residents, of which approximately 46% were employed at least part time. Local government, education and health services, and tourism represented the top three employment sectors. The Angoon community is also predominantly Alaska Native or other Native American heritage, and approximately 31% of the population in Angoon, regardless of race, fell below the Department of Health and Human Service's poverty guidelines in 2012 (U.S. Department of Health and Human Services 2012).

There are minimal existing health and safety risks to children in the Angoon area. The community maintains three active aboveground storage tanks for diesel fuel and gasoline, a solid waste landfill, and a water and wastewater treatment plant, but most of these sites are not located in close proximity to areas where children congregate. The one fuel storage tank located in the town core has no current or unresolved historic spills or leaks. Air quality and water quality in the area are generally good, ambient noise levels are quiet, and there are no known contamination issues for common subsistence resources consumed by children (such as deer and salmon).

Construction of any of the proposed reasonably foreseeable projects would likely result in a small number of short-term employment opportunities and income for Angoon residents. The total number of construction-related jobs and potential revenue cannot be forecast at this time, however, given that most actions are in early stages of analysis. In contrast, very few reasonably foreseeable projects would yield a long-term effect on local socioeconomic conditions in Angoon because they would not require new or additional staff to operate. The Greens Creek Mine tailings expansion is not expected to increase employment because it would not expand beyond its current operating boundary. The Pack Creek bear-viewing area and Whitewater Bay projects would continue to provide some seasonal employment, and the Angoon Hydroelectric Project could also hire local staff. Assuming that these projects generated a similar number of long-term economic opportunities as the Angoon Airport would (1–2 jobs). With the increased commercial recreation allocation proposed in the Shoreline II Outfitter/Guide project and the Angoon-Mitchell Bay Outfitter and Guide project, an increase in tourism-related employment opportunities could be possible, as well. The addition of these actions combined with the effects from any of the Angoon Airport action alternatives would not result in significant cumulative effects.

Discussion of cumulative effects involving resources potentially affecting environmental justice and children's health and safety—air quality, water quality, noise, hazardous materials—is provided in other sections of this chapter. Readers are referred to those sections for further analysis. However, because the addition of these actions with the effects from any of the Angoon Airport action alternatives would not result in significant cumulative effects for any of the above-listed resources, the project would also not result in significant cumulative effects for environmental justice and children's health and safety.

8.3.5.2. Admiralty Island National Monument assessment area

8.3.5.2.1. Monument purposes

The assessment area for effects to monument purposes and federal reserved rights is the Monument assessment area. Figure CU1 shows this area and the reasonably foreseeable future actions that fall within it.

As described in section 4.19 Admiralty Island National Monument, because the lands in the vicinity of the Monument alternatives remain largely undisturbed, the resources that contribute to them remain in excellent condition, as is the case throughout the greater monument. Locales near developed or more frequently used locations like the community of Angoon, the Pack Creek bear-viewing area, the Kanalku Bay watershed, the Admiralty Island Cross-Island Canoe Route, and the various public and private cabins have been affected to some degree, but the assessment area is substantially free of human control and manipulation.

In 1996 the U.S. Congress passed the Greens Creek Land Exchange Act, which granted the Greens Creek Mine title to the monument subsurface of 7,500 acres of public land immediately adjacent to their claims. The Mine will continue to explore and mine these areas. Upon completion of mining, these reclaimed subsurface lands will be returned to the U.S. government, and again be part of the Admiralty Island National Monument (U.S. Forest Service 2013a).

Congress granted Kootnzoowoo, Inc., the right to develop hydroelectric reserves in the Monument in Section 506 (a)(3)(D) of the Alaska National Interest Lands Conservation Act of 1980 (Public Law [PL] 96-487). However, the areas adjacent to this project are expected to have effects on the Monument purposes in the areas adjacent to the hydroelectric project. The Kanalku fish passage barrier modification would degrade Monument purposes during construction of Phase II, but is not expected to be long lasting. Whitewater Bay non-native invasive plant control is intended to improve the qualities of the area. It would degrade the wilderness purposes because it introduces human control, but it would improve the fish and wildlife purposes. The *Shoreline II Outfitter/Guide Environmental Impact Statement* (future) *and Angoon-Mitchelly Bay Outfitter/Guide Environmental Assessment* (expected February 2016) would comply with Monument purposes.

8.3.5.3. Kootznoowoo Wilderness assessment area

8.3.5.3.1. Wilderness character

The assessment area for wilderness character is the Kootznoowoo Wilderness assessment area. Figure CU2 shows this area and the reasonably foreseeable future actions that fall within it.

As described in section 4.16 Wilderness Character, the wilderness in the Kootznoowoo Wilderness assessment area contains vast tracts where all four wilderness qualities are intact and unaltered. Locales near developed or more frequently used locations like the community of Angoon, the Pack Creek bear-viewing area, the Kanalku Bay watershed, the Admiralty Island Cross-Island Canoe Route, and the various public and private cabins have been affected to some degree, but the assessment area is substantially free of human control and manipulation.

The Angoon Hydroelectric Project was exempted from requirements of the Wilderness Act of 1964 (PL 88-577) by Congress through Section 506 (a)(3)(D) of the Alaska National Interest Lands Conservation Act of 1980 (PL 96-487). However, the areas adjacent to this project are expected to have effects on the undeveloped qualities and the opportunities for solitude or primitive and unconfined recreation. The Kanalku fish passage barrier modification would degrade wilderness qualities during construction of Phase II, but are not expected to be long lasting. The Whitewater Bay non-native invasive plant control is intended to improve the qualities of the wilderness area. It would degrade the untrammeled quality of the wilderness because it introduces human control, but it would improve the natural quality. The *Shoreline II Outfitter/Guide Environmental Impact Statement* (expected June 2016) and *Angoon-Mitchelly Bay Outfitter/Guide Environmental Assessment* (expected May 2017) would comply with wilderness land use guidelines, and would include analyses of effects to wilderness character in the alternatives. The increased commercial visitor allocation in the Kootznoowoo wilderness assessment area has the potential to affect opportunities for solitude, as well as the natural quality.

8.3.5.4. Modified Mitchell Bay assessment area

8.3.5.4.1. Compatible land use and noise

The modified Mitchell Bay assessment area shown in Figure CU3 overlaps the area analyzed for noise effects in section 4.11 Noise. This assessment area was chosen because the FAA considers noise to be a primary determinant of compatible land use, and although noise from the proposed airport may travel beyond the modified Mitchell Bay assessment area, the greatest increases in noise level and duration would occur in this area. Therefore, it is the most likely place where effects from the Angoon Airport and other actions would overlap and lead to noticeable changes in noise. These changes in noise would, in turn, potentially affect existing land uses.

The modified Mitchell Bay assessment area is relatively quiet, with the loudest noise coming from the existing Angoon Seaplane Base and periodic aircraft overflights from high-altitude commercial jets and lower-altitude regional jets and propeller airplanes. Of the reasonably foreseeable future actions in this assessment area, the Angoon helipad is the only project with the potential to create additional effects to noise levels over the long term. However, Angoon is currently serviced by helicopter for emergencies, and the amount of helicopter traffic is not expected to change. Noise from construction of the other reasonably foreseeable future actions would increase noise in the short term, but would be expected to stay localized. The addition of these actions combined with the effects from any of the Angoon Airport action alternatives would not result in significant cumulative effects to land use from noise. None of the reasonably foreseeable future actions would change the land use or landownership in the assessment area.

8.3.5.4.2. Terrestrial habitats and associated species

The modified Mitchell Bay assessment area shown in Figure CU3 was chosen for terrestrial habitats and associated species because it is the watershed used by the U.S. Forest Service for management of resources, and also the area that receives the highest levels of use and potential disturbance around the Angoon Airport project alternatives.

The terrestrial habitats in the modified Mitchell Bay assessment area are largely undisturbed by human developments and activities, and are of high quality. Vehicle access is currently limited to the area around the Angoon community, and the habitats are mostly continuous and undisturbed with little or no fragmentation. Because most of the lands in the assessment area are contained in the Monument-Wilderness Area, the condition of these habitats is unlikely to be altered significantly in the future.

With the exception of both Outfitter and Guide projects and the Angoon Hydroelectric Project, the reasonably foreseeable future actions in this assessment area would occur on lands that are already disturbed and therefore would only affect terrestrial species during construction through potential displacement. The hydroelectric project would disturb terrestrial habitats and displace terrestrial species during construction. The ground surface above the underground power lines most likely would be partially revegetated, but trees would not be allowed to grow over the power lines, and, therefore, this area would see a change in habitat type. The Outfitter and Guide projects propose increased commercial visitor allocation in the assessment area. The projects have the potential to increase human presence in the assessment area, and could increase the potential for disturbance to terrestrial species. Increased outfitter and guide activities could also increase injury and mortality from commercially guided hunting of Sitka black-tailed deer, upland birds, and brown bears. The State of Alaska would manage the number of guided hunts so that they would not affect the viability of the local populations.

Because high-quality terrestrial habitats are abundant in the assessment area and the viability of local populations would not be affected, the addition of these actions combined with the effects from any of the Angoon Airport action alternatives would not result in significant cumulative effects.

8.3.5.4.3. Special status species

As discussed in sections 8.3.5.4.2 and 8.3.5.5.3, the existing condition of the terrestrial and aquatic habitats in the assessment area is largely undisturbed by humans and unlikely to be altered significantly in the future.

Effects to federally listed species, candidate species, and species protected under the Marine Mammal Protection Act

Angoon Airport project construction and operation would not result in any direct long-term effects to federally listed species, candidate species, or species protected under the Marine Mammal Protection Act (16 United States Code [USC] 31) (section 4.5.3 Special Status Species). Assuming that the reasonably foreseeable projects would also need to barge materials and supplies to Angoon for construction, marine mammal collisions with the barges, although unlikely, could occur. The potential for ship strikes on marine mammals could be minimized or avoided by adhering to a general marine mammal "code of conduct" such as vigilantly scanning the water's surface and remaining at least 100 yards from marine mammals (Neilson et al. 2012). It is possible that installation and maintenance of the Thayer Lake underwater transmission line across the mouth of Favorite Bay could affect individual animals. Because these are legally protected species, coordination and consultation with the U.S. Fish and Wildlife Service and the Protected Resources Division of the National Oceanic and Atmospheric Administration would be conducted to avoid, minimize, or mitigate adverse effects to them.

Effects to U.S. Forest Service sensitive species, management indicator species, and migratory birds

As discussed in section 8.3.5.4.2, the Angoon Airport project and other proposed projects would result in long-term terrestrial habitat removal and fragmentation. Section 4.5.3 Special Status Species discusses protected U.S. Forest Service sensitive and management indicator species as designated in the *Tongass Land and Resource Management Plan* (U.S. Forest Service 2008a) and to migratory bird species according to the Migratory Bird Treaty Act (as amended 1936 and 1972, 16 USC 703–712). These protected species are found in the terrestrial habitats in the assessment area, and individuals could be directly or indirectly affected by cumulative project effects. However, because of the prevalence of undisturbed terrestrial habitats throughout the assessment area, none of these cumulative effects are anticipated to have significant adverse effects to these species at the population level.

There are four U.S. Forest Service aquatic management indicator species, and cumulative effects to those species would be the same as those discussed in section 8.3.5.5.3.

The addition of these projects to the Angoon Airport project would not result in significant adverse cumulative effects to special status species.

8.3.5.4.4. Cultural resources

The modified Mitchell Bay assessment area as shown in Figure CU3 was chosen for cultural resources because it includes the analysis area used for effects to cultural resources and because it includes locales—coast lines and known historical use areas—where cultural resources are likely to occur. As discussed in section 4.8 Cultural Resources, a large percentage of the land around Favorite Bay and Angoon is considered to have a high probability for containing historic and prehistoric cultural resources.

Any reasonably foreseeable future actions in this assessment area would have the potential to adversely affect cultural resources. In particular, construction of the barge landing area and the ferry terminal passenger facility could affect such resources because they would be built in areas with high probability for cultural resources. However, most of these projects would be under federal or state jurisdiction and would therefore require compliance with federal laws to avoid, minimize, or mitigate effects to archaeological, historical, architectural, and cultural resources. Therefore, the net effect of these projects on such resources is not expected to be significant.

8.3.5.4.5. Wetlands

The modified Mitchell Bay assessment area as shown in Figure CU3 was chosen for wetlands because it is the next higher-order hydrologic unit that is generally similar to the area analyzed for effects from the Angoon Airport action alternatives.

Wetlands in this assessment area are, in general, undisturbed and in high-quality condition, largely because they are in the Monument–Wilderness Area. The only reasonably foreseeable future action that would also have an effect on the wetlands in this assessment area would be development of the Angoon Hydroelectric Project. The other projects occur on previously disturbed lands that are unlikely to contain wetlands. Any project that would have effects on wetlands is required to be offset through compensatory wetland mitigation to satisfy the requirements of Section 404 of the Clean Water Act (PL 107-303). Effects from the reasonably foreseeable future actions would not result in additional significant effects on wetlands.

Terms to know

Sedimentation: The process by which sediment is transported by surface water; also referred to as surface erosion.

