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Airport Master Plan Update Unalaska Airport

DRAFT WORKING PAPER #3

Environmental Overview

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A. ENVIRONMENTAL OVERVIEW

The purpose of this chapter is to provide an inventory of existing environmental conditions at Unalaska Airport (DUT). **Figure A-1** and **Figure A-2** show the project and vicinity.

The following information was assembled using available studies and public data; no field surveys were conducted. This review is in accordance with Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, which states, “the principal objective of the environmental overview is to document environmental conditions that should be considered in the identification and analysis of airport development alternatives.”

The potential environmental impacts of the master plan update’s alternatives will be summarized and addressed in the next phase of the Airport Master Plan (AMP) Update.

FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, discusses the following categories of potential impact that must be addressed in compliance with the National Environmental Policy Act (NEPA):

- Air quality
- Biological resources (including fish, wildlife, and plants)
- Climate
- Coastal resources
- Department of Transportation Act, Section 4(f)
- Farmlands
- Hazardous materials, solid waste, and pollution prevention
- Historical, architectural, archaeological, and cultural resources
- Land use
- Natural resources and energy supply
- Noise and compatible land use
- Socioeconomics, environmental justice, and children’s environmental health and safety risks
- Visual effects (including light emissions)
- Water resources (including wetlands, floodplains, surface waters, groundwater, and wild and scenic rivers)

This environmental overview discusses the Unalaska Airport area using these categories to facilitate future analysis, evaluation, and recommendations.

For the purpose of this inventory, these categories will only be discussed if they apply specifically to the Unalaska Airport. There are no agricultural/farm areas considered important and protected by federal, state, and local regulations in Alaska; therefore, farmlands are not included in this overview.





A.1 Air Quality

Air quality in the Unalaska area is generally good and likely meets all National Ambient Air Quality Standards (NAAQS) set by the US. Environmental Protection Agency (USEPA) and Alaska Ambient Air Quality Standards (AAAQS) set by the Alaska Department of Environmental Conservation (ADEC), although air quality is not actively monitored. The City of Unalaska is within a Special Protection Area for sulfur dioxide (18 Alaska Administrative Code (AAC) 50.025), which has more stringent emissions requirements. Sulfur dioxide is released by power-generating plants and is also present in marine fuel. Diesel fuel used in the Special Protection Area may not exceed 0.075 percent sulfur by weight, and diesel generators or engines may not be used. ADEC collected samples in Unalaska as part of a multi-agency project to measure total mercury concentration and deposition in precipitation between 2005 and 2015. No other air quality pollutants are monitored in Unalaska.

A.2 Biological Resources

This section provides an overview of the marine and terrestrial environments (including plants), birds, fish, wildlife (including marine and land mammals), and federally listed threatened or endangered species in the Unalaska Airport area. The marine environment, and the plants and animals within it, dominate the discussion to reflect the importance of this environment as well as the minimal diversity of terrestrial plants and animal life in the study area.

A.2.1 Marine Environment

The airport runway is bordered along its northeast length by the base of the steeply sloped Mount Ballyhoo. The runway ends both drop off into open marine waters: the northwest end of Runway 13 into Unalaska Bay and the southeast end of Runway 31 into Dutch Harbor.

Table A-1 is a summary of marine environment descriptions identified in the 2008 *Unalaska Airport Master Plan Update* (CH2MHILL 2008) and the 2012 *Final Environmental Assessment* (EA) for Proposed Runway Extension and RSA Improvements at Unalaska Airport (CH2MHILL 2012). **Table A-1** summarizes the two geographic areas (Unalaska Bay and Dutch Harbor), divided into intertidal, shallow sub-tidal (4 to 30 feet mean lower low water [MLLW]), and deeper sub-tidal (30 to 80 feet MLLW).

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Table A-1: Characteristics of the Marine Environment in the Unalaska Airport Vicinity

Zone	Marine Environment Characteristics	
	Dutch Harbor	Unalaska Bay
Intertidal		
Topography	Shoreline composed of steep riprap and naturally occurring boulders	Large to small boulders on moderately steep slopes at the shore; some areas of cobble and large gravel on lesser slopes extending from the toe of the boulder slope
Plant Life	Dense rockweed and sea lettuce on boulders	Upper intertidal zone largely consists of sea lettuce and rockweed; middle intertidal zone dominated by sea lettuce, northern mazza weed, seaweeds, and black pine; lower intertidal zone dominated by brown kelp, a filamentous red algae (unidentified), black pine, rockweed, and sea lettuce
Animal Life	In the middle and lower intertidal zone, rocks covered with barnacles and mussels in places, with limpets and whelk (snail) also present	Upper intertidal zone dominated by acorn barnacles, with limpets, whelk, and blue mussels also present; middle intertidal zone dominated by thatched barnacles, with proliferating anemone, limpets, large chiton, and whelk; lower intertidal zone supports thatched barnacles and whelks
Shallow Sub-tidal (4 – 30 feet MLLW)		
Topography	Riprap shoreline-armoring rock transitions into smaller boulders, then to gravel at a depth of approximately 20 feet; gravel and sand extend throughout this zone	Shallowest portion is mostly boulders and cobble; in deeper water, greater than 20 feet, the sea floor generally transitions into large gravel with some cobble and small boulders; some localized areas of sand formed into small dunes
Plant Life	In shallower water, rocks are covered with short, fuzzy, filamentous green algae transitioning to a thick growth of sieve kelp mixed with short folios red algae and patches of witch's hair as depth increases	Shallower than 10 feet, the plant community is dominated by sieve kelp; dragon kelp forms dense beds farther off-shore, sometimes creating a surface canopy and overstory in deeper water; understory consists of sieve kelp, split kelp, and witch's hair; all rock surfaces not covered with these species are covered with either encrusting algae, rusty rock, or coralline encrusting alga, rock crust; farther offshore, dragon kelp diminishes, but understory plants, sieve kelp, split kelp, rusty rock, rock crust, and witch's hair growth continue

Table A-1: Characteristics of the Marine Environment in the Unalaska Airport Vicinity

Zone	Marine Environment Characteristics	
	Dutch Harbor	Unalaska Bay
Animal Life	Clam shells common to abundant in areas of gravel and sand; most abundant large animals are green sea urchins, white plumed anemones, and sunflower stars	Dominated by large white plumed anemone, unidentified clams (evidenced by empty shells), sunflower stars, and green sea urchins (in some areas); white plumed anemones are ubiquitous; sunflower stars found wherever clams or urchins are abundant as food; green sea urchins found in aggregations on gravel, cobble, or rock in groups of hundreds to tens of thousands; other invertebrates include painted anemones, proliferating anemones, hairy triton snails, Alaska false jingle, chiton, hermit crabs, sea cucumbers, and false ochre stars
Deeper sub-tidal (30 – 80 feet MLLW)		
Topography	Gravel and sand bottom at 30 feet in most places; bottom generally transitions into sand at 40 – 50 feet, and shifts to silt in the 65 – 75-foot range	Mostly gravel and sand with dominance shifting back and forth below 30 feet; bottom shifts toward sand and silt as depth increases; areas of sand at less than 40 feet are rippled into small dunes, indicating that wave action is affecting the bottom
Plant Life	Gravel in the 30 – 40-foot range mostly covered by a short, fuzzy, filamentous algae growth; generally sparse growth of split kelp, sieve kelp, and folios red algae in places; no algae below 50 feet; expansive areas in the 70 – 90-foot range on silt covered with a fluffy layer of white filaments that are probably bacterial growths	At 30 – 40 feet, dragon kelp is present but the bottom is mostly covered with sieve kelp, split kelp, witch's hair, mixed red algae, and rock crust; at depths greater than 50 feet, the bottom is almost devoid of algal growth
Animal Life	In the shallower depths of this zone, where the bottom is mostly gravel, clams are locally abundant as evidenced by empty shells; sunflower stars are common in the shallower areas, especially where clams appear to be abundant, and white plumed anemones are common at all depths, especially where hard attachment points are available; in deeper areas where the substrate shifts to silt, polychaete worms are abundant	White plumed anemones, sunflower stars, painted anemones, green sea urchins, unidentified clams, and unidentified small shrimp are the most abundant animals; other animals observed include hermit crabs, hairy triton snails, false ochre stars, blood stars, Stimpson's sun stars, and giant Pacific chitons; less conspicuous, but important and abundant, organisms present include brittle stars, a tube-forming polychaete worm, a spoonworm, and a burrowing anemone

Source: CH2MHILL 2012: Table 4.3-1; CH2MHILL analysis of underwater video shot in 2006 by Ocean Surveys, Inc.

A.2.2 Birds

The avian community in the Unalaska area is indicative of the marine environments of the Eastern Aleutian Islands (ABR 2010:1). Of the approximately 140 species of birds recorded in the region, more than 50 percent are species that spend most of their life cycle in marine, estuarine, or freshwater habitat, including 26 species of seabirds (albatrosses and shearwaters, alcids, and cormorants), 31 species of waterfowl (swans, geese, and ducks), 6 species of loons and grebes, and 13 species of larids (gulls, jaegers, and terns). Shorebirds, which use the interface between terrestrial and aquatic habitats, account for another 14 percent. The diversity of land bird species is lower than on mainland Alaska, largely due to the treeless landscape.

