4.0 Affected Environment

Consistent with FAA Order 5050.4B, Paragraph 706e, this chapter ". . .describes only those environmental resources the Proposed Action and its reasonable alternatives, if any, are likely to affect." This chapter summarizes these environmental resources as they are listed in the FAA Desk Reference.[26] Appendices E-1 through E-9 provide more detailed information about environmental resources in the Airport environs.

Three resource categories identified in the Desk Reference, Coastal Barriers, Farmlands, and Wild and Scenic Rivers, are not found in the project area and are not discussed in this chapter. The remaining environmental resource categories as they relate to this project are described in the following subsections:

4.1 Floodplains and Storm Surge
4.2 Water Quality
4.3 Wetlands and Other Waters of the U.S.
4.4 Biotic Resources
4.5 Federally Listed Threatened or Endangered Species
4.6 Air Quality
4.7 Noise
4.8 Compatible Land Use
4.9 Coastal Zone Management
4.10 Light Emissions and Visual Effects
4.11 Historic Properties
4.12 Section 4(f) Resources
4.13 Social Impacts, Induced Socioeconomic Impacts and Environmental Justice
4.14 Hazardous Materials and Solid Waste
4.15 Energy Supply, Natural Resources and Sustainable Design

Consistent with FAA Order 5050.4B, this chapter also identifies past, present, and reasonably foreseeable actions that might contribute to significant environmental impacts when considered in combination with the Proposed Action (see Section 4.16).

4.1 Floodplains and Storm Surge

The project area does not include mapped floodplains, but the shoreline is subject to storm surges.[27] This section describes existing coastal flooding from storm surges and wave run-up. The National Oceanic and Atmospheric Administration (NOAA) defines storm surge as the rise in the water surface above normal water level on the open coast due to the action of wind stress and atmospheric pressure on the water surface. NOAA defines wave run-up as the rush of wave water up a slope or structure.

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26 Federal Aviation Administration. 2007. *Environmental Desk Reference for Airport Actions*. Office of Airports, Office of Airport Planning and Programming, Airports Planning and Environmental Division. APP-400. October.

27 The Federal Emergency Management Agency has no floodplain data for Unalaska (http://www.poa.usace.army.mil/en/cw/fld_haz/unalaska.htm). CH2M HILL consultation indicates that the City of Unalaska does not maintain floodplain data.

The National Hurricane Center notes that local bathymetry greatly affects the intensity of storm surge; shallow coastal waters enhance storm surge, while deep ocean depths inhibit surge.[28] According to DOT&PF coastal engineering staff, storm surge in the project area is minimal due to the nearshore deep water and because storm tracks in the Bering Sea tend to move from the west and gradually turn north away from Dutch Harbor.[29]

Wave run-up has caused shoreline erosion along runway end 12, and along the western edge of the runway in Unalaska Bay (see Exhibit 1-2). During strong storm conditions, wave run-up has also caused water to overtop the shoreline and bring water and debris onto the runway. An artificial reef was installed around the runway in Unalaska Bay approximately eight years ago to dissipate waves and reduce the frequency of the overtopping. Airport staff indicate that overtopping from wave run-up occurs off the northwest runway end adjacent to Unalaska Bay once or twice each winter.[30] In such events, the water overtops along the outer 600 ft of the runway and drains quickly from the pavement.

4.2 Water Quality

The Unalaska Airport is located on Amaknak Island between Dutch Harbor and Unalaska Bay. The northwest perimeter of the Airport lies on the shore of Unalaska Bay, while the southeast perimeter lies on Dutch Harbor shoreline. The complex shoreline of these two islands forms Iliuliuk Bay, which is located on the southeast side of Amaknak Island (Exhibit 4.2-1). Unalaska Bay and Iliuliuk Bay are classified as marine waters.[31] The tidal range in these waters averages about 3 ft. Water circulation is driven primarily by winds with surface currents running parallel to the east and west shorelines of Amaknak Island (at either end of the runway) at 5 to 15 cm/sec (one-half foot per second at the higher range). [32] Velocities are somewhat lower in Dutch Harbor and along the nearby shoreline at the south end of the runway. The current is typically north-to-south during the winter when the predominant winds are from the northwest.[33] The current runs in the opposite direction in the summer when the predominant winds are from the southwest. The flushing time (time required for replacement of 95 percent of the water volume) in these waters is estimated to vary between 20 to 50 days. [34] South Unalaska Bay was formerly a Category 5 (water quality impaired) water body due to discharges from numerous fish processing facilities. A total maximum daily load (TMDL) was established for biochemical oxygen demand (BOD) in 1995.[35] South Unalaska Bay is currently a Category 4a waterbody. Waterbodies are placed in Category 4a when a TMDL is developed and approved by USEPA such that, when implemented, full attainment of the water quality standards is expected for the specific impairment for which the TMDL was developed.