Turbidity: Lack of clarity in water as a result of suspended sediments.

8.3.5.5. Resources in the modified watershed assessment area

8.3.5.5.1. Floodplains, stream geomorphology, and hydrology

The modified watershed assessment area was chosen for floodplains, stream geomorphology, and hydrology because water resources are often managed at the watershed scale. The watersheds in this assessment area provide context for the Chapter 4 effects analysis. Figure CU4 shows this assessment area and the ongoing and reasonably foreseeable actions that fall within it. Because most of this assessment area is contained in the Monument–Wilderness Area, the condition of these habitats is unlikely to be altered significantly in the future. As discussed in section 4.6.3.3 in Floodplains, Stream Geomorphology, and Hydrology, the only floodplains in the assessment area that could be affected by the Angoon Airport project are adjacent to Favorite Creek in its lower reaches before it enters Favorite Bay. No effects to these floodplains are anticipated from any of the other projects proposed in the assessment area.

8.3.5.5.2. Water quality

Terms to know

Mitigate: Used here, steps to avoid, minimize, correct, reduce, or compensate for adverse project effects.

The modified watershed assessment area was chosen for water quality because water resources are often managed at the watershed scale. The watersheds of potentially affected marine and fresh water bodies are used to provide context in the Chapter 4 effects analysis. Figure CU4 shows this assessment area and the ongoing and reasonably foreseeable actions that fall within the assessment area. Because most of this assessment area is contained in the Monument–Wilderness Area, the condition of these habitats is unlikely to be altered significantly in the future.

Construction of the Angoon Airport project and other projects in the assessment area could cause increased ***turbidity*** and ***sedimentation*** to fresh and marine waters. As discussed in section 4.14.3.7 in Water Quality, best management practices required by the Alaska Department of Environmental Conservation would prevent and reduce water quality violations and impairment to waters.

The barge landing improvements and ferry terminal passenger facility projects could affect Killisnoo Harbor marine waters. In the past, sediment and surface runoff from the current landfill have decreased water quality in the downstream Salt Lagoon (U.S. Forest Service 2002). In 2009, landfill improvements were made to contain runoff of these pollutants.

No significant cumulative effects to water quality would occur from the combination of these other projects with the Angoon Airport project because these projects would be required to meet Alaska Department of Environmental Conservation permit stipulations. Increased turbidity and sedimentation from construction and operation of these projects would be entirely ***mitigated*** using best management practices. Water quality contamination from surface runoff would be minimized by each project operator adhering to Alaska Department of Environmental Conservation regulations.

8.3.5.5.3. Aquatic habitats and associated species

The modified watershed assessment area (Figure CU4) was chosen for aquatic habitats and associated species because it includes the analysis area used for effects upstream and downstream of the Angoon Airport action alternatives plus adjacent watersheds, and is the area where cumulative effects are likely to occur. Because all aquatic habitats in the assessment area are non-wetland waters of the U.S., the cumulative effects analyses for aquatic habitats also apply to non-wetland waters of the U.S.

Aquatic habitats and species in the modified watershed assessment area are relatively undisturbed and of high quality because the assessment area has a small human population concentrated at Angoon. Outside of town, there are few existing roads or other human-built infrastructure or human activities that could decrease the quality of the existing aquatic habitats. Because most of this assessment area is contained in the Monument–Wilderness Area, the condition of these habitats is unlikely to be altered significantly in the future.

The Angoon-Mitchell Bay Outfitter and Guide Environmental Assessment proposes increased commercial visitor allocation in the assessment area. The potential for increased human presence from this project in the assessment area could increase fishing pressure in the lakes, Favorite Creek, and Favorite Bay, accompanied with the potential to reduce aquatic resources and damage aquatic habitats. The Angoon barge landing improvement and ferry terminal passenger facility would be located in the marine beach riparian management area adjacent to Killisnoo Harbor. For evaluation of effects to riparian areas, the U.S. Forest Service definition of marine beach riparian management areas was applied to the entire assessment area, not only to lands managed by the U.S. Forest Service. Construction and operation of these facilities could affect these riparian areas, which "have high values" for marine aquatic species and terrestrial species that use these areas for foraging and as migratory corridors (U.S. Forest Service 2008a:D-9).

No significant adverse cumulative effects to aquatic habitats and associated species are expected from turbidity or sedimentation increases because all projects would be required to meet permit stipulations (see section 8.3.5.5.2).

The addition of these other project actions combined with the effects from any of the Angoon Airport action alternatives would not result in significant cumulative effects to aquatic habitats and species because of the abundance of these habitats and species throughout the assessment area and Southeast Alaska.

8.3.5.6. Resource-specific assessment areas

8.3.5.6.1. Hazardous materials, pollution prevention, and solid waste

The assessment area for hazardous materials, pollution prevention, and solid waste is resource-specific and parallels the area analyzed for effects as described in section 4.7 Hazardous Materials, Pollution Prevention, and Solid Waste, and as shown on Figure CU5. This area was chosen because, due to the amount of wilderness surrounding the Angoon community, it is the most likely place where effects from the Angoon Airport project would overlap with other actions where hazardous materials, pollution, and solid waste could be a concern.

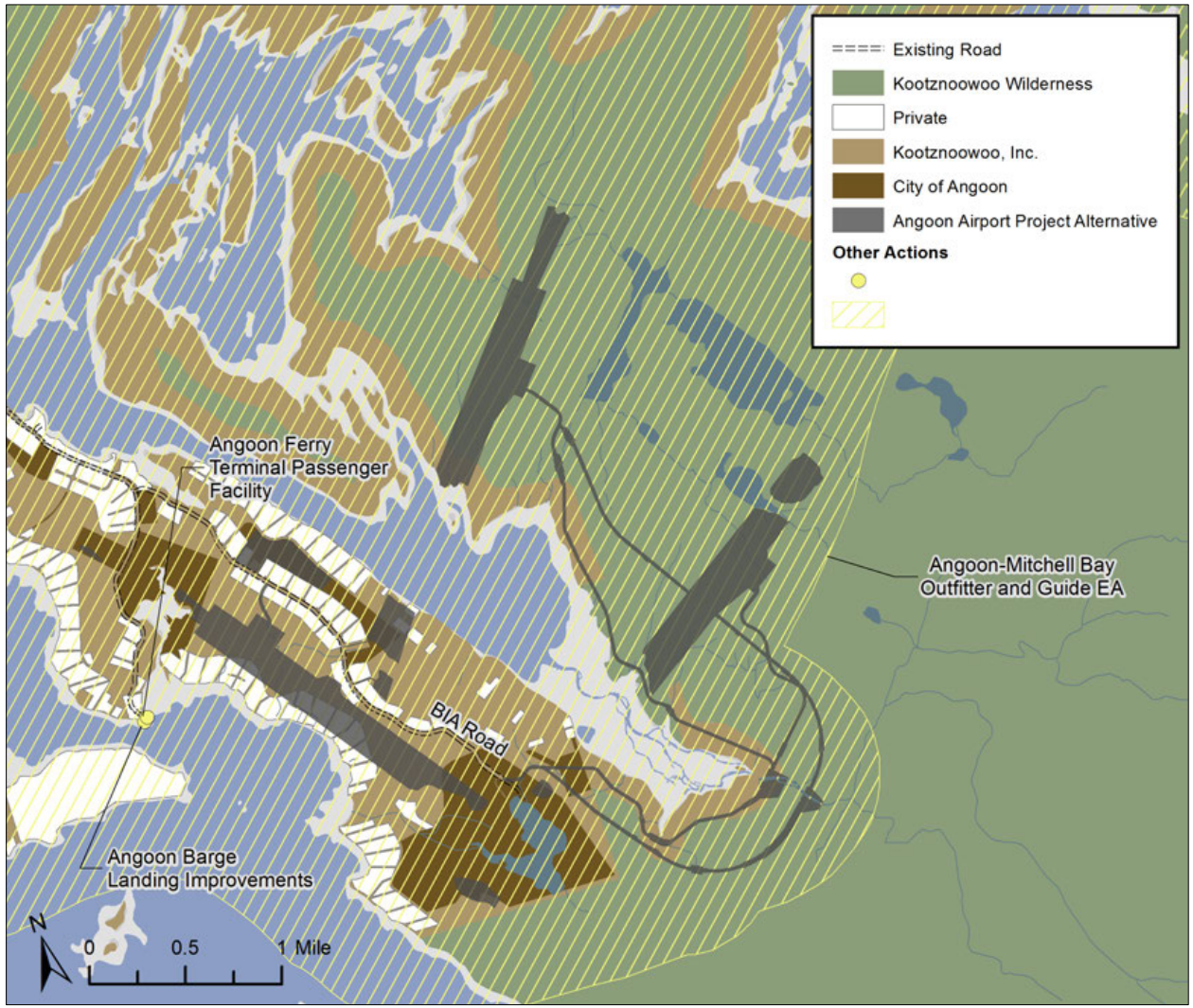

Figure CU5. The hazardous materials, pollution prevention, and solid waste assessment area, and the other actions in it.

No hazardous materials or solid waste sites are known to exist in the direct footprint of any airport or access road action alternative. The lands in the areas of the Angoon Airport action alternatives are primarily undisturbed, and generally lack signs of past dumping or contamination. There are few roads, and evidence of human activity outside the developed areas consists of foot trails that residents use for subsistence harvest. All reasonably foreseeable future actions, including the barge landing improvement, the hydroelectric project, and the *Angoon-Mitchell Bay Outfitter and Guide Environmental Assessment* would be required to meet state and federal regulations on handling hazardous materials and solid waste. The Angoon ferry terminal passenger facility and barge landing area sites would be in the vicinity of one of the active aboveground storage tanks for diesel fuel and gasoline. The addition of these actions combined with the effects from any of the Angoon Airport action alternatives would not result in significant cumulative effects.

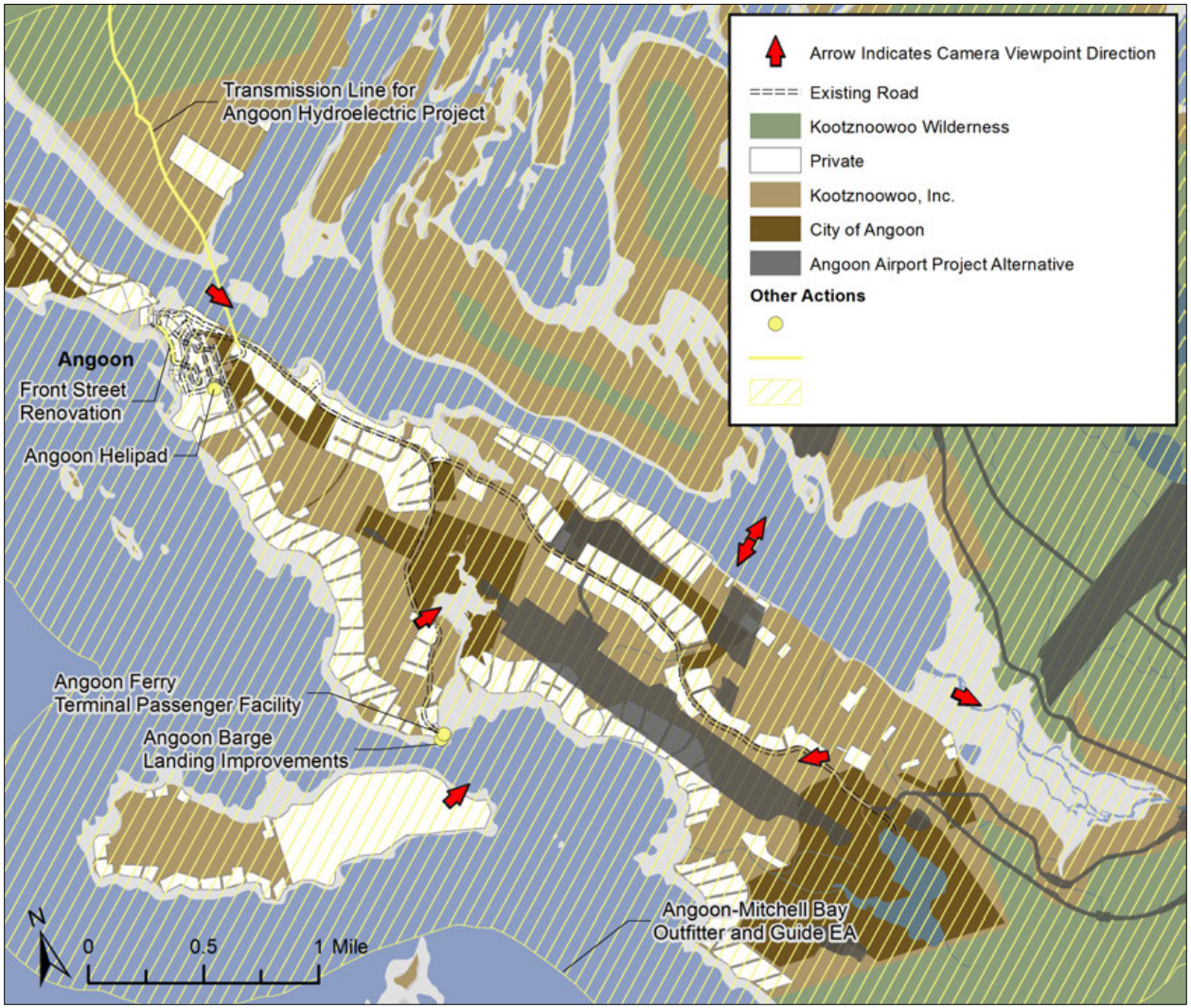

Figure CU6. The light emissions and visual resources viewpoints, and other actions potentially seen from these points.