Of the breeding species in the region, many use the nearshore waters adjacent to the airport, but no breeding colonies of seabirds are located nearby (ABR 2010:1). The U.S. Army Corps of Engineers (USACE 2018) identified that the seabird colonies closest to the airport are located on Eider Point (4.4 miles northwest) and Hog Island (1 mile west).

Unalaska is an important wintering area for many bird species. The most abundant, according to the National Audubon Society Christmas Bird Count, include emperor geese, harlequin ducks, bald eagles, glaucous winged gulls, black scoters, white-winged scoters, and common ravens, each averaging more than 200 sightings every year over the past 10 years, and with emperor geese, black scoters, and harlequin ducks averaging 1,000 or more sightings each every year (Audubon 2019). Some species, such as common murre and Steller's eiders, used to be sighted during the annual count in much greater numbers, but have been appearing in notably smaller numbers in recent years (CH2MHILL 2012). While common murre are generally found farther from shore, Steller's eiders regularly forage in the shallow and intertidal areas adjacent to the airport.

Wintering birds increase through January, peak in February, then decrease through spring migration in March and April. Most of the species occur throughout winter in the nearshore waters adjacent to the airport. While little has been studied of the movements of the birds near the airport, the 2012 EA (CH2MHILL 2012) noted that use of nearshore waters on both sides of the airport by seaducks and other waterbirds suggests that these birds fly between Unalaska Bay and Dutch Harbor when moving between feeding and resting areas, and such movements can cause bird strike hazards to aircraft.

A.2.3 Marine Mammals

Harbor seals, northern sea otters, Steller sea lions, killer whales, and harbor porpoises inhabit Unalaska Bay year-round, although killer whales and porpoises occur infrequently and in small numbers (USACE 2018). Humpback whales are present in Unalaska Bay from early spring through fall. Northern fur seals and Pacific white-sided dolphins occur seasonally and in small numbers. Fur seals are typically only observed in Unalaska Bay during migration to the Pribilof Islands during spring and fall.

USACE (2018) states that harbor seals are distributed throughout Unalaska Bay and are usually solitary except when hauled out. There are three different locations in Iliuliuk Bay where seals occasionally haul out in small numbers (typically 1 to 12 seals) in calm conditions, and they routinely forage at the kelp beds along the spit at Dutch Harbor and along the eastern shoreline of Iliuliuk Bay (USACE 2018). Northern sea otters are common in

the Unalaska area, and frequently forage near shore kelp beds, often the same as the ones frequented by harbor seals although they do not haul out. Northern sea otters are along the entire coastline, even when kelp beds are absent, and often occur in the industrialized area inside the Dutch Harbor spit. Section 4.2.6 includes information on the threatened and endangered marine mammal species that may be present in the study area.

Table A-2 summarizes marine mammals potentially in the Unalaska Airport vicinity, including their abundance, habitat, primary prey, seasonal presence, and listing status under the Endangered Species Act (ESA) or Marine Mammal Protection Act (MMPA).

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Table A-2: Marine Mammals Potentially in the Unalaska Island Region and their Federal Status

Species	Scientific Name	Relative Abundance	Primary Habitat	Primary Prey	Season(s) Present	ESA/MMPA Status
Harbor seal	<i>Phoca vitulina</i>	Common	Coastal/ Shelf	Fish	Year Round	N/A
Steller sea lion	<i>Eumetopias jubatus</i>	Uncommon	Coastal/ Shelf	Fish	Year Round	Endangered/ Depleted
Northern fur Seal	<i>Callorhinus ursinus</i>	Uncommon	Offshore/ Slope	Fish/Squid	Spring – Fall	N/A / Depleted
Dall's porpoise	<i>Phocoenoides dalli</i>	Common	Shelf/Slope/ Offshore	Fish	Year Round	N/A
Harbor porpoise	<i>Phocoena phocoena</i>	Common	Shelf/ Coastal	Fish/Squid	Year Round	N/A
Killer whale	<i>Orcinus orca</i>	Common	Shelf/Slope/ Coastal	Fish/Marine Mammal	Year Round	N/A
Gray whale	<i>Eschrichtius robustus</i>	Common	Coastal/ Shelf	Crustaceans	Spring – Fall	N/A
Humpback whale	<i>Megaptera novaeangliae</i>	Uncommon	Shelf/Slope	Zooplankton /Fish	Spring – Fall	Endangered/ Depleted
Minke whale	<i>Balaenoptera acutorostrata</i>	Common	Shelf	Fish/Squid	Year Round	N/A
Fin whale	<i>Balaenoptera physalus</i>	Uncommon	Slope/ Offshore	Fish/ Zooplankton	Spring – Fall	Endangered/ Depleted
Sei whale	<i>Balaenoptera borealis</i>	Uncommon	Shelf/Slope	Zooplankton	Spring – Fall	Endangered/ Depleted
North Pacific Right whale	<i>Eubalaena japonica</i>	Rare	Shelf/Slope	Zooplankton	Spring – Fall	Endangered/ Depleted
Baird's beaked whale	<i>Berardius bairdii</i>	Rare	Slope/ Offshore	Squid/ Octopus/ Fish	Spring – Summer	N/A
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	Rare	Offshore	Squid/Fish	Unknown	N/A
Stejneger's beaked whale	<i>Mesoplodon stejnegeri</i>	Rare	Shelf/ Offshore	Squid/Fish	Unknown	N/A
Northern sea otter	<i>Enhydra lutris kenyoni</i>	Common	Coastal	Sea Urchins/ Clams	Year Round	Threatened/ Depleted

Source: Source: CH2MHILL 2012: Table 4.4-2; developed using Allen and Angliss 2010; updated using Muto et al. 2019.

A.2.4 Fish

Nearshore estuarine and marine waters near the airport are designated as Essential Fish Habitat (EFH) for the weathervane scallop, Pacific salmon, and groundfish species managed under federal Fishery Management Plans (NPFMC 2014, 2018a, 2018b). EFH refers to “waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” **Table A-3** lists species identified by the National Marine Fisheries Service (NMFS) interactive mapping tool (NOAA, NMFS 2020) that have EFH designated in Dutch Harbor and throughout Unalaska Bay.

Table A-3: Species with Marine EFH Designated in Dutch Harbor and Unalaska Bay		
Common Name	Scientific name	Species Life Stage
Arrowtooth flounder	<i>Atheresthes stomias</i>	Larvae, Juvenile, Adult
Atka mackerel	<i>Pleurogrammus monopterygius</i>	Egg, Adult
Bering skate	<i>Bathyraja interrupta</i>	Juvenile, Adult
Bigmouth sculpin	<i>Hemitripterus bolini</i>	Juvenile
Dark rockfish	<i>Sebastes ciliatus</i>	Adult
Dusky rockfish	<i>Sebastes variabilis</i>	Juvenile, Adult
Flathead sole	<i>Hippoglossoides classodon</i>	Egg, Juvenile, Adult
Great Sculpin	<i>Myoxocephalus polyacanthocephalus</i>	Juvenile, Adult
Harlequin rockfish	<i>Sebastes variegatus</i>	Juvenile
Red king crab	<i>Paralithodes camtschatica</i>	Juvenile
Northern rock sole	<i>Lepidopsetta polyxystra</i>	Larvae, Juvenile, Adult
Northern rockfish	<i>Sebastes polyspinus</i>	Adult
Pacific cod	<i>Gadus macrocephalus</i>	Larvae, Juvenile, Adult
Rex sole	<i>Glyptocephalus zachirus</i>	Adult
Rougeye rockfish	<i>Sebastes aleutianus</i>	Juvenile, Adult
Sablefish	<i>Anoplopoma fimbria</i>	Juvenile
Southern rock sole	<i>Lepidopsetta biliniata</i>	Juvenile, Adult
Chinook salmon	<i>Oncorhynchus tshawytscha</i>	Immature
Chum salmon	<i>Oncorhynchus keta</i>	Immature, Juvenile
Coho salmon	<i>Oncorhynchus kisutch</i>	Juvenile, Mature
Pink salmon	<i>Oncorhynchus gorbuscha</i>	Juvenile, Mature
Sockeye salmon	<i>Oncorhynchus nerka</i>	Immature, Juvenile
Walleye pollock	<i>Gadus chalcogrammus</i>	Larvae, Adult
Weathervane scallops	<i>Patinopecten caurinus</i>	Late Juvenile, Adult

Source: NOAA, NMFS 2020

Bold: Species included in the 2012 EA EFH Assessment (CH2MHILL 2012), based on consultations with NMFS

The EFH Mapping Tool (NOAA, NMFS 2020) did not identify any Habitat Area of Particular Concern near the airport. Habitat Areas of Particular Concern are high priority areas for conservation, management, or research.