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28 National Hurricane Center. 2010. “Storm Surge Scales and Storm Surge Forecasting.” NOAA, National Weather Service. Online: http://www.nhc.noaa.gov/sshws_statement.shtml

29 CH2M HILL discussion with Mr. Harvey Smith, Statewide Coastal Engineer, State of Alaska DOT&PF, June 2, 2010.

30 CH2M HILL discussion with Mr. Steve Berninger, Unalaska Airport Manager June 3, 2010.

31 18 AAC 70, July 1, 2008.

32 CH2M HILL. 1994. *Circulation Study of Unalaska Bay and Contiguous Inshore Marine Waters.* Bellevue, Washington. August.

33 CH2M HILL, 1994.

34 CH2M HILL, 1994.

35 U.S. Environmental Protection Agency. 1995. *Total Maximum Daily Load (TMDL) for Biochemical Oxygen Demand (BOD5) in the Waters of South Unalaska Bay, Alaska.* USEPA Region 10, Seattle, Washington.

Source: Google Earth, 2009.

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Aerial View of Unalaska Airport and Marine Surroundings

Exhibit 4.2-1

Iliuliuk Bay, including Dutch Harbor, is listed on the 303(d) list of water quality limited waterbodies as a Category 5 waterbody (see Section 5.2.1.1, Regulatory Setting). Elevated levels of petroleum hydrocarbons, oil, and grease in the bay sediments (due primarily to industrial and urban runoff) are the primary reason for the listing. A Draft TMDL was published in May, 2010.[36] Although no water quality violations for petroleum hydrocarbons have been documented in the past several years, the Alaska Department of Environmental Conservation (ADEC) has established that the bottom sediments at two locations have concentrations of polyaromatic hydrocarbons (PAHs) that exceed the Threshold Effects Level (TEL)[37] of 1,684 micrograms per kilogram (µg/kg). These are identified as Areas of Impairment in Exhibit 4.2-2. As shown in the exhibit, there are two areas of impairment along the Dutch Harbor shoreline: the upper (northern) end of Dutch Harbor, and an area around the Delta Western Dock, the latter located about 1,000 ft from the southern end of the Airport runway. These areas both support extensive boat mooring and maintenance activity. PAHs can come from a number of sources including fuels spills.

The remaining shoreline areas were sampled less intensively by ADEC. They may contain sediments with elevated PAH levels and are therefore labeled as Impacted Areas (see Exhibit 4.2-2).[38] Although the areas of impairment are priority areas for control of PAHs, the impact areas are also considered areas for implementation of best management practices (BMPs) to reduce additional inputs of PAHs. It should be noted that two sediment samples collected near the south end of the runway (SD-09 and SD-38) each had sediment PAH concentrations that were less than 500 µg/kg, well below the TEL.[39]

Deicing operations typically occur at the Airport between October and April. When conditions dictate, Airport staff apply urea and/or potassium acetate to the runway and apron surfaces. The Airport operates under a Multi-Sector General Permit (MSGP) for Industrial Activities. The Airport's Stormwater Pollution Prevention Plan (SWPPP)[40] required under the MSGP was recently updated. Through the years, the Airport has continued to operate well under the monitoring and reporting threshold of 100 tons/year of urea or 100,000 gallons/year of glycol-based deicer, as required by the USEPA Industrial General Stormwater Permit. There is no monitoring and reporting threshold for potassium acetate under this permit. Therefore, there has been no requirement for the collection of water quality data from Airport runoff, and no such data have been collected. The SWPPP reports that the Airport typically uses 55 tons of urea and 10,000 gallons of potassium acetate per year.

36 Alaska Department of Environmental Conservation. 2010. *Total Maximum Daily Load (TMDL) for Petroleum Hydrocarbons in the Waters of Dutch Harbor and Iliuliuk Harbor in Unalaska, Alaska.* May.

37 The TEL is a sediment concentration below which toxic effects would rarely, if ever, be observed in sensitive species.

38 CH2M HILL consultation with Laura Eldridge, Alaska Department of Environmental Conservation, November 18, 2010.

39 Alaska Department of Environmental Conservation, 2010.

40 Alaska Department of Transportation and Public Facilities. 2011. *Stormwater Pollution Prevention Plan for: Unalaska Airport*, *Unalaska*, *Alaska.* Prepared by Jennifer Lindberg/DOT&PF. Online: http://www.dot.state.ak.us/stwdav/documents/SWPPP/Unalaska_SWPPP_SPCC_Web.pdf. June 22.

Legend:

- Area of Impairment
- Impacted Areas

SCALE IN FEET

0 1000 2000

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PAH-Impaired Areas in the Dutch Harbor Study Area (ADEC 2010)

Exhibit 4.2-2

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4.3 Wetlands and Other Waters of the U.S.