8.3.5.6.2. Light emissions and visual resources

The assessment area for light emissions and visual resources is resource specific and parallels the area analyzed for effects in section 4.9 Light Emissions and Visual Resources, specifically the viewpoints along or in each potentially affected visual priority route as shown in Figure CU6. This is because these are the viewpoints from which the Angoon Airport project can be seen that would overlap with other project. Nighttime light emissions are concentrated in developed areas on the Angoon peninsula, around the ferry terminal, and on Killisnoo Island near the ferry terminal. Beyond these developed areas, visible lighting is limited. There are few sources of light emissions, and there is very little skyglow as a result. Because the developed areas are concentrated on the Angoon peninsula and Killisnoo Island, the visual character of the Angoon area is that of a very lightly developed and unaltered landscape. Because the area is surrounded on the north and west by Chatham Strait and on the east by Favorite Bay and to the north, east, and south of the peninsula by the Monument–Wilderness Area, light emissions and visual character would be likely to remain as they currently are.

The barge landing improvements and ferry terminal passenger facility actions would be the only reasonably foreseeable future actions that could additionally affect the visual quality from the established viewpoints. These areas are already developed, and therefore these actions combined with the effects from any of the action alternatives of the Angoon Airport project would not result in additional significant cumulative effects.

8.3.5.6.3. Energy supply, natural resources, and sustainable design

The assessment area for energy supply, natural resources, and sustainable design (Figure CU7) is resource-specific and parallels the area analyzed for effects in section 4.10 Energy Supply, Natural Resources, and Sustainable Design. This is because the Kootznoowoo Wilderness Area prohibits development of natural resources like gravel, rock, water, and timber. Asphalt, concrete, and building supplies (like lumber, metals, and finishing materials) are not available in Angoon, and would likely have to be barged in for any of the actions shown in Figure CU7. There is one developed quarry on the Angoon peninsula along the Bureau of Indian Affairs (BIA) Road. Electricity in Angoon is produced at a single diesel-burning power plant. The Angoon Hydroelectric Project would reduce the community's reliance on diesel, and the airport could connect to this facility if it is cost effective. Because most materials would likely be barged in for the Angoon Airport project and other future actions, the combination of these actions would not result in significant cumulative effects.

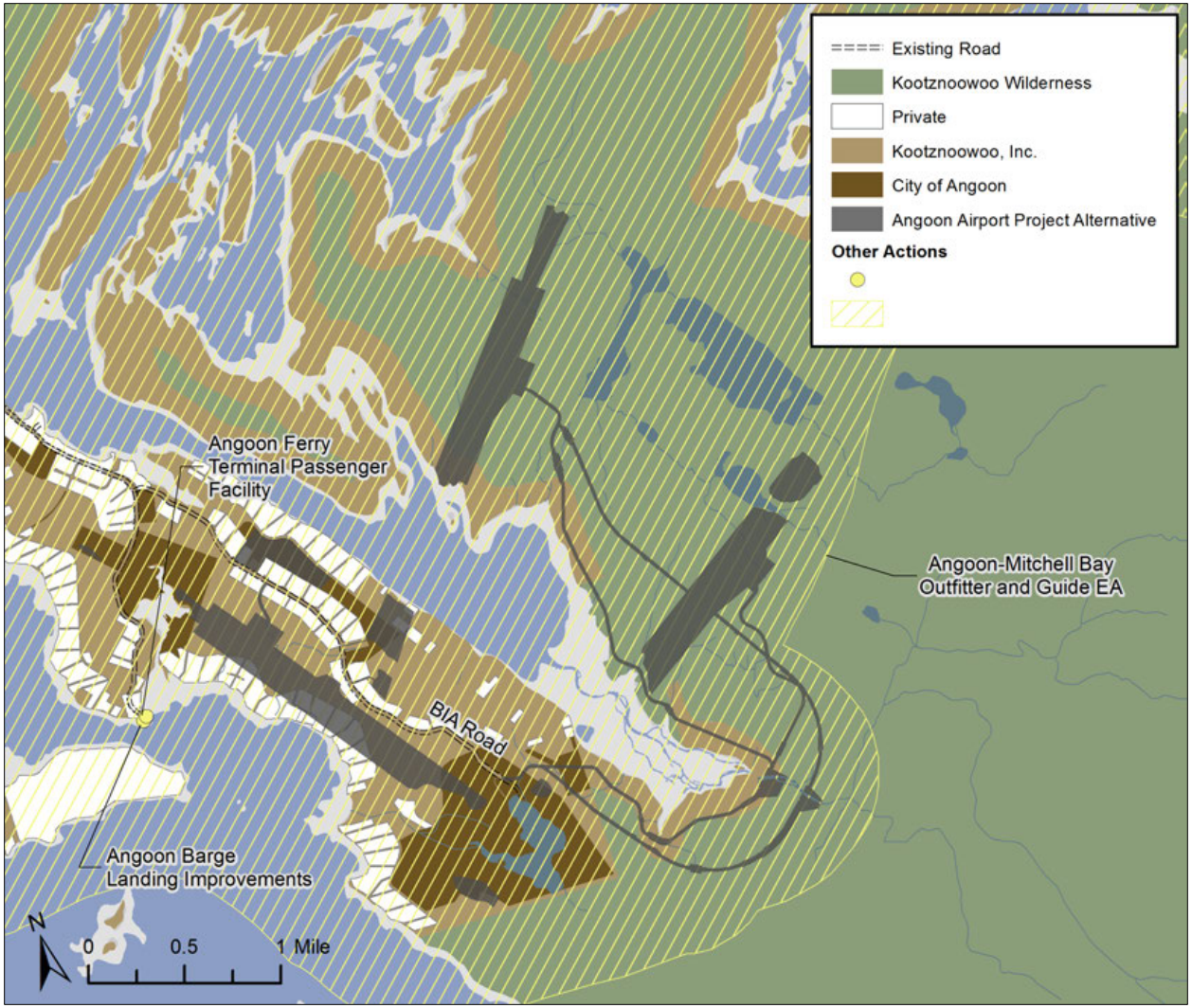

Figure CU7. The assessment area for energy supply, natural resources, and sustainable design, and other actions in it.

8.3.5.6.4. Subsistence resources and uses

The assessment area for subsistence is the subsistence use assessment area, which parallels the area analyzed for effects in section 4.13 Subsistence Resources and Uses. Although members of the community of Angoon go outside of this area and into the broader landscape, most subsistence harvest occurs in this assessment area. It consists of all of upper Favorite Bay, the lower Favorite Creek watershed, uplands between Favorite Bay and Kanalku Bay, and uplands along the Angoon peninsula south of the community of Angoon (Figure CU8). The health of the subsistence resources in this assessment area is directly tied to the health of the terrestrial and aquatic habitats, which, as described in sections 8.3.5.4.2 and 8.3.5.5.3, are high-quality habitats and are likely to remain so because they fall in the Monument-Wilderness Area. Figure CU8 shows the subsistence use assessment area as well as the reasonably foreseeable future actions that fall within it.

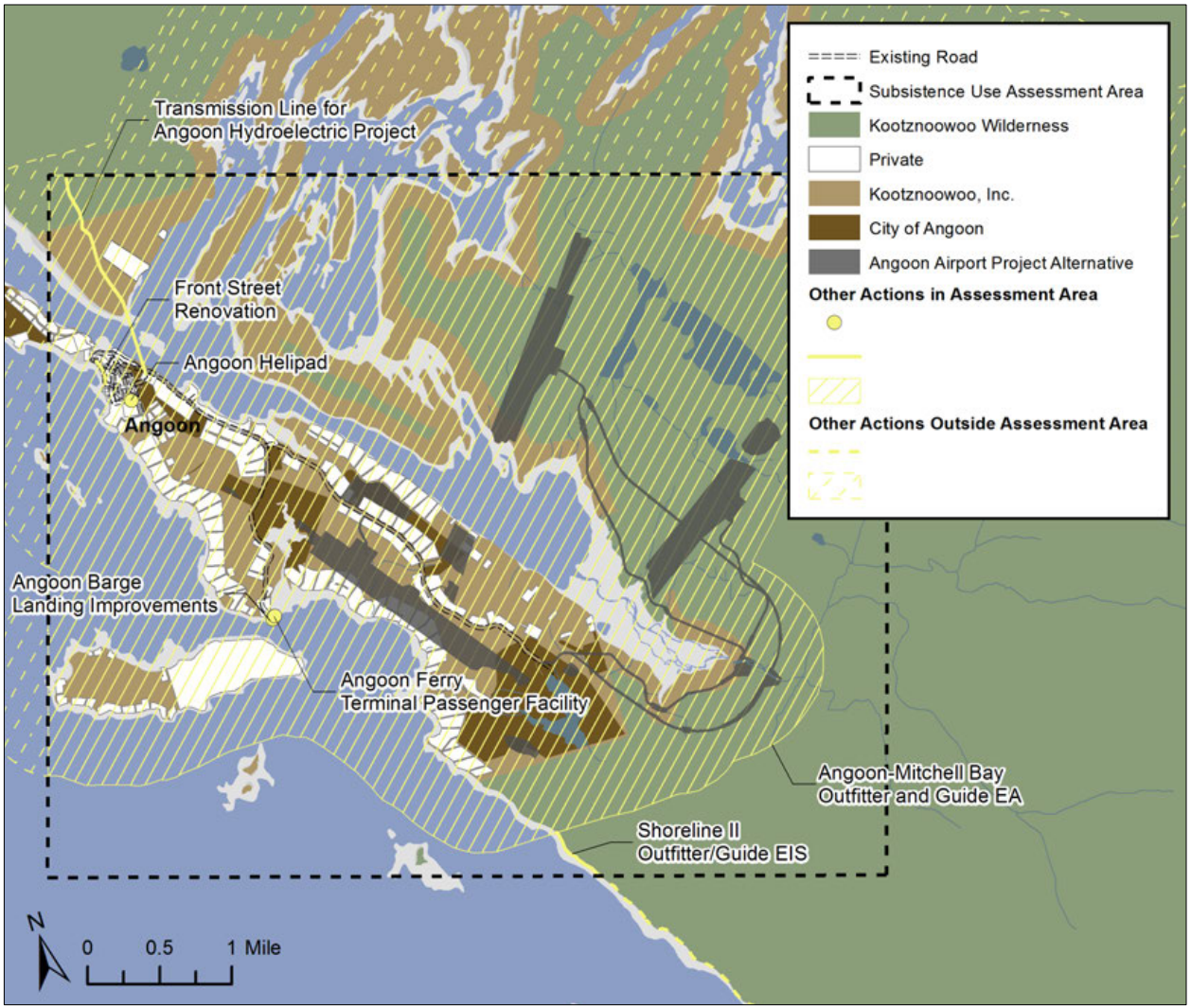

Figure CU8. The subsistence use assessment area and other actions in it.

The installation of the underwater cable for the hydroelectric project would result in a short-term reduction of abundance and availability in the immediate vicinity of the cable in Favorite Bay. The construction of the barge landing area and ferry terminal passenger facility would result in a short-term reduction of abundance and availability in an area known to be a high use for clamming by the Angoon community.

There would be no significant cumulative effects to access or competition in the long term. Temporary displacement of subsistence users would occur during construction of reasonably foreseeable future actions, but access would be restored after construction. This displacement could have minimal effects on competition as users move to other areas, but users would return to these areas once construction was complete. The potential for increased commercially guided visitors in the assessment area from the Outfitter and Guide projects could increase competition, but the U.S. Forest Service would monitor for effects to subsistence users, and reduce commercial allocation if it was negatively affecting subsistence harvest. Therefore, the addition of these actions combined with the effects from any of the Angoon Airport action alternatives would not result in significant cumulative effects.

9. COORDINATION AND CONSULTATION

9.1. What information is provided in Chapter 9?

In this chapter, the reader will find the following:

- An explanation on who has been involved in coordination and consultation for this environmental impact statement (EIS)
- A discussion of how this coordination and consultation occurred for both the public and for agencies

What is discussed in Chapter 9?

9.2. Who has the FAA involved in coordination and consultation?

The Federal Aviation Administration (FAA) has involved the public; Alaska Native groups; and local, state, and federal agencies in the Angoon Airport EIS project, and has solicited feedback from these groups to help shape the project's goals and scope.

Several policies and regulations guide coordination and consultation. The Council on Environmental Quality's implementation regulations for the National Environmental Policy Act require public involvement (40 Code of Federal Regulations [CFR] 1506.6) and emphasize agency cooperation (40 CFR 1501.6).