The Anadromous Waters Catalog (AWC) identifies freshwater habitats important for anadromous (migrating from sea to freshwater to spawn) Pacific salmon; such habitats are considered freshwater EFH for such species (NPFMC 2018a; Geifer and Blossom 2020). The AWC does not identify any freshwater EFH on Amaknak Island, according to the Alaska Fish Resource Monitor (ADF&G 2020). The Iliuliuk River (302-31-10500), located more than one mile south of the airport at the head of Iliuliuk Bay, is the nearest anadromous stream (Geifer and Blossom 2020).

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as amended by the Sustainable Fisheries Act of 1996, directs federal agencies to consult with NMFS when any of their activities may have an adverse effect on EFH. An adverse effect refers to any impact that reduces quality and/or quantity of EFH, and may include direct (e.g., contamination or physical disruption); indirect (e.g., loss of prey or reduction in species fecundity); and site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 Code of Federal Regulations [CFR] 600.810). Consultation with NMFS is recommended to determine which species should be evaluated as part of any EFH assessments needed to support future NEPA documentation and/or permitting.

A.2.5 Terrestrial Environment

The Unalaska area is within a maritime climate, and is dominated by alpine and moist tundra ecosystems. Vegetation on Amaknak Island is primarily grasses and forbs. Spruce trees imported during the 1800s are present in Sitka Spruce Park. Moist tundra occurs at lower elevations and along shorelines, and is dominated by beach grasses, ferns, and forbs.

Terrestrial wildlife on Unalaska Island is limited to small mammals, many of which were introduced at various times by Russians and Americans for the fur industry (CH2MHILL 2012:4-14). The largest native species is the red fox. Other small mammals that were introduced include the arctic fox, Norway rat, lemming, and arctic ground squirrel.

A.2.6 Federally Listed Threatened or Endangered Species

Unalaska Bay and Dutch Harbor provide habitat for some species listed as threatened or endangered under the ESA.

A.2.6.1 Marine Mammals

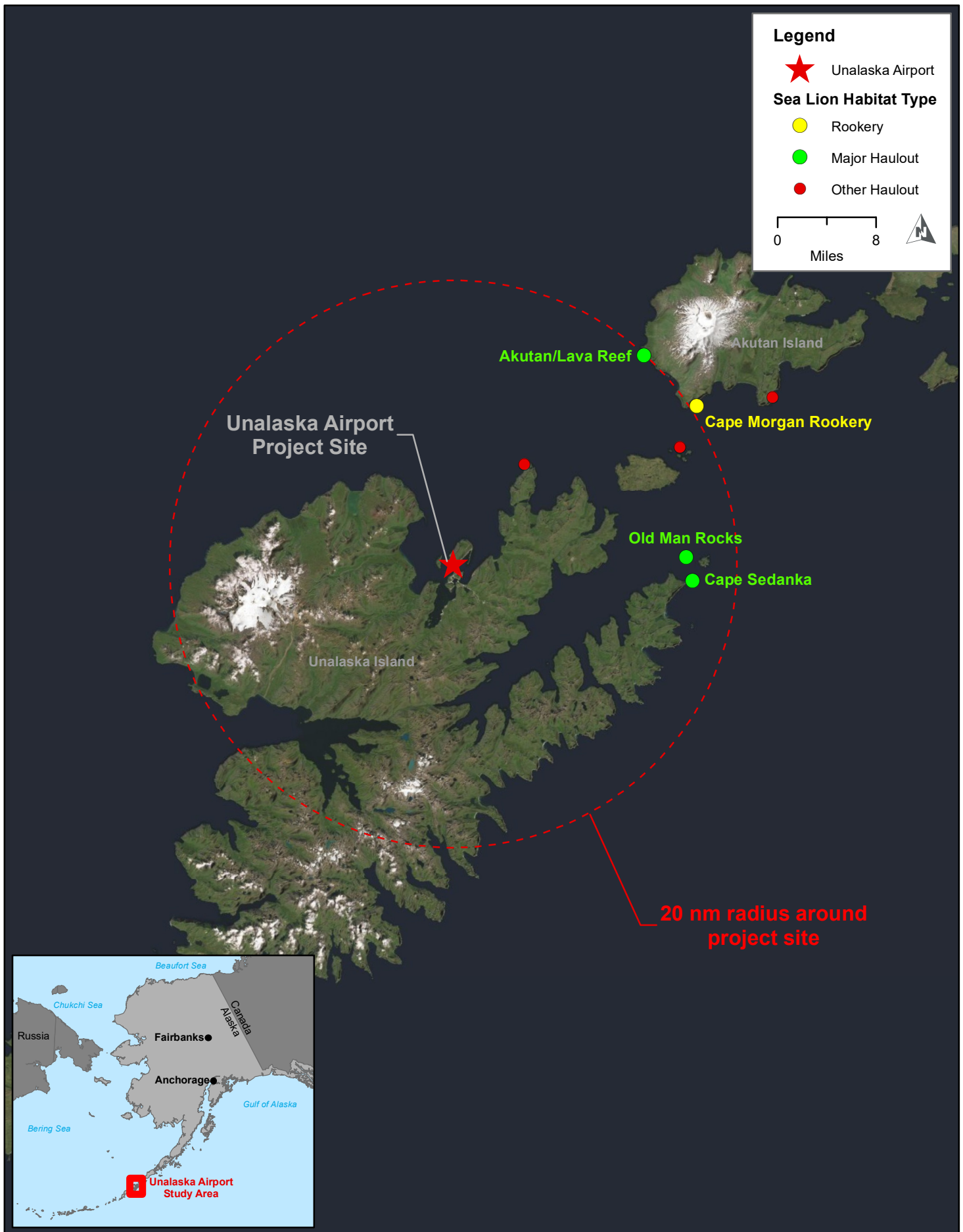
Six marine mammal species in the study area are listed as endangered or threatened under the ESA: Steller sea lion, humpback whale, fin whale, sei whale, northern right whale, and northern sea otter (see **Table 4-2**). Fin, sei, and northern right whales are more likely to be found farther offshore in the Bering Sea or Gulf of Alaska (USACE 2018). Marine areas bordering the airport are considered part of the northern sea otter critical habitat (USFWS 2020).

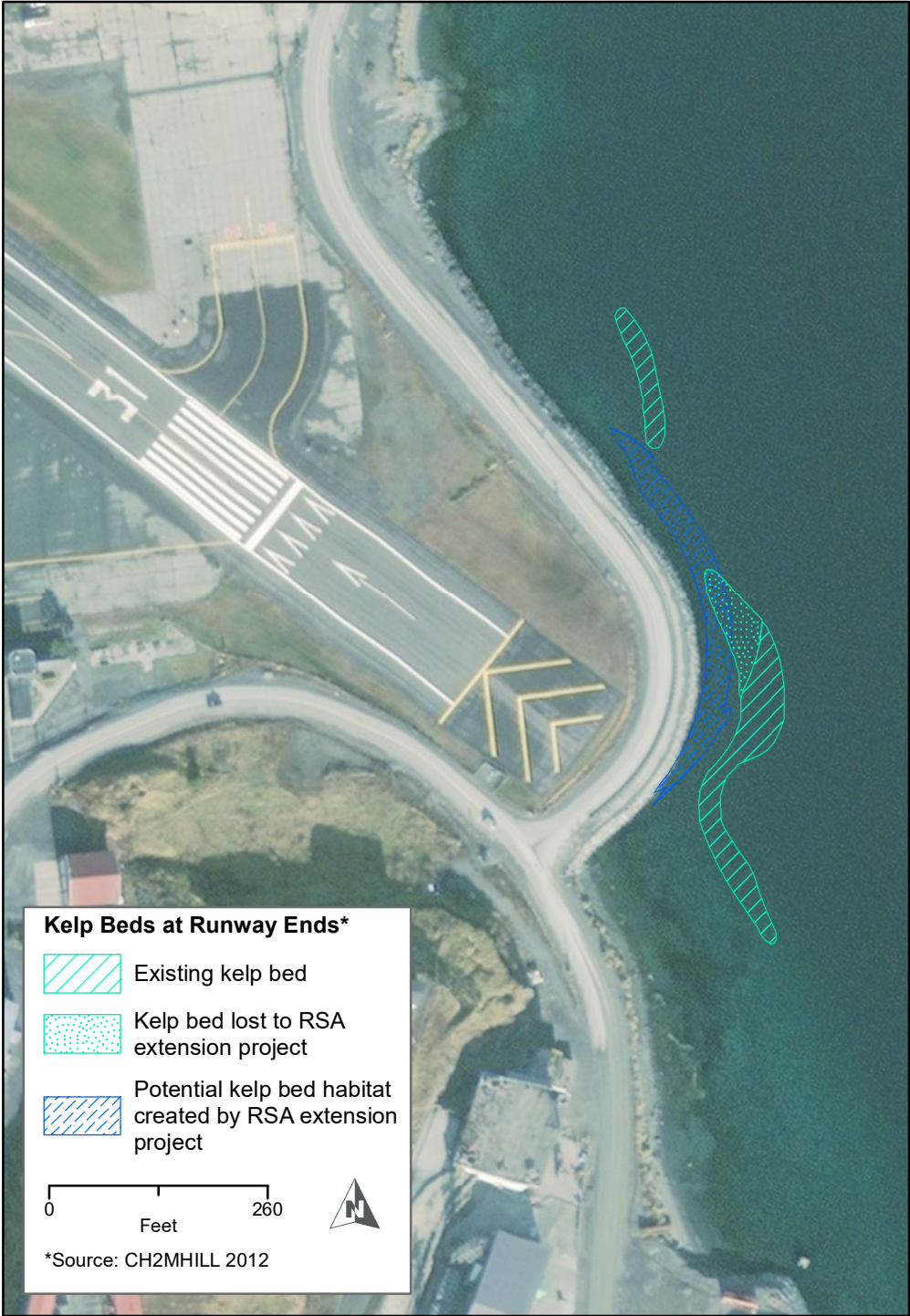
Steller sea lion. Steller sea lions occur in two stocks in Alaska. The eastern United States Distinct Population Segment (DPS), including animals east of Cape Suckling, Alaska, is no longer listed under the ESA (78 CFR 66140). The western United States DPS, including animals at and west of Cape Suckling (including the Unalaska Island area), is listed as endangered (62 CFR 30772). Steller sea lions are not known to migrate, but individuals can disperse widely outside of the breeding season (late May to early July) (USACE 2018). Sea lion rookeries in Alaska are located in the Pribilof Islands, on Amak Island north of the Alaska Peninsula, throughout the Aleutian Islands and western Gulf of Alaska to Prince William Sound, and on several islands in southeastern Alaska. Haulouts and rookeries are numerous throughout their breeding range. Steller sea lion critical habitat is defined by a 20-nautical mile (nm) radius (straight line distance) encircling a haulout or rookery, and includes special foraging areas. The project area occurs within critical habitat for three major haulouts and one rookery, but no special foraging areas. The three haulouts (Old Man Rocks, Cape Sedanka and Akutan/Lava Reef) are approximately 16 to 20 nm from the project area. The closest rookery is Akutan/Cape Morgan, which is slightly more than 20 nm from the project area. See **Figure A-3** for approximate locations of sea lion haulouts and rookeries from the project area.