Two FAA orders—*Order 1050.1E, Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) and *Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b)—echo the Council on Environmental Quality's regulations and require public involvement, tribal consultation, and agency consultation.

Participants in the Angoon Airport EIS process include members of the general public such as local Angoon residents, other interested individuals, representatives of commercial aviation services and other businesses, and members of non-governmental organizations with specific interest in Admiralty Island and the Angoon area. These individuals participate by providing information and feedback on the project, but they do not have a formal decision-making or regulatory role in the project.

Other parties that have decision-making or regulatory roles in the project are certain Alaska Native groups (described in section 9.3.3), the Alaska Department of Transportation and Public Facilities, the U.S. Forest Service, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration, and the National Marine Fisheries Service.

What is discussed in this section?

9.3. How did the FAA involve the public and agencies?

9.3.1. Public involvement plan

Public involvement began in early stages of the Angoon Airport project, including during the development of the *Angoon Airport Reconnaissance Study* (Alaska Department of Transportation and Public Facilities 2004) and the *Angoon Airport Master Plan* (Alaska Department of Transportation and Public Facilities 2007). The FAA has incorporated the comments and input provided during development of those documents into this EIS.

For the EIS itself, a public involvement plan (SWCA 2008, included in this EIS as Appendix P) was prepared to identify interested parties and establish outreach goals and techniques. The sidebar titled "The FAA's community involvement policy" provides more details. The following public involvement goals were identified:

1. Ensure that the public is well informed about the process and project
2. Convey the importance and value of public, agency, and stakeholder input throughout the National Environmental Policy Act process, and ensure that stakeholders have opportunities to help identify issues, alternatives, and potential effects
3. Create a comfortable communication environment where stakeholders can freely discuss issues and ideas
4. Encourage effective coordination between the lead agency (the FAA) and the project sponsor (the Alaska Department of Transportation and Public Facilities)

The FAA's community involvement policy

Section 401 of FAA Order 5050.4B states the following:

The FAA has a community involvement policy (FAA-EE-90-03, August 1990) that recognizes community involvement as an essential part of FAA programs and decisions. The FAA's Office of Airports, like each FAA office, must incorporate open, effective community involvement to achieve the following goals and tasks.

- Provide active, early, and continuous public involvement and reasonable public access to information that accurately describes a proposed project and its environmental effects.
- Ask for and consider public input on plans, proposals, alternatives, impacts, and mitigation.
- Use public involvement techniques designed to meet the needs of different interest groups and individuals.
- Promote an active public role to lessen potentially adverse community reaction to agency actions needed for safe, efficient aviation.

9.3.2. Public outreach practices

The FAA is using a wide range of public outreach practices throughout the project. The specific outreach practices listed below are required by FAA orders and Council on Environmental Quality regulations. Part of the intent of these outreach practices is to provide opportunities for meaningful involvement for Angoon's environmental justice populations (see section 4.18.2.2 in Environmental Justice and Children's Health and Safety for further information on these populations). The sidebar titled "Public hearing requirements" contains more information on required public hearings for this EIS.

Public hearing requirements

Public hearings for this EIS are required by 49 United States Code (USC) 47106(c)(1)(a)(i) and other special purpose laws, including Alaska National Interest Lands Conservation Act (ANILCA) Title XI as well as executive orders regarding floodplains and wetlands.

- Notices in the *Federal Register:*
  - The FAA published a notice of intent to prepare an EIS in the *Federal Register* on September 24, 2008. This notice announced the proposed project and provided details on how to submit comments on the proposed project.
  - The FAA published a notice of availability for the draft EIS and details about the public comment period in the *Federal Register* on January 9, 2015.
  - The FAA published a notice of extension for the final EIS in the *Federal Register* on January 8, 2016. See the blue sidebar titled "ANILCA and the EIS" for further information.
  - Similarly, the release of the final EIS will be announced with a notice of availability in the *Federal Register*.
- Formal public and agency scoping:
  - In October 2008 the scoping period and scoping meetings were announced in newspapers and through other forms of advertising. Hardcopy announcements were mailed, and electronic copies were emailed to those on the project mailing list.
  - The scoping period ran from September 24, 2008, to December 31, 2008. During this period, scoping meetings were held in Anchorage, Angoon, and Juneau.
  - Comments received during the scoping period, including at the meetings, were used to clarify preliminary issues, determine the appropriate scope of environmental analysis, and gather new input on alternatives development.

ANILCA and the EIS

The Alaska Department of Transportation and Public Facilities filed a title XI ANILCA application with the FAA, U.S. Forest Service, and U.S. Army Corps of Engineers on January 9, 2015. ANILCA section 1104(e) states that "the final environmental impact statement shall be completed within one year from the date of such filing. Such nine-month and one-year periods may be extended for good cause by the Federal agency head assigned lead responsibility for the preparation of such statement if he determines that additional time is necessary for such preparation, notifies the applicant in writing of such determination and publishes notice of such determination, together with the reasons therefore, in the Federal Register."

- The *Public and Agency Scoping Report* (SWCA 2009, included in this EIS as Appendix A) provides details on this process as well as responses to comments received during the scoping period.

- Formal draft EIS and ANILCA comment period:
  - The draft EIS was released on January 9, 2015. The DOT&PF submitted a Title XI application to the FAA, the U.S. Forest Service, and the U.S. Army Corps of Engineers on this same day.
  - The release of the draft EIS and the submittal of the Title XI application began the public comment period. This period ran from January 9, 2015, through March 20, 2015.
  - During the comment period, public hearings were held in Angoon and Juneau, Alaska, as well as Washington, D.C.
  - The comment period and public hearings were announced in newspapers and through other forms of advertising. Hardcopy announcements were mailed, and electronic copies were emailed to those on the project mailing list.
  - Comments were received during the public hearings, via email, and via U.S. Postal Service mail.
  - The FAA reviewed and responded to all comments received on the draft EIS. These comments and responses are included in Appendix T, *Responses to Comments Received on Draft Environmental Impact Statement (SWCA 2016).*

Regional and village corporations

In 1971 the Alaska Native Claims Settlement Act (ANCSA) (43 USC 1601 et seq.) established a process for settling outstanding Alaska Native land claims and establishing clear title to Alaska's land and resources. ANCSA created Alaska Native corporations instead of reservations, and conveyed surface and subsurface estate to them. In Alaska there are only two reservations. There are 12 regional Alaska Native corporations and more than 200 village corporations. Many Alaska Natives are shareholders in the regional and village corporations. The village corporations have surface ownership of acreage surrounding their respective villages, whereas the regional corporation owns the subsurface and a larger surrounding surface estate area.

In addition, to ensure meaningful involvement during this project, the FAA has chosen to use the following additional public outreach practices beyond those required by the Council on Environmental Quality:

- Advertisements and notices in newspapers and on the radio and television to disseminate project findings, upcoming public involvement activities, and key project milestones.
- Routine updates to the project website (Figure CO1) and the project Facebook page.
- Informational newsletters sent to the project contact list via mail and email (see Figure CO1). The newsletter describes updates on fieldwork or preparation of the EIS document, answers frequently asked questions, requests input, and clarifies aspects of the process.

- Community flyers and postcards to announce events.
- Informal visits to Angoon to provide in-person updates and receive input.
- Telephone calls to engage the public.

9.3.3. Tribal consultation

Although the groups discussed below do not have a decision-making role in the project, they do have formal agreements with the FAA, and have discussed specific issues of concern including the alternatives, cultural resources, land use, socioeconomics, and subsistence (see sidebar titled "Regional and village corporations" for more information). In addition, Executive Order 13175: Consultation and Coordination with Indian Tribal Governments requires FAA to establish regular and meaningful consultation and collaboration with tribal officials. Copies of relevant tribal consultation documents can be found in *Documentation of Communications with Agencies and Tribes* (included in this EIS as Appendix Q).

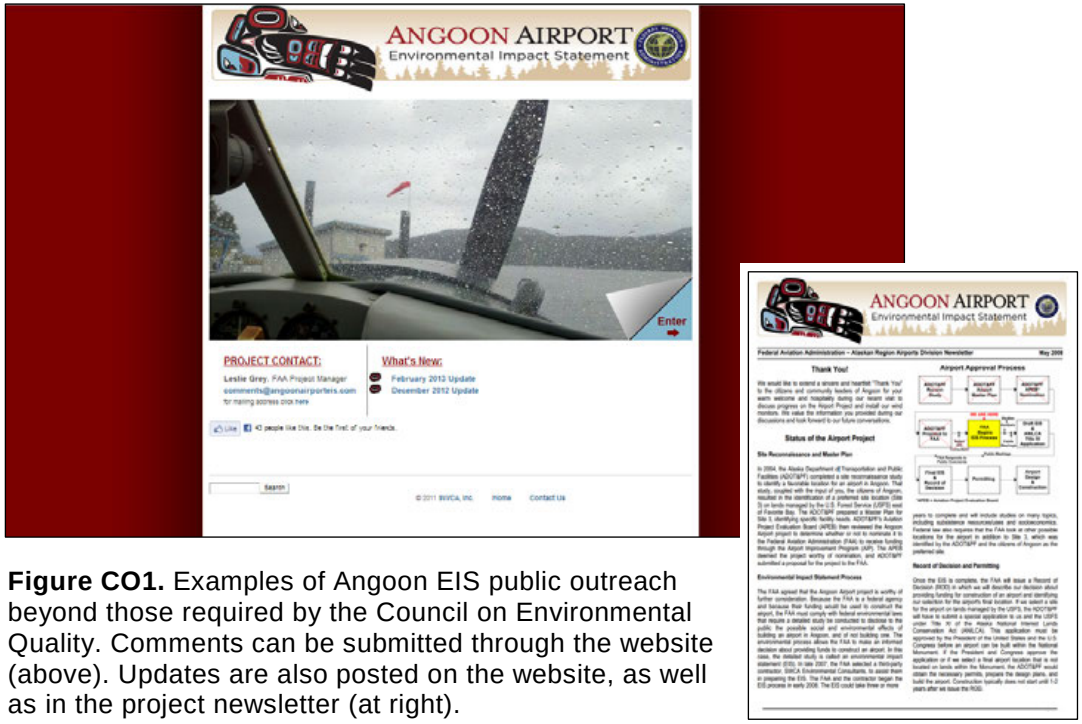

Figure CO1. Examples of Angoon EIS public outreach beyond those required by the Council on Environmental Quality. Comments can be submitted through the website (above). Updates are also posted on the website, as well as in the project newsletter (at right).

Consultation with the following Alaska Native groups has begun and will continue throughout the EIS process until a final decision has been made:

- The Angoon Community Association, the village tribal government
- Kootznoowoo, Inc., the village-level Alaska Native corporation
- Sealaska Corporation, the regional Alaska Native corporation
- The Central Council of the Tlingit and Haida Indian Tribes of Alaska, the Southeast Alaska regional tribal government

Consultation between the FAA and the Angoon Community Association began on April 30, 2008, and included the following topics:

- Consultation under Section 106 of the National Historic Preservation Act, April 2008
- A formal communications protocol, July 2008
- Cultural resources fieldwork results provided on video, 2009
- Elimination of the Hood Bay alternative from detailed analysis (see SWCA 2014a, *Alternatives Eliminated from Detailed Analysis*, included in this EIS as Appendix B), January 2010
- Informal community visits by the FAA, 2011–2013

The FAA established a memorandum of understanding in September 2008 with Kootznoowoo, Inc., which accomplishes the following:

- Describes the roles and responsibilities of each entity
- Provides Kootznoowoo, Inc. with an advance review of EIS sections that relate to Kootznoowoo, Inc.'s landownership
- Invites Kootznoowoo, Inc.'s input on mitigation measures that would be implemented on their lands
- Establishes Kootznoowoo, Inc. as an active participant throughout the EIS process

Sealaska Corporation and the Central Council of the Tlingit and Haida Indian Tribes of Alaska were invited to become formal consulting parties. Although neither party formally accepted those invitations, they have both provided input. On November 22, 2009, the Central Council of the Tlingit and Haida Indian Tribes of Alaska submitted a letter supporting the Angoon Airport EIS action alternatives. Sealaska Corporation provided scoping comments during the scoping period.

9.4. Which agencies were consulted?

What is discussed in this section?

In addition to being included in the public involvement components described in section 9.3.1, certain local, state, and federal agencies must also formally and directly consult with the FAA. These agencies have specific expertise or regulatory authority for the actions being considered during preparation of this EIS. Consultation with these agencies will continue throughout the EIS process and will not be complete until after a final decision has been made. Copies of relevant agency consultation documents can be found in Appendix Q.

On October 27 and 29, 2008, the FAA held initial interagency scoping meetings to present the preliminary scope of the project and solicit input. Specific topics included the purpose and need for the action, the proposed methodology for effects analysis, critical environmental concerns, data sources and data gaps, and possible mitigation opportunities. A summary of agency scoping comments is included in Appendix A.

Other meetings were periodically held with the agencies during the course of the EIS development to discuss specific issues of concern, including alternatives, cultural resources, land use, wilderness, ANILCA, and wetlands. Some of the agencies provided consultation and jurisdictional determinations on specific issues consistent with their regulatory responsibilities. These coordination and consultation efforts are described below.

9.4.1. The project sponsor and cooperating agencies

Specific agencies involved were:

- The Alaska Department of Transportation and Public Facilities, as the project sponsor
- The U.S. Forest Service, as a cooperating agency
  - This agency manages the Admiralty Island National Monument and Kootznoowoo Wilderness Area (referred to in this EIS as the Monument–Wilderness Area), on which two of the three proposed airport alternatives and their respective access roads would be located.
- The U.S. Army Corps of Engineers, as a cooperating agency
  - This agency has regulatory authority over any potential dredge or fill effects on waters of the U.S., which are present in the immediate vicinity of all airport and access road alternatives.

Consultation between the FAA and the Alaska Department of Transportation and Public Facilities began with a memorandum of understanding on November 6, 2006. The memorandum establishes the following:

- Each agency's roles and responsibilities for the Angoon Airport EIS
- How FAA environmental requirements would be met with this EIS
- How information-sharing and document review would occur
- How a third-party consultant would be managed by the FAA and Alaska Department of Transportation and Public Facilities

Consultation between the FAA and the U.S. Forest Service began with a memorandum of understanding on February 19, 2009. The memorandum establishes the following:

- The roles and responsibilities of each agency in the EIS process
- The roles and responsibilities of each agency in the ANILCA Title XI process.
- That the FAA would ensure that the draft EIS and final EIS include information addressing the U.S. Forest Service's federal compliance requirements
- The FAA's request that the U.S. Forest Service comment on issues and resource areas related to its jurisdiction and expertise, including reviewing the preliminary draft of this EIS
- That the U.S. Forest Service will receive copies of all public and agency comments on the public draft EIS and final EIS
- That the U.S. Forest Service commits to sharing data, information, and staff expertise; participating throughout the EIS process; and participating in developing mitigation measures

Consultation between the FAA and the U.S. Army Corps of Engineers began with a memorandum of understanding on April 6, 2009. The memorandum establishes the following:

- The roles and responsibilities of each agency in the EIS
- That the FAA will meet the U.S. Army Corps of Engineers' federal compliance requirements
- That the FAA invites the U.S. Army Corps of Engineers to share information and technical expertise for those resources over which they have jurisdictional authority (in other words, waters of the U.S.)
- That U.S. Army Corps of Engineers will be given copies of all comments received during public comment periods
- That the FAA will consult with the U.S. Army Corps of Engineers about mitigation throughout the EIS process to the record of decision

The cooperating agencies have played an important role in the formulation of this EIS. Each has participated in interagency meetings held since the EIS began. Interagency comments and deliberation influenced the development of technical reports describing existing conditions in the Angoon area. Resource specialists from the cooperating agencies and from the project sponsor reviewed and commented on the draft EIS prior to public release. These agencies provided comments on the draft EIS during the official comment period, and assisted with response to comments.

9.4.2. Other agencies

As part of the Section 106 process, the FAA has consulted with the State Historic Preservation Office, the U.S. Forest Service, and the Alaska Department of Transportation and Public Facilities to establish the level of effort to identify potential historic properties, evaluate cultural resources to determine which are historic properties, and assess project effects on those historic properties. Consultation has occurred through in-person meetings and written correspondence. The FAA submitted determinations of eligibility and findings of no adverse effects for Airport 12a with Access 12a, and received concurrence from the Alaska SHPO on those determinations.

The U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration National Marine Fisheries Service were consulted for potential effects to threatened and endangered species, marine mammals, and essential fish habitat.

The FAA has determined that the project may affect, but is not likely adversely affect humpback whales or Steller sea lions. The National Oceanic and Atmospheric Administration National Marine Fisheries Service has concurred with this determination.

The U.S. Fish and Wildlife Service has assigned consultation log number 07CAJN00-2013-SL-0054 to this project. Because there are no listed species in the project area, the FAA has determined that there will be no adverse effects to threatened and endangered species and USFWS concurred with this determination.

As described in section 4.5.2 Aquatic Habitats and Associated Species, no essential fish habitat is present at the proposed location of Airport 12a with Access 12a (the preferred alternative), and therefore no essential fish habitat assessment would be required if that alternative is selected, and no consultation with the National Oceanic and Atmospheric Administration National Marine Fisheries Service regarding essential fish habitat is needed.

9.5. Who received a copy of the environmental impact statement?

The draft and final EIS was distributed to individuals (by request) and a number of governmental organizations. Table CO1 is a list of agencies and organizations that received a copy of the EIS.

Table CO1. EIS distribution list

Cooperating agencies
U.S. Forest Service, Tongass National Forest
U.S. Army Corp of Engineers, Regulatory Branch
Tribal organizations
Angoon Community Association
Kootznoowoo, Inc.
Central Council Tlingit & Haida Indian Tribes of Alaska
Sealaska Corporation
State of Alaska agencies
Alaska Department of Transportation and Public Facilities
Alaska Department of Fish and Game, Division of Habitat
Alaska Department of Fish and Game, Wildlife Conservation Division
Alaska Department of Fish and Game, Sportfish Division
Alaska Department of Fish and Game, Commercial Fisheries Division
Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation
Alaska Department of Natural Resources, ANILCA Implementation Office
Alaska State Historic Preservation Office
Alaska Department of Environmental Conservation
Alaska Department of Fish and Game Subsistence Division
Alaska Department of Fish and Game Boards Support
Alaska Department of Fish and Game Angoon Advisory Committee
Alaska Department of Natural Resources Division of Mining, Land, and Waters
Federal agencies
U.S. Fish and Wildlife Service, Protected Species
NOAA Fisheries, Protected Resources Division
U.S. Environmental Protection Agency

Table CO1. EIS distribution list

Other agencies and organizations
City of Angoon
Locations draft EIS available for public comment
Federal Aviation Administration, Airport Division, 222 W. 7th Ave, Anchorage, Alaska 99513-7504
Juneau Public Library Downtown Branch: 292 Marine Way, Juneau, Alaska 99801 Douglas Branch: 1016 3rd Street, Douglas, Alaska 99824 Mendenhall Mall: 9109 Mendenhall Mall Road, Juneau, Alaska 99801
Alaska Department of Public Transportation and Public Facilities
U.S Forest Service, Admiralty Island National Monument Office, 8510 Mendenhall Loop Road Juneau, Alaska 99801
Angoon Community Association Building, 315 Heendae Road, Angoon, Alaska, 99820
Angoon City Government Office, 700 Aan Deina At Street, Angoon, Alaska 99820
Angoon Senior Center, 812 Xootz Road, Angoon, Alaska 99820
Angoon Airport EIS Website: http://www.angoonairporteis.com

10. LIST OF PREPARERS

This chapter lists the individuals who assisted in the preparation of this environmental impact statement (EIS). Under the direction of the Federal Aviation Administration (FAA) and following the guidance of FAA Orders *1050.1E Chg 1. Policies and Procedures for Considering Environmental Impacts* (FAA 2006a) and *5050.4B. National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA 2006b), the consulting team prepared alternatives, collected data for the analysis, and assessed potential effects of the alternatives, with additional comments and critiques from the cooperating agencies. Table LP1 identifies the individuals involved with the preparation and review of this EIS. Each individual's qualifications (titles, areas of expertise, and years of experience) and EIS responsibilities are listed.

Table LP1. List of preparers

Preparer	Title	Education and years of experience	Roles and responsibilities
Federal Aviation Administration			
Leslie Grey	Environmental Protection Specialist FAA Alaskan Region	MS, Geography University of Wisconsin – Stevens Point BS, Geography University of Idaho – Moscow 19 years of experience	• Project manager and reviewer
Mike Edelmann	Civil Engineer FAA Alaskan Region	BS, Electrical Engineering New York Institute of Technology 17 years of experience	• Aviation planner and reviewer
Frank Smigelski	Environmental Protection Specialist FAA Washington Headquarters	MS, Engineering (Environmental Studies) University of Massachusetts – Lowell BS, Biology Roanoke College – Salem, Virginia 25 years of experience	• Headquarters reviewer
Craig Black	Attorney FAA Alaskan Region	JD, University of Pittsburgh BA, Economics University of California Davis 20 years of experience	• Attorney

Table LP1. List of preparers

Preparer	Title	Education and years of experience	Roles and responsibilities
Peggy Wade	Environmental Protection Specialist FAA Washington Headquarters	MA, Biology San Francisco State University BS, Biology San Francisco State University 15 years of experience	• Headquarters reviewer
SWCA Environmental Consultants			
Tom Furgason	Consultant Team Project Principal	BS, Ecology & Evolutionary Biology University of Arizona—Tucson 24 years of experience	• Quality assurance/quality control (QA/QC)
Amanda Childs	Consultant Team Project Manager	BS, Environmental Studies (NEPA Emphasis) Utah State University – Logan 16 years of experience	• Alternatives • Documentation and QA/QC • Purpose and need
Jamie Young	Consultant Team Assistant Project Manager	BS, Biology Gonzaga University – Spokane, Washington 12 years of experience	• Agency coordination • Aquatic habitats and associated species
Kari Chalker	Managing Editor	MA, Liberal Education St. John's College, Santa Fe BA, Anthropology University of Florida – Gainesville 11 years of experience	• Document structure and continuity • QA/QC
John Pecorelli	Technical Editor	BS, Physical Anthropology, and BS, Journalism and Mass Communication University of Utah – Salt Lake City 19 years of experience	• Documentation and QA/QC • Graphics and formatting
Lara Bjork	Project Coordinator (Until July 15, 2014)	MA, Museum Studies John F. Kennedy University – Pleasant Hill, California AB, Anthropology University of Michigan – Ann Arbor 12 years of experience	• Administrative record

Table LP1. List of preparers

Preparer	Title	Education and years of experience	Roles and responsibilities
Jen Rideout	Project Coordinator (Since May 2015)	BS, Environmental Science University of Idaho – Moscow, Idaho 7 years of experience	• Administrative Record
Sue Wilmot	Planning Specialist	PhD, Human Dimensions of Ecosystem Science and Management Utah State University – Logan MEM, Environmental Management Duke University – Durham, North Carolina BS, Biology Wake Forest University – Winston-Salem, North Carolina 7 years of experience	• Air quality • Climate change and greenhouse gas emissions • Compatible land use • Environmental justice and children's health • Mitigation • Noise • Public involvement • Socioeconomics
George Weekley	Environmental Specialist (Until September 2015)	MS, Natural Resource Management West Virginia University – Morgantown BS, Plant and Soil Science West Virginia University – Morgantown 12 years of experience	• Agency coordination • Alaska National Interest Lands Conservation Act compliance • Subsistence resources and uses • Wilderness character
Leyla Arsan	Aquatic Biologist (Until August 2015)	MS, Fisheries and Aquatic Science Oregon State University – Corvallis BA, Environmental Studies Prescott College – Prescott, Arizona 10 years of experience	• Aquatic habitats and associated species • Special status species
Stacy Benjamin	Senior Ecologist (Until April 2014)	MS, Ecology and Evolution University of Oregon – Eugene BS, Biology University of Oregon – Eugene 18 years of experience	• Special status species • Terrestrial habitats and associated species • Wetlands

Table LP1. List of preparers

Preparer	Title	Education and years of experience	Roles and responsibilities
Greg Swenson	Wetland Scientist (Until April 2014)	BS, Forest Resources University of Georgia – Athens 13 years of experience	• Hazardous materials and solid waste • Mitigation, permitting coordination, and right-of-way • Natural resources and energy supply • Wetlands
Thomas Sharp	Wildlife Ecologist (Until April 2016)	MS, Biology Northeastern Illinois University – Chicago BS, Biology University of Miami – Coral Gables 23 years of experience	• Special status species • Terrestrial biology
Hope Hornbeck	Botanist	MS, Plant Biology University of Minnesota – Minneapolis BA, Environmental Biology University of Montana – Missoula 12 years of experience	• Terrestrial biology
Erica Gaddis	Water Resources Specialist (Until May 2015)	PhD, Natural Resources University of Vermont – Burlington MS, Environmental Science and Policy Central European University – Budapest BS, Environmental Science, and BS, Biology Willamette University – Salem, Oregon 10 years of experience	• Water quality
Allen Stutz	Geographic Information System Coordinator/Analyst	BS, Zoology University of Washington – Seattle AS, Chemistry North Seattle Community College 17 years of experience	• Geographic information system and data management

Table LP1. List of preparers

Preparer	Title	Education and years of experience	Roles and responsibilities
Melissa Katz-Moye	Geographic Information System Analyst	MS, Geological Sciences University of Oregon – Eugene BS, Geology Vassar College – Poughkeepsie, New York 10 years of experience	• Geographic information system and data management
Elizabeth Perry	Consultant Team Project Principal (until January 2014)	PhD, Anthropology University of Arizona – Tucson MA, Anthropology University of Arizona – Tucson BA, Anthropology Arizona State University – Tempe 17 years of experience	• QA/QC
Certus Environmental Solutions			
Sheri M. Ellis	Principal (formerly National Historic Preservation Act and NEPA Senior Project Manager at SWCA Environmental Consultants)	MS, American Studies Utah State University – Logan BS, Anthropology and Psychology Weber State University – Ogden, Utah 23 years of experience	• Airport planning and alternatives analysis • Cultural resources • Local/tribal consultation • U.S. Department of Transportation Act Section 4(f) evaluation