Northern sea otter. The U.S. Fish and Wildlife Service (USFWS) listed the Southwest Alaska DPS of northern sea otter as threatened under the ESA in 2005 (70 CFR 46366). This population includes animals found along the Alaska Peninsula and Bristol Bay coasts as well as the Aleutian, Barren, Kodiak, and Pribilof islands. An estimated 9,000 sea otters inhabit the Aleutian Islands (Allen and Angliss 2010). Critical habitat was designated for this stock throughout its range, and is defined as all contiguous waters from the mean high tide line to the 20-meter (65.6-foot) depth contour as well as waters within 100 meters (328 feet) of the mean high tide line that occur adjacent to the island (74 CFR 51987).




Sea otters occur in nearshore coastal waters, generally less than 40 meters (128 feet) in depth and 1 to 2 kilometers (0.6 to 1.2 miles) from shore since they need frequent access to subtidal and intertidal zones for feeding (Green and Brueggeman 1991). Sea otters mainly eat benthic invertebrates, including sea urchins, crabs, octopus, mussels, and some bottom fishes in rocky substrates and clams in soft substrates. Sea otters are commonly observed year round in areas where large kelp beds are present. Kelp forests (less than 20 meters [64 feet] deep) offer protection from marine predators and provide important prey resources for sea otters. **Figure A-4** shows kelp beds present at the runway ends.

Humpback whale. The humpback whale was listed as endangered in 1970. However, in 2016, NMFS published a final rule that recognized 14 DPSs, designating 4 of these as endangered and 1 as threatened. An analysis of migration between overwintering areas and summer feeding areas concluded that whales feeding in Alaskan waters belong primarily to the Hawaii DPS (recovered), with small numbers of Western North Pacific DPS (endangered) and Mexico DPS (threatened) individuals (Wade et al. 2016). Critical habitat for the Western North Pacific DPS and Mexico DPS has been proposed, but not finalized (84 Federal Register [FR] 54354). Previous surveys have indicated that humpback whales are not likely to occur in the study area except possibly when they migrate through Unimak Pass in spring and fall (CH2MHILL 2012).





Kelp Beds at Runway Ends*

-  Existing kelp bed
-  Kelp bed lost to RSA extension project
-  Potential kelp bed habitat created by RSA extension project

0 260
Feet

*Source: CH2MHILL 2012

Sea Otter Critical Habitat
All contiguous waters within 100 m of Mean High Tide Line (MHTL) adjacent to the island, and all waters between the MHTL down to the 20-m depth contour

FIGURE A-4

A.2.6.2 Birds

Two species of birds appear on the federal Endangered Species List in the Unalaska-Dutch Harbor area: short-tailed albatross (endangered), and Steller's eider (threatened). Kittlitz's murrelet and yellow-billed loons are candidate species that occur in the area. Short-tailed albatross occur in the offshore marine waters around Unalaska Island, and are unlikely to be found near the project area (Platt et al. 2006).

Steller's eider can occur in the project area during winter (November through March), and large numbers have been observed southwest of the airport in Unalaska Bay and off the eastern and northeastern edges of the airport in Dutch Harbor (CH2MHILL 2012). Steller's eider use shallow nearshore waters to dive for prey, predominantly benthic invertebrates. The distribution of Steller's eiders in the area is affected by the nutrient-rich gurry outfalls from local fish processors in Unalaska Bay southwest of the airport, and at the base of the spit in Dutch Harbor on the Iliuliuk Bay side (Reed and Flint 2007; CH2MHILL 2012). The current population of Steller's eider is estimated at 220,000 birds, most of which nest in Russia (USACE 2018). Approximately 150,000 birds winter in Alaska in the shallow nearshore waters from the eastern Aleutian Islands to Lower Cook Inlet. The Alaska breeding population of Steller's eider was federally listed as threatened in 1997. In 2001, the USFWS designated critical habitat for the Alaska breeding population of Steller's eider on the Yukon-Kuskokwim Delta and in marine waters of Southwest Alaska. There is no critical habitat designated in Unalaska Bay or Dutch Harbor (USACE 2018).

The State of Alaska no longer maintains a Species of Special Concern list; however, other federal agencies and non-governmental organizations (e.g. Audubon Alaska) list species of conservation concern. Studies for the 2012 EA identified 41 out of the 141 bird species believed to occur in the Dutch Harbor-Unalaska area that were listed by one or more organization (ABR 2010:16). Of these, 29 species of conservation concern occur commonly in the area, including several waterfowl and shorebird species that occur seasonally in habitats on or immediately adjacent to the airport. These species include emperor geese, harlequin duck, long-tailed duck, black oystercatcher, wandering tattler, sanderling, western sandpiper, rock sandpiper, and dunlin (ABR 2010:16). The 20 remaining species occur primarily in deeper waters farther from the airport.

A.3 Climate

Scientific research is ongoing to better understand climate change, including any incremental atmospheric impacts that may be caused by aviation. Uncertainties are too large to accurately predict the timing, magnitude, and location of aviation's climate impacts; however, the FAA has identified that minimizing greenhouse gas (GHG) emissions and identifying potential future impacts of climate change are important for a sustainable national airspace system.

Climate conditions in Alaska are changing faster than in other areas of the United States. The Intergovernmental Panel on Climate Change identified the following vulnerabilities for island communities around the world: sea level rise, coastal erosion, increased storminess, isolation from emergency response, less access to federal and state resources, and rapid shifts in fish stocks and ocean life (ABSI 2014). The Aleutian-Bering Sea Islands region has already noticed changes to weather patterns as well as fish and marine mammal

movements (ABSI 2014). Regional vulnerabilities include changes to commercial fishing, subsistence harvests, and cultural resources as well as impacts to infrastructure. These could lead to increased spread of invasive species, spread and prevalence of pathogens, increased vessel traffic from Arctic development, and broad socioeconomic changes.

A.4 Coastal Resources

Alaska withdrew from the voluntary National Coastal Zone Management Program on July 1, 2011; therefore, the Coastal Zone Management Act federal consistency provision no longer applies in Alaska. Federal agencies no longer provide consistency determinations.

A.5 Hazardous Materials and Solid Waste

A.5.1 Hazardous Materials

An inventory of potential contamination, underground storage tanks, and leaking underground storage tanks was conducted through a review of Alaska Department of Environmental Conservation (ADEC) databases in September 2020. **Figure A-5** shows hazardous material sites on airport property.

- The ADEC hazardous waste contaminated sites map and database (ADEC 2020) identifies four active sites on at the airport: the DOT&PF Snow Removal Equipment Building (SREB), the MarkAir (later known as the PenAir) hangar, the Aerology Building, and the “old shop and control tower” (suspected mercury contamination).
- The ADEC database (ADEC 2020) identifies several active sites off airport property but within the immediate vicinity of the airport: Delta Western Dock Pipelines, Pre-WWII Tank Farm, Warehouse WWII B 551, and Aqua Fuel System #1. The City Power Plant site status was changed to Cleanup Complete, with Institutional Controls, in 2016.

Any future analyses of hazardous materials for this project should consider the following applicable statutes and regulations: Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 United States Code [USC] 9601, et seq.; and Oil Pollution Act of 1990, 33 USC 2701, et seq.

A.5.2 Solid Waste

Solid waste generated throughout Unalaska is disposed of at the Unalaska Municipal Solid Waste Landfill, located at 1181 Summer Bay Road on Unalaska Island. While it is across Iliuliuk Bay, it is still within 10,000 feet of the airport, which is the minimum distance between public airports and landfills preferred by FAA due to their tendency to attract hazardous wildlife, especially birds. See **Figure A-6**.





A.6 Historical, Architectural, Archaeological, and Cultural Resources

Federally-funded improvements to the airport would be considered a federal undertaking subject to compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. Section 106 requires federal agencies to take into account the effects of their undertakings on historic properties (36 CFR 800.1[a]). Historic properties are any prehistoric or historic district, site, building, structure, object, or traditional cultural property included in or eligible for inclusion on the National Register of Historic Places (NRHP) (36 CFR 800.16(l)(1)).

Under 36 CFR 800.16(d), the Area of Potential Effect (APE) is defined as “the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historical properties, if any such properties exist.” Since the project is in the early development stage and changes to design and other factors may occur that would change the APE, the limits of the APE in this study are broad and include: the area immediately surrounding the runway; the area to the northeast of the runway covered by Tundra Drive; and the area up to approximately 500 meters south of the runway along the isthmus of Amaknak Island, including the fuel dock (**Figure A-7**).

Based on a review of the Alaska Heritage Resources Survey (AHRS) database (ADNR 2020), cultural resources have been documented within the proposed APE. These resources depict a long history of human occupation of the region and include prehistoric archaeological sites and those associated with World War II. The documented resources are summarized below in **Table A-4** and shown on **Figure A-7**. Additional information on the history of Amaknak Island can be found in the 2012 EA (CH2M Hill 2012).

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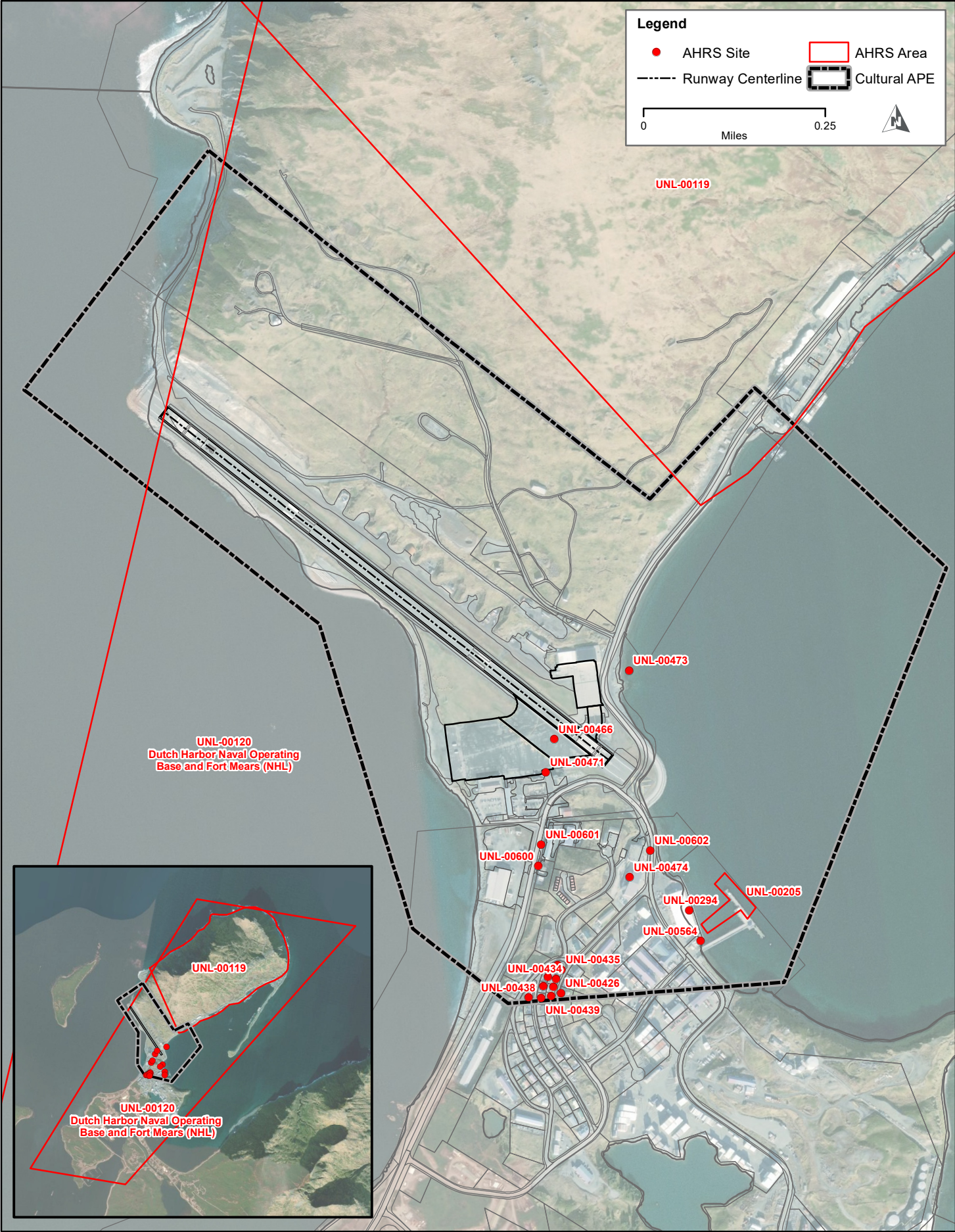


Table A-4: AHRs Sites within the APE

AHRs Number	Property/Site Name	NHRP Eligibility	Site Type	Description
UNL-00105	Airport Flake Site	No evaluation	Archaeological	South end of site disturbed during World War II hangar and revetment excavation; blade and flake artifacts suggest continuity with Anangula of mid-Holocene.
UNL-00114	Powerhouse Flake Site	No evaluation	Archaeological	Approximately 90 artifacts have been collected, including flakes and blades.
UNL-00119	Fort Schwatka	Contributing property to UNL-00120	Building	Center point of the coastal defense system; site contains remains of World War II coastal defense and coastal artillery quarters.
UNL-00120	Dutch Harbor Naval Operating Base and Fort Mears, U.S. Army	National Historic Landmark, Criteria A and D	District	When Japan attacked Pearl Harbor on December 7, 1941, the Naval air station at Dutch Harbor and the adjacent Army post, Fort Mears, on Amaknak Island, were the only U.S. defenses on the 1,220-mile Aleutian Island Chain.
UNL-00123	Airport Buried Site	No evaluation	Archaeological	Now buried midden site that was exposed during road work; remnants of the site are likely situated beneath current roadbed.
UNL-00124	Airport Beach "Site"	No evaluation	Archaeological	Re-deposited site of midden deposits from UNL-00054 and UNL-00123; artifacts and faunal remains were noted.
UNL-00205	Delta Western Fuel Dock	Contributing property to UNL-00120	Structure	Initially supported vessels associated with the seal harvest; later was Unalaska's principal fueling station and supported military activities, whaling vessels, and boats transporting gold prospectors.
UNL-00293	Airport Not Buried Site	No evaluation	Archaeological	Site composed of a small hill with a World War II structure on top; artifacts and flakes were exposed by construction.
UNL-00294	Dutch Harbor Townsite	Eligible, Criterion D	Townsite	Original townsite of Dutch Harbor.
UNL-00316	Ballyhoo Antenna Site	No evaluation	Archaeological	A light scatter of large blades and flakes eroding out of blowouts; seem to be eroding from stratum associated with Mt. Makushin,