Table LP1. List of preparers

Preparer	Title	Education and years of experience	Roles and responsibilities
Mead & Hunt (formerly Barnard Dunkelberg & Company)			
Brad Rolf	Senior Airport Planner	BS, Civil and Environmental Engineering University of Cincinnati 16 years of experience	• Airport planning and alternatives analysis • Documentation and QA/QC • Oversight for FAA orders compliance
Ryk Dunkelberg	Executive Vice President	JD, University of Tulsa MS, Natural Resource Planning Colorado State University – Fort Collins BS, Forest Ecology Oklahoma State University – Stillwater 37 years of experience	• Airport planning and alternatives analysis
Cody Fussell	Senior Airport Planner	BS, Landscape Architecture, and BLA, Landscape Architecture Oklahoma State University – Stillwater 24 years of experience	• Airport planning and alternatives analysis
DOWL HKM			
Tom Middendorf	Manager of Transportation Planning and Engineering	MS, Public Affairs University of Minnesota – Minneapolis 30 years of experience	• Alternatives design and engineering
Brian Hanson PE	Aviation Engineering Manager	BS, Mining Engineering University of Alaska – Fairbanks 16 years of experience	• Pre-design engineering and construction impacts

Table LP1. List of preparers

Preparer	Title	Education and years of experience	Roles and responsibilities
Environmental Science Associates (formerly Vigil-Agrimis)			
Paul Agrimis RLA, PE, PWS	Vice President	MLA, Landscape Architecture University of Washington – Seattle BSE, Civil Engineering University of Connecticut – Storrs 32 years of experience	• Water resources and hydrology
Susan L. Cunningham	Senior Environmental Planner	BS, Biology University of Oregon—Eugene	• Mitigation
Harris Environmental, LLC			
David Harris	Principal (formerly Visual Resources Specialist at SWCA Environmental Consultants)	MS, Environmental Science Washington State University – Pullman BA, English University of Washington – Seattle 14 years of experience	• Visual impacts and light emissions
Southeast Strategies			
Linda J. Snow	Principal	BA, Economics University of Hawaii at Hilo 28 years of experience	• Environmental justice and children's health • Socioeconomics
BridgeNet International			
Paul Dunholter	President	BS, Civil Engineering University of California – Irvine 31 years of experience	• Air quality model • Noise model
Cynthia Gibbs	Project Manager	BS, Aviation Management California State University – Los Angeles 16 years of experience	• Air quality model • Noise model

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ABBREVIATIONS AND GLOSSARY

Abbreviations

ANCSA: Alaska Native Claims Settlement Act

ANILCA: Alaska National Interest Lands Conservation Act

ARD: acid rock drainage

BIA: Bureau of Indian Affairs

BMPs: best management practices

CFR: Code of Federal Regulations

cfs: cubic feet per second

dBA: A-weighted decibels

DEC: Alaska Department of Environmental Conservation

DNL: day-night average sound level

EIS: environmental impact statement

EPA: Environmental Protection Agency

FAA: Federal Aviation Administration

FTE: full-time equivalent

Leq: equivalent noise level

Lmax: maximum sound level

NAAQS: National Ambient Air Quality Standards

NEPA: National Environmental Policy Act

O&M: operation and maintenance

PL: Public Law

TAA: Time above ambient

USC: United States Code

USDOT: United States Department of Transportation

Glossary

Accessory use: A secondary use of a property that is incidental to its primary use.

Adverse effects: In general, an adverse effect is one that is negative, detrimental, or unfavorable. An effect that is generally adverse is not necessarily "significant" under the Council on Environmental Quality's guidance for implementing the National Environmental Policy Act (NEPA).

Airport Improvement Program: An FAA program that provides grants to public and private organizations for the planning, development, and improvement of public use airports. To qualify, an existing or proposed airport must be included in the National Plan of Integrated Airport Systems, which identifies airports considered significant to national air transportation.

Airport layout plan: A planning document for all public airports that receive state or federal funding. An airport layout plan describes existing conditions, future facilities, and the property necessary for development and operation of an airport.

Alluvial stream: A stream whose bed and banks are made from large amounts of sediments and other debris transported by flow. These stream features will change as the rate of flow changes.

Alternative: A NEPA term that refers to a required option for a project. Alternatives must meet the goals of the project while providing different possibilities for how the project would affect the environment.

Ambient: A term describing the background noise level at a given location. For this EIS, the noise level that is considered ambient is 27 A-weighted decibels, or dBA.

Amphibious planes: Aircraft that can take off and land on both land and water.

Anadromous: A term describing fish that spawn in freshwater but live most of their adult lives in saltwater.

Analyze: Used here, to assess or study something to answer a question. EIS analyses identify similarities or differences among the various alternatives' effects on the environment. This allows comparison of the alternatives to each other and to the no action alternative.

Antidegradation policies: Policies that prohibit deterioration of water quality beyond legal limits.

Aquatic: Relating to water.

Aquifer: An area below the surface of the earth that contains water.

Area of potential effects (APE): A term used in the Section 106 process of the National Historic Preservation Act of 1966 to describe the area where the effects of a project, including both direct and indirect disturbance, would occur. The APE is used to determine the area where efforts to identify historic properties should occur. Often, the nature of the APE also contributes to decisions about what types of studies should be used to identify historic properties. For example, in an area where the entire APE is paved with asphalt, no field studies may be necessary, but in areas of undisturbed land, field studies may be appropriate to search for artifacts or similar cultural resources.

Associated buffer: A setback area around a stream, river, lake, or wetland that maintains the natural vegetation cover along the wetland or waterway, which is an essential part of the aquatic ecosystem.

Associated species: The plant and animal species that live in or use a habitat type for all or part of their lifecycle.

Average daily traffic: The average number of vehicles passing a specific point on a road within a 24-hour period. Measurement of average daily traffic includes vehicles travelling in both directions, so average daily traffic estimates may count the same car multiple times if it travels back and forth on the same road in a 24-hour period.

Availability and reliability: Used here, the number of hours or percentage of a year that visibility and daylight hours allow successful completion of a flight (the frequency), and the ability to have on-demand or emergency transportation for varying numbers of passengers.

Avigation easement: A right-of-way tool used in airport planning to grant certain rights to the holder of the easement. For this EIS, avigation easements outside of airport property would provide the Alaska Department of Transportation and Public Facilities the right to access areas to clear them of obstructions and maintain that clearance.

A-weighted decibel (dBA): An adjusted unit of measure for noise within the range that humans hear.

Background: The visible area more than 4 miles from a viewpoint to the horizon.

Barter: Used here, the exchange of subsistence items for goods or services other than money.

Base: The foundation for the paved surface layer.

Batch plant: A machine used to mix and produce asphalt.

Beneficial uses: Uses designated to a specific water body based on its historic water quality and natural conditions. In Alaska, beneficial uses include water supply, recreation, and aquatic life.

Best management practices: Processes, procedures, or systems that have been determined to be effective and practicable in preventing or reducing environmental effects from a project.

Bioaccumulate: Used here, the process by which living organisms collect or store pollutants or other toxic materials like pesticides in their tissues.

Bog: A type of wetland with spongy ground consisting of partially decayed plants, particularly peat mosses.

Bog forest: Used here, a bog area with a canopy of greater than 30% shore pine and western hemlock.

Bog woodland: Used here, a bog area with a low understory that allows light to penetrate to the ground.

Borrow: Material (usually rock, gravel, or soil) that was taken from one area and used in another place.

Candidate species: Plants or animals being considered for listing as an endangered or threatened species under the Endangered Species Act.

Carbon dioxide equivalent (CO_2e): A unit of measurement that allows the effects of different greenhouse gases to be compared using carbon dioxide as a standard unit for reference.

Channel form: The three-dimensional shape of a channel including its sides, bed, sinuosity (the curves it makes through a landscape), and other physical features.

Characteristic species: A species that occurs only in a particular region or that is representative of the natural habitats that exist in a given area.

Clean Air Act: Federal legislation originally passed in 1970 to regulate air pollution.

Coffer dams: Vertical enclosures installed in the stream with a pile-driving hammer. Water is then pumped out of the enclosure, and construction can occur within it, isolated from the creek. This prevents construction materials and sediment from entering the stream during the installation of bridge piers.

Color: The colors of vegetation, soil, water, rock, and sky, and the colors of structures within the landscape.

Common species: A species that occurs widely or in abundance in a given area.

Compensatory Mitigation: Amount of mitigation required by the US Army Corps of Engineers to replace the unavoidable loss of wetland, stream, or other aquatic resource functions.

Compound: A substance formed by the chemical union of two or more elements or ingredients.

Conditional use: A use of property that is legal only when certain conditions regulating that use are met.

Connected actions: An action that automatically triggers another action that 1) may require environmental impact analysis; 2) cannot or will not proceed unless other actions are taken previously or at the same time; and 3) are interdependent parts of a large action and dependent on that larger action for their justification.

Conservation system unit: Per the Alaska National Interest Lands Conservation Act (Section 102(4)), "any unit in Alaska of the National Park System, National Wildlife Refuge System, National Wild and Scenic Rivers System, National Trails System, National Wilderness Preservation System, or a National Forest Monument."

Construction aggregate: Quarried rock that has been crushed to meet specific engineering specifications.

Contrails: The thin, wispy trails formed from water vapor that can sometimes be seen behind aircraft in flight.

Conveyance: Used here, the legal transfer of property from one person or organization to another.

Critical habitat: As defined by the Endangered Species Act, critical habitat is an important geographic area that has biological elements crucial to the preservation of a special status species and that therefore needs to be protected or managed properly to maintain species viability.

Crushed aggregate: A material composed of coarse gravel created from crushing larger rocks. It is frequently used in the base course of fill material for roads or other prepared surfaces such as runways. Different sizes of gravels are used for different purposes.

Culturally modified trees: Trees that have been purposely altered by humans. Alterations may include cutting notches in the trees to hold springboards, stripping bark off of trees to mark trails or use for crafts or other purposes, removing sections of trees to extract sap or pitch, and carving words or symbols into trees.

Culture bearer: A person of any age whose identified role in the community is to preserve aspects of its cultural identity. Culture bearers may be familiar with oral traditions, rituals, or objects, and have knowledge of important sites or resources, among other things.

Culvert: A drain or pipe that allows water to flow under a road, runway, or similar structure.

Culverting: The creation of a drain or pipe that allows water to flow under a road, runway, or similar structure.

Cumulative actions: Past, present, and reasonably foreseeable future actions unrelated to the project but occurring in and around the same area and potentially having combined effects on the same environmental resources.

Customary trade: Used here, the exchange of subsistence items for money.

Day-night average sound level (DNL): DNL is an average of noise levels experienced during an entire 24-hour day. It includes a penalty for nighttime operations in that noise occurring between the hours of 10:00 p.m. and 7:00 a.m. is increased by an additional 10 dBA to account for higher sensitivity to noise heard at night.

de minimis impact: In the context of Section 4(f), a "*de minimis* impact" is an effect on a public park, recreation area, wildlife refuge, or historic site that will not adversely affect the property's important activities, features, or attributes.

de minimis thresholds: In the context of air quality, *de minimis* thresholds are the minimum emission levels for which a conformity determination must be performed. For the Angoon area, which currently meets all air quality standards, the threshold is set at 100 tons per year for all criteria pollutants except lead, which has a threshold of 25 tons per year.

Decision altitude: The minimum altitude above the runway threshold at which a pilot must decide whether or not to initiate a missed approach procedure.

Delineation: A process developed by the U.S. Army Corps of Engineers that is used to determine if a given area is a wetland.

Demand: The need of a community for airplanes to accommodate passengers and cargo.

Design aircraft: The most demanding aircraft that will use an airport regularly and for which a given airport is designed.

Developments: For the purposes of section 4.16, Wilderness Character, the term "developments" refers to human-introduced installations and structures that are generally prohibited under the Wilderness Act.

Dilution: The process by which the concentration of a particular substance is lessened because the other surrounding substances are increased.

Direct effects: Effects caused by an alternative-related action that occur in the same time and place as the action (per the Council on Environmental Quality's guidance for implementing NEPA at 40 Code of Federal Regulation [CFR] 1508.8). For example, the loss of wildlife habitat in an area cleared for runway construction is a direct effect.

Disposition: Used here, the transfer of property to the care or management of another individual or agency.

Disproportionately high and adverse effect: As defined by the USDOT Order 5610.2(a), *Final DOT Environmental Justice Order*, a disproportionately high and adverse effect is "an adverse effect that: (1) is predominately borne by a minority population and/or a low-income population, or (2) 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" (USDOT 2012:15).