Table A-4: AHRs Sites within the APE

AHRs Number	Property/Site Name	NHRP Eligibility	Site Type	Description
				circa 8,000 – 9,000 years Before Present.
UNL-00426	Building 521 Former Commanding Officer's Quarters, Admiral's House	Contributing property to UNL-00120	Building	House was built in 1942 as the Commanding Officer's Quarters.
UNL-00432	Roraback House 2, House #5	Contributing property to UNL-00120	Building	One of 40 duplex residences built to house officers' families in the defense housing area, 1941-1942.
UNL-00433	House #4	Contributing property to UNL-00120	Building	One of 40 duplex residences built to house officers' families in the defense housing area, 1941-1942.
UNL-00434	House #3	Contributing property to UNL-00120	Building	One of 40 duplex residences built to house officers' families in the defense housing area, 1941-1942.
UNL-00435	FDOC House, House #2	Contributing property to UNL-00120	Building	One of 40 duplex residences built to house officers' families in the defense housing area, 1941-1942.
UNL-00436	House #1	Contributing property to UNL-00120	Building	One of 40 duplex residences built to house officers' families in the defense housing area, 1941-1942.
UNL-00437	Alyeska Seafoods House, House #9	Contributing property to UNL-00120	Building	One of 40 duplex residences built to house officers' families in the defense housing area, 1941-1942.
UNL-00438	House #10	Contributing property to UNL-00120	Building	One of 40 duplex residences built to house officers' families in the defense housing area, 1941-1942.
UNL-00439	House #11	Contributing property to UNL-00120	Building	One of 40 duplex residences built to house officers' families in the defense housing area, 1941-1942.
UNL-00457	House #16	Contributing property to UNL-00120	Building	One of 40 duplex residences built to house officers' families in the defense housing area, 1941-1942.
UNL-00466*	Torpedo Bombsight and Utility Shop Building 423	Contributing property to UNL-00120	Building	Prepared torpedoes for loading onto aircraft, and repaired and stored torpedo bombsights and portable precision optical devices; a loft located in the tower was used to pack and store parachutes.
UNL-00471	Aerology Building	No evaluation	Building	No description.
UNL-00473	<i>Eliza Anderson</i> Sidewheel Steamship Wreck	No evaluation	Shipwreck	The boiler and engine remains of the <i>Eliza Anderson</i> , a side-wheel

Table A-4: AHRs Sites within the APE

AHRs Number	Property/Site Name	NHRP Eligibility	Site Type	Description
				steamship that was abandoned in Dutch Harbor in 1898.
UNL-00474	Building 400, Naval Laundry Facility	No evaluation	Building	No description.
UNL-00564	Building 503, Booster Heating Station	Contributing property to UNL-00120	Building	Housed equipment used to heat oil as it passed through fuel lines in support of base operations.
UNL-00600	Torpedo Assembly Annex Building 447	Contributing property to UNL-00120	Building	Built during the Aleutian Campaign, and associated with the defense of Dutch Harbor and Unalaska.
UNL-00601	Torpedo Assembly-Aviation Supply, Building 443	Contributing property to UNL-00120	Building	Built during the Aleutian Campaign, and associated with the defense of Dutch Harbor and Unalaska.
UNL-00602	Powerhouse, Building 409	Contributing property to UNL-00120	Building	Completed in 1942 and supported Naval Operating Base operations.

Source: ADNR, 2020.

* In 2014, the FAA recommended this site for demolition in order to mitigate safety risks. The AHRs database has not been updated to reflect whether the building was demolished (FAA 2014).

Amaknak Island was a vital World War II outpost. Construction began in July 1940, and it was the only base in existence on the Aleutian Island Chain during the Pearl Harbor bombing attack in 1941. On June 3 and 4, 1942, the Japanese attacked both Midway Island and Amaknak Island. For Amaknak Island, it became known as the “most serious air attack on North American territory during the war” (NPS 1984:4). Subsequently, Dutch Harbor naval air station expanded to a naval operating base and served as a defensive feature to identify Soviet vessels and act as an anchorage for U.S. Naval ships (NPS 1984).

The Dutch Harbor Naval Operating Base and Fort Mears (UNL-00120) is a large site that encompasses nearly all of Amaknak Island. In 1985, the site was designated as a National Historic Landmark (NHL) as it was the farthest west U.S. Naval and Army base in Alaska when the Japanese attacked the Aleutians in 1942 (NPS 2020). Since its original NHL nomination, additional buildings and structures as well as Fort Schwatka (UNL-00119), all located within the boundaries of the APE, have been determined to be contributing elements to the original NHL.

Within the NHL’s boundaries, Amaknak Island can be broken into four prominent regions: 1) Ulakta Head or “Fort Schwatka” (UNL-00119), 2) Dutch Harbor Naval Operating Base (proper) (UNL-00120), 3) Fort Mears (proper) (UNL-00121), and 4) Hill 400 or “Bunker Hill” (UNL-00122). Both Ulakta Head and Hill 400 incorporate a steep-sloped environment with World War II coastal defenses lining the elevated areas that once protected the land. These are located at the north and south end of the island, respectively. Hill 400 (UNL-00122) is also referred to as “Little South America” based on similarity in shape to the geographical feature on the globe. Of these two regions, only Ulakta Head (UNL-00119) falls within the APE, just beyond the northeast end of the runway.

Dutch Harbor Naval Operating Base (proper) (UNL-00120) and Fort Mears (proper) (UNL-00121) are located along the long isthmus near the center of the north-south running island. The operating base contains much of the area intensively constructed during World War II, including hangars, wharves, storehouses, barracks, and a hospital. Also included in this region is the 4,385-foot-long Navy runway, which has become the commercial runway used today (NPS 1984).

In addition to the buildings and structures associated with the Dutch Harbor Naval Operating Base (UNL-00120), other documented cultural resources within the APE include prehistoric archaeological sites. Archaeological evidence documented on the island indicates that humans have lived there for as long as 9,000 years (Knecht and Davis 2001, in CH2MHILL 2012). Documented archaeological resources within the APE include six unevaluated archaeological sites with lithic debitage and the original townsite for Dutch Harbor (UNL-00294). The townsite (UNL-00294) dates between 1890 and 1942, and was determined eligible for listing on the NRHP. The 1898 shipwreck, the Eliza Anderson (UNL-00473), is plotted within 125 meters of the southeast end of the Unalaska Airport runway (see **Figure A-7**). The Eliza Anderson has not had a Determination of Eligibility, although it has been recommended that the remains of the vessel are eligible for the NRHP (Roger 2011). Additional research on the shipwreck may be needed because its geographical location reported on the AHRS database is imprecise.

To consider potential indirect impacts of the Unalaska Airport improvements, documented sites within 1/2 mile of the APE were identified (see **Table A-5**). This resulted in a list of 52 documented resources, most of which are buildings or structures associated with World War II and considered as contributing properties to the Dutch Harbor Naval Operating Base (UNL-00120) NHL. Of the archaeological sites identified within 1/2 mile of the APE, only two have been evaluated for listing on the NRHP and both were determined not eligible. Also located within 1/2 mile of the APE is the Sitka Spruce Plantation (UNL-00074), an NHL listed on the NRHP for being the oldest recorded afforestation project in North America (1805). It is located approximately 1/2 mile south of the southeastern extent of the Unalaska Airport runway. An AHRS site labelled UNL-00563 is also located within 1/2 mile of the APE; however, the data for this site in the AHRS database is incomplete and it is unknown what the site entails or if it is historic or pre-contact in nature.

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Table A-5: AHRs Sites within 1/2 Mile of the APE

AHRs Number	Property/Site Name	NHRP Eligibility	Site Type
UNL-00018	Xatacxan	No evaluation	Archaeological
UNL-00054	Amaknax	No evaluation	Archaeological
UNL-00074	Sitka Spruce Plantation	Listed, NHL, Criterion A	Historic
UNL-00113	Dutch Harbor Naval Radio Station	Contributing property to UNL-00120	Building
UNL-00121	Fort Mears	Contributing property to UNL-00120	Building
UNL-00401	House #39	Contributing property to UNL-00120	Building
UNL-00423	House #32	Contributing property to UNL-00120	Building
UNL-00427	Roraback House 1	No evaluation	Building
UNL-00429	House #8	Contributing property to UNL-00120	Building
UNL-00430	House #7	Contributing property to UNL-00120	Building
UNL-00431	House #6	Contributing property to UNL-00120	Building
UNL-00440	Sundholm House, House #12	Contributing property to UNL-00120	Building
UNL-00441	House #13	Contributing property to UNL-00120	Building
UNL-00442	House #14	Contributing property to UNL-00120	Building
UNL-00443	Fishing Company of Alaska House, House #15	Contributing property to UNL-00120	Building
UNL-00444	Peterson House, House #40	Contributing property to UNL-00120	Building
UNL-00446	House #34	Contributing property to UNL-00120	Building
UNL-00447	House #38	Contributing property to UNL-00120	Building
UNL-00448	House #37	Contributing property to UNL-00120	Building
UNL-00449	House #36	No evaluation	Building
UNL-00450	House #23	Contributing property to UNL-00120	Building
UNL-00451	House #22	Contributing property to UNL-00120	Building
UNL-00452	House #21	Contributing property to UNL-00120	Building
UNL-00453	McClain House, House #20	Contributing property to UNL-00120	Building
UNL-00454	House #19	Contributing property to UNL-00120	Building
UNL-00455	UNL-00455 House	No evaluation	Building
UNL-00456	Shield House, House #17	Contributing property to UNL-00120	Building
UNL-00458	House #24	Contributing property to UNL-00120	Building
UNL-00459	Pound House, House #33	Contributing property to UNL-00120	Building
UNL-00460	Napper House, House #25	Contributing property to UNL-00120	Building
UNL-00461	House #27	Contributing property to UNL-00120	Building

Table A-5: AHRs Sites within 1/2 Mile of the APE

AHRs Number	Property/Site Name	NHRP Eligibility	Site Type
UNL-00462	Mahoney House, House #28	Contributing property to UNL-00120	Building
UNL-00463	House #29	Contributing property to UNL-00120	Building
UNL-00464	House #30	Contributing property to UNL-00120	Building
UNL-00465	Ramberg House, House #35	Contributing property to UNL-00120	Building
UNL-00472	Strawberry Hill	No evaluation	Archaeological
UNL-00557	UNL-00557	No evaluation	Archaeological
UNL-00558	UNL-00558	No evaluation	Archaeological
UNL-00559	Rocky Point	Not Eligible (Archaeological)	Archaeological and Historic
UNL-00560	UNL-00560	No evaluation	Archaeological
UNL-00562	UNL-00562	No evaluation	Archaeological
UNL-00563*	UNL-00563	No evaluation	Unknown
UNL-00569	Valve House H	Contributing property to UNL-00120	Building
UNL-00571	Steam Plant Building 627	Contributing property to UNL-00120	Building
UNL-00572	UNL-00572	Not Eligible	Archaeological
UNL-00579	Fort Mears Hospital	Contributing property to UNL-00120	Building
UNL-00581	Unalaska Pill Boxes	Contributing property to UNL-00120	Structure
UNL-00584	Fort Mears Building #884, Marine Garage	Contributing property to UNL-00120	Building
UNL-00585	UNL-00585	Contributing property to UNL-00120	Structure
UNL-00586	UNL-00586	Contributing property to UNL-00120	Structure
UNL-00587	UNL-00587	Contributing property to UNL-00120	Structure
UNL-00588	UNL-00588	Contributing property to UNL-00120	Structure

Source: ADNR, 2020

*This site has no information on the AHRs card and associated reports. Further investigation will be necessary to identify if the site exists geographically or if it was meant to be voided within the AHRs system.

A.7 Department of Transportation Act, Section 4(f)

Section 4(f) of the U.S. Department of Transportation Act of 1966 precludes the use of protected resources for transportation purposes unless there is no feasible and prudent alternative. Protected resources include public parks; recreational areas; wildlife and waterfowl refuges of federal, state, or local significance; and historic sites of federal, state, or local significance. In addition to physical use of the resource, the term “use” also includes “constructive use,” meaning that the action:

...does not incorporate land from a Section 4(f) property, but the project’s proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the property are substantially diminished. 23 CFR 774.14

Resources in the study area that fall under Section 4(f) include the Alaska Maritime National Wildlife Refuge, the Dutch Harbor Naval Operating Base and Fort Mears NHL described in Section 4.6, and Sitka Spruce Park.

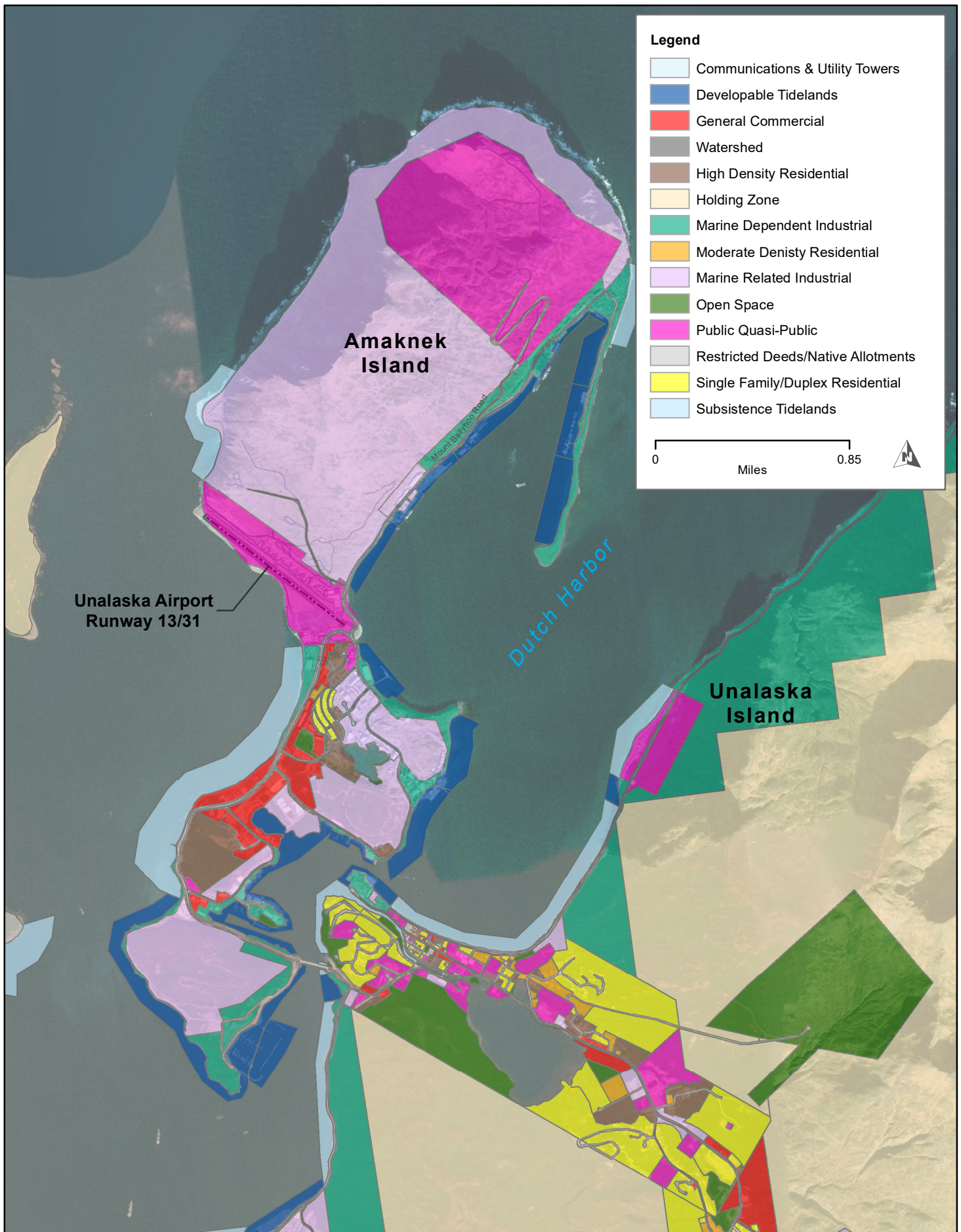
Although much of the Aleutian Chain is within the Alaska Maritime National Wildlife Refuge, Ounalashka Corporation land and the City of Unalaska are excluded from the Refuge. The airport property was owned by the Ounalashka Corporation, the regional Native corporation formed under the Alaska Native Claims Settlement Act (ANSCA) in 1971, which deeded surface rights to the DOT&PF in 1980.

Sitka Spruce Park is a local neighborhood park located approximately 1/2 mile southwest of the airport on Airport Beach Road.

A.8 Land Use

The Unalaska Airport is located on Developed Land marked for Institutional Use (City of Unalaska 2014a). It is zoned as Public/Quasi-Public (City of Unalaska 2014b). Institutional land uses are a major land use category in Unalaska, comprising approximately 16% of Unalaska’s Developed Land in 2014, and accounts for city government functions, including all government buildings (except utility buildings), as well as the health clinic, airport, schools, churches, and post offices (City of Unalaska 2014a). The airport, located on the Amaknak Island side, comprises the largest area Institutional land use in Unalaska (City of Unalaska 2014a).

The shoreline immediately north and south of the airport on the Unalaska Bay side are Tideland Water, Open Space and are zoned Subsistence Tidelands (City of Unalaska 2014a, 2014b). The shoreline immediately north and south of the airport on the Dutch Harbor side are Tideland Water, Vacant and are zoned Developable Tidelands (City of Unalaska 2014a, 2014b). **Figure A-8** shows the city land use and zoning map in the project vicinity.



A.9 Natural Resources and Energy Supply

A.9.1 Natural Resources

Natural resources available for use at the Unalaska Airport would be limited to fill materials. Past projects have used a borrow material site on airport property north of the runway and multiple material pits owned by the Aleut Regional Corporation and operated by the Unalashka Corporation within 3 to 6 miles of the airport. Unused materials from past airport construction projects are stockpiled on site and would be available for use.

Building materials and supplies are typically brought in by barge. Depending on the source, the transportation of materials to Unalaska could require a substantial amount of fuel.

A.9.2 Energy Supply

Electricity at the Unalaska Airport is provided by the City of Unalaska and generated by two diesel-fueled generating plants. A new facility was constructed adjacent to the airport (next to the original powerhouse constructed by the military during World War II) in 2010, with an installed capacity of 16.6 megawatts (MW). A smaller plant located in Unalaska Valley has an installed capacity of 1 MW.

The City of Unalaska has installed heat recovery generators at the power plant to generate electricity, and proposes installing microturbines in a water treatment plant to provide its electrical needs and provide excess to the city's main power grid.

Aviation gas and other bulk fuels are provided by three companies—Delta Western Fuel, North Pacific Fuel, and Offshore Systems—with a combined storage capacity of approximately 18 million gallons.