In the context of environmental justice, adverse effects are considered those individual or cumulative effects that may include but are not limited to "air, noise, and water pollution and soil contamination; destruction or disruption of man-made or natural resources; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community's economic vitality; destruction or disruption of the availability of public and private facilities and services; vibration; adverse employment effects; displacement of persons, businesses, farms, or nonprofit organizations; increased traffic congestion, isolation, exclusion or separation of minority or low-income individuals within a given community or from the broader community; and the denial of, reduction in, or significant delay in the receipt of, benefits of USDOT programs, policies, or activities." (USDOT 2012:14–15)

Effects: Potential changes to the environment from alternatives.

Embankment: A raised structure of earth, usually to prevent water from flowing over it.

Emission: The release of a substance into the atmosphere.

Endangered species: Species in danger of extinction throughout all or a significant portion of its range.

Enplanement: A passenger boarding an aircraft for departure at a given location.

Environmental justice population: A group of people consisting of minority or low-income individuals or households.

Erosion: A process in which sediment detaches from the earth's surface and is transported by surface water or wind. Sediment itself can be of concern for water quality, and can also aid in the transport of bacteria and other contaminants into water bodies.

Essential Air Service: Government-subsidized air service to rural communities that guarantees those communities access to the national air transportation system.

Estuarine habitats: Partly enclosed, nutrient-rich bodies of water where saltwater from the ocean mixes with freshwater from rivers and streams.

Estuaries: Nutrient-rich bodies of water where saltwater from the ocean mixes with freshwater from rivers and streams.

Feasible: In a Section 4(f) context, a feasible alternative is one that can be built as a matter of sound engineering judgment.

Feasible and prudent: In an ANILCA context and per 43 CFR 36.2, this term describes a route either within or outside an area that is based on sound engineering practices and is economically practicable, but does not necessarily mean the least costly alternative route.

Federal reserved rights: Used here, those rights that the federal government retained when portions of the Admiralty Island National Monument were transferred to Kootznoowoo, Inc., under ANILCA. See section 4.19.1.3.

Fen: A type of wetland with flowing mineral-rich surface water or groundwater.

Fixed threshold: The start or end of a runway.

Flight tracks: Routes that aircraft follow when approaching or leaving a runway.

Floodplain: A flat or nearly flat land adjacent to a stream or river.

Flow: The amount of water moving through a stream.

Foreground: The visible area up to 0.5 mile from the viewpoint.

Form: The masses or shapes of the landscape, such as existing structures, topography, and natural objects (for example, cone-shaped peaks, rolling hills, or flat water).

Freshwater habitats: Habitats in surface waters such as lakes, ponds, rivers, and streams that have low salinity.

Fugitive dust: Small dirt or soil particles coming from a general source, such as a dirt road, and suspended in the air by the wind or human activities, such as driving on a dirt road when it is dry.

Future conditions: FAA orders require that the DNL analysis consider future project noise effects both without an airport (discussed in this EIS as the no action alternative or existing conditions) and with an airport for two timeframes: on opening day and 5–10 years after opening.

General Conformity Rule: The General Conformity regulations set forth in 40 Code of Federal Regulations [CFR] 93.153 define *de minimis* levels—or maximum thresholds—for emissions of criteria pollutants in nonattainment and maintenance areas.

Glidepath qualification surface (GQS): An imaginary surface extending from the runway threshold along the runway centerline to the decision altitude point. It limits the height of allowable obstructions between the decision altitude and runway threshold. Certain instrument approaches are not authorized when obstructions exceed the height of the GQS.

Grid point: Used here, a grid point is a specific location established at predetermined intervals of 1 nautical mile (see definition below). This spacing of the points results in a geometric pattern known as a grid.

Habitat value: The capacity of a habitat to support the life requirements of a species.

Habitat: An area with the combination of environmental conditions that supports a given species' life.

Hazardous substances: Substances that are severely harmful to human health and the environment.

Hazardous waste: Solid wastes that are ignitable, corrosive, reactive, or toxic.

Headwater: The origin or source of a stream or river that is the farthest distance upstream of its mouth.

High-quality aquatic habitat: Used here, a water body in which the combination of physical, chemical, and biological components results in an ideal spawning, rearing, refuge, or migratory setting.

Historic property: An archaeological, cultural, or historical site that is listed on or eligible for the National Register of Historic Places.

Human environment: The natural, cultural, and social resources that make up the physical and social environment in which humans live and with which they interact.

Hydric: Characterized by an abundance of moisture.

Hydrology: The science of water, especially the movement, timing, and distribution of water.

Hydrophytic: Adapted for growth in water or in saturated soils.

Imaginary surface: An aviation planning term describing the airspace around an airport as measured from the sides and ends of a runway and extending in different directions from those points. The FAA has defined different types of imaginary surfaces at public airports to ensure that the airspace around approaching and departing aircraft is clear of obstacles that could create safety hazards.

Impervious: The quality of not allowing water to pass through a surface. Instead, water collects and can create runoff.

In-lieu fee mitigation: Mitigation that occurs when a permittee provides funds to an in-lieu fee sponsor (a public agency or non-profit organization) who has an approved compensatory mitigation instrument. Usually, the sponsor collects funds from multiple permittees to pool the financial resources necessary to build and maintain the mitigation site. The in-lieu fee sponsor is responsible for the success of the mitigation. Like banking, in-lieu fee mitigation is also "off-site," but unlike mitigation banking, it typically occurs after the permitted impacts.

Indigenous: Originating in and characteristic of a particular region or country; native.

Indirect effects: Effects caused by an alternative-related action that occur later in time or farther away from the action but that are still reasonably foreseeable (40 CFR 1508.8). For example, noise and human activity adjacent to wildlife habitat may make it less desirable for the species that would normally use it even though the habitat has not been directly removed. This is an indirect effect because of the distance between action and effect.

Infiltration: Slow passage of water into soil.

Instrument approach procedure: A series of predetermined maneuvers for an aircraft under instrument flight rules conditions from the beginning of an initial approach to a landing or to a point from which a landing may be made visually.

Instrument flight rules: Flight procedures used when conditions for visual flight rules are not met (for example, the cloud cover and fog are at less than 1,000 feet or visibility is less than 3 miles).

Interpolate: To estimate missing values between two known values.

Invasive plant species: Introduced or exotic plant species whose introduction causes or is likely to cause economic or environmental harm to human health.

Irreversible and irretrievable effects: An irreversible effect means the resource is permanently lost and can never be regained, replaced, or recovered. Examples are the extinction of a species or the removal and use of fossil fuels. Similarly, funding, labor, and construction materials would be irreversibly expended in airport and access road construction.

An irretrievable effect means the resource is gone and impossible to retrieve or recover during the life of the project. An example of an irretrievable effect is the loss of a forest as habitat. If a forest is committed to an airport project and cleared, its use as habitat is impossible to retrieve or recover while the area is an airport. This use is reversible, however, because over time the airport could conceivably be converted back into forest.

Isolated artifact: A single artifact or very few artifacts located in a small area.

Isolation: Used here, isolation refers to a portion of land that has been disconnected from the main body of the monument through the construction of the road or runway.

Level of service: In socioeconomic studies, a measure of how well a given road is performing with regard to maintaining appropriate vehicle speeds and minimizing congestion and time delays.

Line: The real or imagined paths that the eye follows when perceiving abrupt changes in form, color, or texture. These are often noticeable as the edge effect created at the boundary of two different landscape features (for example, a line of trees along a bare rocky slope or ledge or a dark mountain ridgeline silhouetted against a bright sky).

Long-term effects: Effects that will last for a long time, possibly years, decades, or longer. An example would be the loss of habitat where pavement has been put down for a runway or road.

Low flow: The flow in a stream that involves the least amount of water. The water during low flow events is often supplied by groundwater surfacing in the stream channel.

Macroinvertebrate: Animals such as snails, beetles, and mayflies that do not have a backbone (invertebrate) and that are large enough to be seen without the use of a microscope (macro).

Major: Project-related effects that would create a high degree of change in the existing landscape, would dominate the view, and would be a focus of viewer attention.

Major federal action: An action that potentially requires the use of federal lands or money or that requires a federal permit, and that would have effects that may be significant.

Management indicator species: Species used by the U.S. Forest Service to assess ecosystem health.

Marine habitats: Habitats influenced by saltwater. These occur in estuarine, coastal, and open ocean environments.

Marine invertebrates: Animals without a backbone that live in ocean habitats (for example, crabs and shrimp).

Marine mammals: Mammals that live in saltwater and/or derive their food from a saltwater environment.

Metric: Used here, an indicator of noise level or duration.

Midden: A term used in archaeology to refer to a dump for domestic trash such as discarded food scraps, shells, broken pottery, and other items.

Middleground: The visible area between 0.5 mile and 4.0 miles from a viewpoint.

Minor: Project-related effects to scenic quality that would retain the existing character of the landscape, would create a low level of change, and, although visible, would not attract the attention of the casual viewer.

Migratory birds: Birds that travel from one place to another at regular times, often over long distances.

Mitigate: To reduce or offset an effect on the environment. As defined by the Council on Environmental Quality (40 CFR 1508.20), measures one can take to mitigate an effect include the following: A) Avoiding the effect altogether by not taking a certain action or parts of an action; B) minimizing effects by limiting the degree or magnitude of the action and its implementation; C) correcting the effect by repairing, rehabilitating, or restoring the affected environment; D) reducing or eliminating the effect over time through preservation and maintenance operations; and E) compensating for the effect by replacing or providing substitute resources or environments.

Mitigation: Used here, a process involving steps to avoid, minimize, rectify, reduce, or compensate for adverse project effects.

Mitigation Banks: A wetland, stream or other aquatic resource area that has been restored, created, enhanced, or, in certain circumstances, preserved. This resource area is then set aside to compensate for future conversions of aquatic resources for development activities. The value of a bank is determined by quantifying the aquatic resource functions restored or created in terms of "credits." Permittees, upon approval of regulatory agencies, can acquire these credits to meet their requirements for compensatory mitigation. A permit applicant may purchase credits from a mitigation bank.

Modeling: Used here, modeling means using a computer and known information to generate additional data that cannot be directly gathered.

Moderate: Effects to scenic quality that would partially retain the existing character of the landscape, and, although attracting the attention of the casual viewer, would not dominate the view.

NAAQS assessment: In air quality studies, a comparison of estimated pollutant concentrations with the National Ambient Air Quality Standards for each criteria pollutant.

National Hydrography Dataset: A mapped dataset compiled by the U.S. Geological Survey that contains information about the location of surface waters in the United States.

National monument: Federal lands that contain historic landmarks, historic and prehistoric structures, or other objects of historic or scientific interest. The Antiquities Act of 1906 authorizes the President to create national monuments on federal lands. Congress can also pass legislation to establish national monuments.

National Register of Historic Places: The country's official list of places deemed important to the nation's history. Cultural resources are assessed for National Register eligibility based on four criteria. States, tribes, and federal agencies may nominate a place for listing on the National Register if it fits one or more of the criteria.

National Wetlands Inventory: A collection of data and maps showing the extent and status of the nation's wetlands. It is primarily maintained by the U.S. Fish and Wildlife Service to evaluate the status of wetlands at the national level.

Natural amenities: Factors associated with a community such as scenic value, environmental quality, outdoor recreation opportunities, climate, and a desirable pace of life.

Nautical mile: A unit of length equal to 1.9 kilometers, or about 6,076 feet.

Nephelometric Turbidity Units (NTUs): Units of measure for turbidity that represent the degree to which light is scattered in water.

Net emissions: Potential emissions from the airport action minus potential emissions from the no action alternative.

Noise-sensitive area: Used here, an area where noise would interfere with the area's normal activities.

Nonattainment area: An area where one or more criteria pollutants persistently exceeds National Ambient Air Quality Standards.

Non-edible byproducts: Parts of an animal such as the hide or antlers of a deer that typically are not consumed as food.

Nonlocal people: In this EIS, people who are not residents of Angoon.

Non-purposeful take permit: Regulations at 50 CFR 22.26 provide for issuance of permits to take bald eagles and golden eagles where the take is associated with, but not the purpose of, the activity and where it cannot practicably be avoided. Most take authorized under these regulations will be in the form of disturbance. Other permits, however, may authorize non-purposeful take that could result in mortality (U.S. Fish and Wildlife Service 2009b).

Nonrural person: A person who does not qualify for subsistence harvest under the federal subsistence program because they live outside of Alaska or in an urban area in Alaska.

Non-wetland: Used here, other waters of the U.S. that lack the three wetland characteristics of water, hydrophytic plant predominance, and hydric soils.

Noxious weed: An invasive plant that has been designated by county, state, or federal authorities as harmful to agricultural or horticultural crops, natural habitats or ecosystems, and humans or livestock.

Nutrient cycling: The process by which minerals and nutrients move from a physical environment (such as soil) into living organisms (such as plants and animals), then back into the environment again.

Operations: In aviation contexts, takeoffs or landings at a given airport.

Ordinary high water mark: The line on a shore or streambank created by the rise and fall of water levels. It can be indicated by impressions or shelving on the bank, changes in *soil*, destruction of vegetation, or the presence of debris.