A.10 Noise and Compatible Land Use

A.10.1 Noise

Day-night average sound level (DNL) contours were developed in 2009 to assess the significance of noise impacts and to establish land compatibility guidelines as part of the 2012 EA (CH2MHILL 2012). Per FAA guidelines, most land uses are compatible with sound levels of DNL 65 dBA or less. The DNL 65 contours at the airport were generally restricted to the airfield and immediate vicinity for both the existing (2009) and proposed RSA extension projects (constructed in 2014).

A.10.2 Compatible Land Use

The compatibility of existing and planned land uses near an airport are typically associated with the extent of the airport's noise impacts. The noise analysis performed in 2009 demonstrated that the existing and planned uses near the airfield (within the 65 DNL contour) were not noise sensitive.

Lands north of the airport property are zoned for marine related/industrial use. Lands immediate south of the airport are zoned for general commercial, marine dependent/industrial use, subsistence tidelands, developable tidelands, and high density residential. Future land uses within these zones would likely be compatible with airport

noise levels, except for high density residential, which includes residential, schools, churches, and hospitals that are not compatible with noise levels above DNL 65. General commercial zoning allows for mobile home parks and residential dwellings as conditional uses, which would also not be compatible with noise levels above DNL 65.

A.11 Socioeconomics, Environmental Justice, and Children’s Environmental Health and Safety Risks

A.11.1 Socioeconomics

Unalaska’s economy is dominated by the fishing industry, with jobs provided by fishing vessels, on-shore processors, and support industries. Until the 1980s, the primary commercial fishery in the area was king crab, which was suspended in the early 1980s. In subsequent years, fisheries have been re-established for a number of groundfish and other shellfish, with openings occurring throughout the year. This diversification has resulted in a shift from fishing being a seasonal industry to a year-round industry, supporting a more stable and permanent residential population. Dutch Harbor is currently the top-ranked U.S. port in volume of commercial fish landed, a position it has held since 1988. It often ranks among the top three ports for value of fish landed as well (McKenney 2020; NOAA Fisheries 2020). Unalaska also has a developing tourism industry, with cruise ship stopovers, sport fishing, kayaking, and bird watching attracting visitors.

Unalaska is the 28th most populous city in Alaska (Cubit 2020). Based on the 2018 American Community Survey (ACS) 5-year estimates, the current population in Unalaska is 4,781, up from 4,376 in the 2010 U.S. Census (ADCCED, DCRA 2020; ADLWD 2020a; U.S. Census Bureau 2018, 2020). During peak fishing season, seasonal employees can increase the population to more than 10,000.

Although employment data is not available for Unalaska, the 2018 ACS 5-year estimates reported that 35 percent of employment in the Aleutians West Census Area, of which most live in Unalaska, is related to manufacturing, which includes fishing and fish processing. Other strong employment sectors include government (17 percent), transportation (14 percent), and trade (9 percent) (U.S. Census Bureau 2018, 2020). The unemployment rate in the Aleutians West Census Area in August 2020 was 2.2 percent (ADLWD 2020b). These statistics are affected, however, by seasonal employment and fluctuations in the fishing industry. Based on the 2018 ACS 5-year estimates, the median per capita income in Unalaska was \$37,404 and the median household income was \$92,273 (U.S. Census Bureau 2018, 2020).

Unalaska has a diverse population, with the primary races reported in the 2018 ACS 5-year estimates being white (25 percent), Asian (46 percent), and Hispanic (14 percent) with other races comprising the remaining 15 percent (U.S. Census Bureau 2018, 2020). American Indians and Alaska Natives compose approximately 3 percent of the population (U.S. Census Bureau 2018, 2020).

Most properties in Unalaska are rental properties, with 78 percent of the 1,175 total housing units being renter-occupied (U.S. Census Bureau 2018, 2020). A number of employers also provide housing (66 percent of housing is multi-unit) for seasonal employees (U.S. Census Bureau 2018, 2020).

A.11.2 Environmental Justice

FAA Order 1050.1F and Chapter 10 of the *FAA Desk Reference* require the analysis to address whether a proposed action would result in any disproportionately high and adverse impacts on minority and/or low-income populations when compared to the No Action Alternative. As mentioned in A.11.1, Unalaska has a diverse population, with the 2018 ACS 5-year estimate reporting that 75 percent of the population is not white (U.S. Census Bureau 2018, 2020). The 2018 ACS 5-year estimates also reports that 7.2 percent of individuals have incomes below the poverty level (U.S. Census Bureau 2018, 2020), qualifying them as low-income under US DOT Order 5610.2, *Environmental Justice in Minority Populations and Low-Income Populations*.

A.11.3 Children's Environmental Health and Safety Risks

No schools or childcare facilities are located in the study area, or on Amaknak Island, and the nearest playground is at Sitka Spruce Park, located more than 1/2 mile from the airport. Residences located near the study area may have children, who may congregate outside, and may be affected by changes in noise and air quality, if any occur.

A.12 Visual Effects

Unalaska airport is located on a flat, low-lying area of Amaknak Island, surrounded by industrial and commercial uses and dominated by the profile of Mount Ballyhoo. Light levels in the area are considered consistent with a small, commercial airport.

Visual effects that would occur from any proposed project would be examined to determine potential impacts to sensitive viewers and viewsheds, most notably those important and contributing to the Dutch Harbor Naval Operating Base and Fort Mears NHL (UNL-00120). The central part of the NHL contains the runway; lands adjacent to it; and facilities such as the airplane holding areas, the seaplane ramp and historic buildings (see discussions of cultural and Section 4(f) resources in Sections 4.6 and 4.7, respectively).

A.13 Water Resources

The following section addresses water resource issues, including wetlands and Waters of the U.S., surface and ground waters, floodplains, and water quality issues.

A.13.1 Wetlands

No potentially jurisdictional wetlands have been identified in the airport study area. However, the marine habitats of Unalaska Bay and Dutch Harbor are Waters of the U.S. Their characteristics are described under Section 4.2.1, Marine Environment.

A.13.2 Floodplains and Storm Surge

The Federal Emergency Management Agency (FEMA) has no floodplain data for Unalaska. The City of Unalaska's Hazard Mitigation Plan indicates that typical minor flooding events, most of which occur from rainfall and snowmelt run-off, occur at Iliuliuk River, Iliuliuk Lake, Lake Ilulaq, Summers Bay, Broad Bay and Nateekin Bay (City of Unalaska 2013:5-28). The airport study area is not included. There is no data identifying a 500-year flood threat in Unalaska (City of Unalaska 2013:5-29).

Storm surge is coastal flooding that can occur when the sea is driven inland above the high-tide level onto land that is normally dry. Heavy surf conditions driven by high winds can add to the flooding water's force and cause shoreline erosion (City of Unalaska 2013:5-25). Storm surge on the east side of the study area is considered minimal due to nearshore deep water and because storm tracks in the Bering Sea move from the west and typically north from Dutch Harbor (CH2MHILL 2012:4-2). However, wave runoff on the Runway 12 end (now designated Runway 13) and along the western edge of the runway in Unalaska Bay has caused shoreline erosion (CH2MHILL 2012:4-2). An artificial reef was installed around the runway in Unalaska Bay to dissipate waves and reduce the frequency of overtopping. The extension of the Runway Safety Area (RSA) west into Unalaska Bay in 2015 placed fill and rip rap along the Unalaska Bay shoreline. The RSA extension length was limited due to the presence of kelp beds, which are highly productive nursery areas for juvenile fish and invertebrates.

A.13.3 Water Quality

There are no freshwater surface waters on the airport property. The marine water bodies on either side of the airport are listed as Category 4a Waters – Impaired, with an established total maximum daily load (TMDL). TMDL limits establish amounts of pollutants that waters can receive while maintaining compliance with applicable water quality standards.

South Unalaska Bay was initially placed on the 303(d) list of impaired waterbodies in 1994 as Category 5 due to discharges from fish processing facilities. TMDLs were established for biochemical oxygen demand (BOD) and settleable solids in 1995, and the bay is currently designated a Category 4a waterbody (Impaired with an established TMDL).

Dutch Harbor had been initially placed on the 303(d) list in 1994 as Category 5 due to petroleum hydrocarbon contamination, specifically polycyclic aromatic hydrocarbons (PAHs) in bottom sediments from historical spills and current operations at the docks and harbors. ADEC developed a TMDL for petroleum hydrocarbons and oil and grease, and the water body was delisted in 2010 to be Category 4a. Bottom sediments at the north end of Dutch Harbor and an area around the Delta Western Dock have PAH concentrations that exceed threshold levels, and remain areas of impairment.

The airport operates under a Multi-Sector General Permit (MSGP) for Industrial Activities. The airport Stormwater Pollution Prevention Plan (SWPPP) required under the MSGP was updated most recently in 2011. The airport deicing agent use is below the monitoring and reporting thresholds; therefore, no water quality data from airport runoff is collected (CH2MHILL 2012).

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