Paving aggregate: A material used for the surface layer of pavement. Like crushed aggregate, it must be of clean, sound, durable particles or crushed stone or gravel. It must be free of organics, silt, or clay coatings, and it must meet specifications for wear and durability.

Peak discharge: The maximum amount of flow in a stream during a single flood event. Discharge is typically measured in cubic feet per second (cfs).

Percolation: Gravity flow of groundwater through the spaces in rock or soil.

Permittee-Responsible Mitigation: When a permit applicant implements compensatory measures at the impact site (i.e., on-site mitigation) or at another location usually within the same watershed as the permitted impact (i.e., off-site mitigation). The permittee retains responsibility for the implementation and success of the mitigation.

Pier: Upright support for a structure.

Pile: A pole or H-shaped length of steel that is driven into the ground to strengthen bridge foundations.

Pile driving: Use of a crane-mounted hammer that pounds the steel pile deep into the ground.

Pools: Used here, portions of a river with deeper and slower-moving water.

Practicable: Capable of being done considering cost and existing technology.

Practical or feasible: In a NEPA context, alternative may be practical or feasible if it is technically implementable (in other words, possible to construct and operate) and economically viable (meaning its construction, operation, and maintenance costs are generally reasonable).

Precipitation: Any form of water such as rain, snow, or hail that falls to the earth's surface.

Preferred Alternative: As defined by the Council on Environmental Quality, "the alternative which the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors."

Preservation in place: A Section 4(f) term that indicates a site is chiefly important for reasons other than its scientific data potential (in other words, what can be learned by excavating it). As an example, a site would warrant preservation in place because its presence on the landscape in that location is important, and it would lose its value by being removed or altered.

Primary productivity: The process of using or releasing oxygen in a water body through the breakdown of organic matter or photosynthesis by aquatic plants.

Priority travel routes: Routes from which many people can see an area's scenery and landscapes. These include highways, railroads, rivers, canals, waterways, and commercial flight paths.

Proposed action: A NEPA term referring to the project or action as put forth by the project sponsor and for which federal funding or approval is requested.

Prudent: In a Section 4(f) context, a proposed alternative or measure does not compromise a project to an extent that it is unreasonable to proceed, given the project's purpose and need; results in unacceptable safety or operational problems; even with mitigation, still causes severe social, economic, or environmental impacts, disruption of established communities, disproportionate impacts to minority or low-income populations, or impacts to environmental resources protected under other federal statutes; results in extraordinary additional construction, maintenance, or operational costs; causes other unique problems or unusual factors; or causes cumulative impacts of an extraordinary magnitude.

Publicly owned: Owned by a local, state, or federal governmental agency and available to the general public most of the time.

Purpose and need: A NEPA term referring to a statement that is required to explain why an agency action is necessary.

Raptor: Bird of prey.

Reasonably foreseeable future action: For this environmental impact statement, an action is considered reasonably foreseeable if it has been or will be analyzed in a NEPA document or plan; has a federal, state, local, or tribal government permit application or approval; would occur within the same time frames as the proposed airport action; or has had a funding source identified.

Record of decision: A concise document that states an agency's final decision for a proposed project; identifies the alternatives considered, including the environmentally preferred alternative; and discusses mitigation plans, including any enforcement and monitoring commitments.

Recurrence interval: Estimated time between the occurrence of a particular peak discharge (flood) event of a given size. A 100-year flood event will occur on average one in 100 years and has a 1% chance of occurring in any given year.

Regulatory agencies: Local, state, and federal agencies responsible for ensuring that laws and policies related to specific public lands or environmental resources are followed.

Resource: A natural, cultural, or social feature that is valued for its role in the human environment, economy, or society. Examples include archaeological sites, vegetation and wildlife, visual resources (how the land appears), and water bodies such as streams and wetlands.

Riffles: Sections of river where the water is faster moving, shallower, and usually flowing over cobbles or larger gravel. Riffles are often used by certain fish for spawning.

Riparian: A term describing the zone between land and a river or stream. Riparian areas contribute many essential elements to the health and normal function of a river or stream.

Riprap: Large rocks protecting a structure, such as a bridge pier, from erosion.

Salmonids: Members of the scientific family of fish, Salmonidae, which contains species such as trout, salmon, and Dolly Varden.

Scenic integrity: According to the U.S. Forest Service, scenic integrity is the degree to which the landscape *character* is, or appears to be, intact, unaltered, and natural-appearing.

Scoping: An activity conducted early in an EIS process in which the public and federal, state, and local agencies are invited to provide input on project alternatives and issues of concern. Scoping helped the FAA identify what should be analyzed in this EIS and potentially significant issues related to the proposed action.

Scour: The action of water eroding a stream channel, typically in areas with increased velocity, power, or slope. This can occur on the bottom of the channel or the banks.

Section 4(f) properties: A Department of Transportation Act term for publicly owned land that is designated as a public park, recreation area, or wildlife refuge of national, state, or local significance, or any historic site of national, state, or local significance.

Sediment: Material such as sand or silt that can be transported by water to a water body, where it can remain suspended in the water or settle to the bottom.

Sedimentation: The process by which sediment is transported by surface water; also referred to as surface erosion.

Seep: A location where groundwater percolates through the ground to form a puddle.

Sensitive species: Native plants and animals designated by the U.S. Forest Service as needing special management.

Short-term effects: Effects that extend beyond construction but that are not long term. An example would be vegetation clearing in the temporary use area for bridge construction. This area would be revegetated when construction is complete, and once revegetation is successful, this effect would end.

Significance: Once an effect has been identified and described, its significance is determined through consideration of its context and its intensity. Context comprises the area, time, and conditions that matter for a given resource. Intensity is the severity of the effect, and it is evaluated through considerations like effects to public health and safety, effects to unique characteristics of the area, public controversy, uncertainty or unknown risks, and effects to endangered species. In many resource sections, significance is discussed in terms of the thresholds established in FAA Order 1050.1E.

Similar actions: Actions that have similarities (such as timing or location) that provide a basis for evaluating their environmental effects together.

Skyglow: A background illumination of the night sky that often occurs when light is scattered by water droplets in the form of rain, snow, fog, clouds, or high humidity.

sp.: Abbreviation that indicates an unknown species within a particular classification of plants or animals.

spp.: Abbreviation that indicates multiple species under a particular classification.

Social trails: Informal trails that are not designated and maintained by a land management agency.

Socioeconomic: A term that refers to the field of social economics, which examines the relationship between social life and economic activity and assesses social or economic change in human populations.

Soil compaction: The reduction in space between grains of soil by removal of air. This process typically occurs in areas where heavy equipment operates. Soil compaction can make it more difficult to revegetate disturbed areas.

Soil productivity: The soil's ability to support both the quality and quantity of vegetation.

Special Status Species: A species protected by federal or state law or identified by state or federal agencies as requiring special consideration in project planning.

State-listed species: According to the State of Alaska, species whose numbers have decreased to such an extent as to indicate that their continued existence is threatened.

Stormwater: Water that runs off of developed areas during a rain or snow storm. Stormwater accumulates quickly in developed areas because paved surfaces prevent water from soaking into the ground. Stormwater flows into nearby surface water bodies in large volume, sometimes carrying with it contaminants from developed areas.

Straight missed approach: An instrument approach procedure when a pilot reaches the decision altitude and determines that he/she cannot land on the runway. In a straight missed approach, the aircraft maintains the same heading as when approaching the runway for landing but climbs in altitude rather than descends. The path in a straight line beyond the runway must be clear of obstructions.

Stream channel: The physical boundaries of a stream, including the bed (bottom) and banks (sides).

Stream class: A designation applied to all freshwaters (streams and lakes) that describes how fish use those water bodies and how the water bodies influence downstream areas.

Stream geomorphology: The physical form of a stream channel and its change over time.

Stream inventories: Data collected to establish aquatic conditions and to assess management needs.

Stream slope: The change in elevation of the water from upstream to downstream over a given length. Steeper stream slopes (a large change in elevation) have faster-moving currents.

Subbase: A foundation for the base course in road construction.

Subsistence use: According to Section 803 of the Alaska National Interest Lands Conservation Act (ANILCA), "the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade."

Substrate: The material on the bottom of a water body, such as sediment or bedrock underlying wetlands and stream channels. In aquatic habitats, substrate provides the surface material on which a species lives, grows, or feeds.

Subsurface estate: A real estate term meaning ownership or controlling interest in the resources below the surface of a parcel of land; subsurface rights.

Surface erosion: A process in which sediment detaches from the earth's surface and is transported by surface water or wind. Sediment itself can be of concern for water quality, and can also aid in the transport of bacteria and other contaminants into water bodies.

Surface rights: Property rights conferred to a landowner providing the right to use and modify a property's surface area.

Surface waters: Water bodies such as streams, rivers, lakes, and oceans that exist on the earth's surface.

TAA (time above ambient): The total time in minutes that aircraft noise exceeds existing ambient noise levels in a 24-hour period.

Take: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect wildlife or to attempt to engage in any such conduct.

Temperate rain forest: A forest with coniferous trees (an order of mostly evergreens with needle-shaped or scale-like leaves) or broadleaf trees (those with broad leaves). These forests have high precipitation levels and typically mild winters with cool summers.

Temporary effects: Effects that end as soon as construction ceases. An example would be the displacement of wildlife caused by construction noise. Once construction noise stopped, the effect would end.

Terrestrial: Relating to the land surface.

Texture: The variation, pattern, density, and graininess of the landscape surface (for example, sparse and seemingly randomly ordered shrubs in an arid landscape or dense crowding of trees in a forest), and the dimensions of those surface variations (for example, tall conifers or short grasses).

Threatened species: Species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Threshold: An airport planning term referring to the point on a runway behind which aircraft cannot land or from which aircraft begin their takeoff.

Transition zones: Used here, areas in a waterway where water flow changes from smooth to turbulent.

Transportation and utility system: As defined in ANILCA Section 1102(4)(A), the term "transportation or utility system" is any system—such as roads, transmission lines, or airports, as defined in ANILCA 1102(4)(B)—where any portion of that system is located in a conservation system unit.

Turbidity: Lack of clarity in water as a result of suspended sediments.

Turning missed approach: Similar to a straight missed approach, but instead of continuing in a straight line, the aircraft turns. A turning missed approach is used when a straight missed approach is not possible because of obstructions beyond the end of the runway.

Upland birds: Birds that use land habitats.

Uplands: An area that is elevated above surface water or groundwater. In wetlands studies, uplands are areas that lack one or more of the three wetland characteristics, and that are seldom or infrequently flooded with water.

Use areas: Locations from which many people can view an area's scenery and landscapes. These include national forest visitor centers, trailheads, campgrounds, picnic grounds, marinas, beaches, resorts, and scenic overlooks.

Using or Use: The term "use" under Section 4(f) means physically taking land from a historic property or indirectly affecting a historic property in such a way that the important values of that property are substantially impaired.

Viewer sensitivity: The importance or concern people place on scenery or a scenic landscape.

Visual flight rules: Rules that govern flight procedures when visibility and weather conditions are clear enough for a pilot to navigate the airplane by sight instead of by using the instrument panel.

Visual simulations: Computer-generated images of a project's structures, surface disturbances, and visibility as seen from selected viewpoints. Used to assist in visualizing the degree of landscape contrasts and effects to the existing landscape.

Water quality standards: To ensure the suitability of water for beneficial uses, the various characteristics of the water are measured against certain standards. For example, all the characteristics in a water body designated as a drinking water supply must meet standards that protect human health.

Waters of the U.S.: A federal regulatory term referring to surface waters, rivers, lakes, estuaries, coastal waters, and wetlands that are used or can be used for interstate or foreign commerce.

Watershed: An area of land from which surface water runoff from rain and melting snow converges, usually at the mouth of a stream. Stream flows tend to increase from a watershed's upper parts (highest elevations) to its lower parts.

Wetland functions: Benefits that wetlands provide as part of the environment, such as protecting and improving water quality, providing fish and wildlife habitat, storing floodwaters, and controlling erosion.

Wetland services: Attributes of wetlands that contribute specifically to human use or human well-being, such as providing plants and animals that humans can use for provisioning.

Wetlands: Areas that are inundated or saturated often enough and long enough that they support vegetation adapted to saturated soil. Wetlands include areas such as swamps, marshes, and bogs (40 CFR 230.3(t)).

Wilderness area: To paraphrase the Wilderness Act (Public Law 88-577), which was enacted specifically to protect wilderness, a wilderness area (in contrast with areas where people dominate the landscape) is an area where the earth and community of life are unrestricted by humans, where humans are visitors who do not remain. A wilderness area is further defined as an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation.

Wilderness character: The term "wilderness character" comes from the definition of "wilderness" in the Wilderness Act (Public Law 88-577). It describes an area where the earth and its community of life are untrammeled by humans, that is managed for natural conditions, that has no permanent improvements or human habitation, and that has outstanding opportunities for solitude or a primitive and unconfined type of recreation.

Wind coverage: A term used in aviation to represent the percentage of the total wind energy that is blowing in line with the runway.

Zoning ordinance: Municipal law establishing building codes and land use regulations for given zones or geographic areas of a community.

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