No wetlands, as defined by the U.S. Army Corps of Engineers (USACE), occur in the study area. USACE-defined Waters of the U.S. include the marine deep water habitats of Unalaska Bay and Dutch Harbor. These areas have not been surveyed as part of the National Wetlands Inventory (NWI).

The marine environment in the vicinity of the Airport is divided into two geographic areas, Unalaska Bay and Dutch Harbor (see Exhibit 4.2-1). For purposes of description, the physical habitat is divided into intertidal, shallow sub-tidal (4 to 30 ft below mean lower low water [MLLW]), and deeper sub-tidal (30 to 80 ft below MLLW) zones. Table 4.3-1 provides an overview of the marine environment in the vicinity of the Airport.

TABLE 4.3-1
Marine Environment by Zone

Zones	Characteristics of Marine Environment in the Airport Vicinity	
	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.	Dominated by acorn barnacles, with limpets, whelk, and blue mussels also present. Middle intertidal zone is dominated by thatched barnacles, with proliferating anemone, limpets, large chiton, and whelk. Lower inter tidal zone supports thatched barnacles and whelks.
Shallow Sub-tidal		
Topography	Riprap shoreline-armoring rock transitions into smaller boulders and then to gravel at a depth of about 20 ft. Gravel and sand extend throughout this zone.	The shallowest portion is mostly boulders and cobble. In deeper water, greater than 20 ft, 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 ft, the plant community is dominated by sieve kelp. Dragon kelp forms dense beds further off-shore, sometimes creating a surface canopy and an overstory in deeper water. The understory consists of sieve kelp, split kelp, and witch's hair. All rock surfaces not covered with these species are covered with either the encrusting algae, rusty rock, or the coralline encrusting alga, rock crust. Further offshore, dragon kelp diminishes, but understory plants, sieve kelp, split kelp, rusty rock, rock crust, and witch's hair growth continue.

TABLE 4.3-1
Marine Environment by Zone

Zones	Characteristics of Marine Environment in the Airport Vicinity	
	Dutch Harbor	**Unalaska Bay**
Animal life	Clam shells common to abundant in areas of gravel and sand. The most abundant large animals are green sea urchins, white plumed anemones, and sunflower stars.	Dominated by the large white plumed anemone, unidentified clams (evidenced by empty shells), sunflower stars and, in some areas, green sea urchins. 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		
Topography	Gravel and sand bottom at 30 ft in most places. Bottom generally transitions into sand at 40 to 50 ft, and shifts to silt in the 65- to 75-foot range.	Mostly gravel and sand with dominance shifting back and forth below 30 ft. Bottom shifts toward sand and silt as depth increases. Areas of sand at less than 40 ft are rippled into small dunes, indicating that wave action is affecting the bottom.
Plant life	Gravel in the 30- to 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 ft. Expansive areas in the 70- to 90-foot range on silt covered with a fluffy layer of white filaments that are probably bacterial growths.	At 30 to 40 ft, 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 ft, 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:
CH2M HILL analysis of underwater video shot in 2006 by Ocean Surveys, Inc.

4.4 Biotic Resources

Biotic resources in the Airport vicinity include fish, marine mammals, birds, terrestrial wildlife, and plants. This section provides an overview of the species found in this area. Appendix E-3 provides additional information on the bird species found in the Airport environs.

4.4.1 Fish

"Essential fish habitat" (EFH) is defined by NOAA's National Marine Fisheries Service (NMFS) as habitat used by one or more life history stages of a species and included in any one of the federal fishery management plans. NMFS identifies the species in Table 4.4-1 as managed by the North Pacific Fishery Management Council in Dutch Harbor and Unalaska Bay.[41]

TABLE 4.4-1
Essential Fish Habitat Species

Common Name	Scientific Name	Life Stage in Dutch Harbor and Unalaska Bay
Atka mackerel	*Pleurogrammus monopterygius*	Mature, late juvenile, larvae, eggs
Pacific cod	*Gadus macrocephalus*	Mature, late juvenile
Walleye pollock	*Theragra chalcogramma*	Mature, late juvenile
Rock sole	*Lepidopsetta biliniata*	Mature, late juvenile, larvae
Sculpin	Various genera	Mature, late juvenile, larvae, eggs
Forage fish complex	Various genera	Mature
Sockeye salmon	*Oncorhynchus nerka*	Marine juvenile, immature, maturing adult
Pink salmon	*O. gorbuscha*	Marine juvenile, immature, maturing adult
Coho salmon	*O. kisutch*	Marine juvenile, immature, maturing adult
Chum salmon	*O. keta*	Marine juvenile, immature, maturing adult
Chinook salmon	*O. tshawytscha*	Marine juvenile, immature, maturing adult
King crab	*Paralithodes camtschatica*	Late juvenile, larvae

Source:
National Marine Fisheries Service. 2010. Essential Fish Habitat Mapper Tool.
Online: http://sharpfin.nmfs.noaa.gov/website/EFH_Mapper/map.aspx

41 NOAA Fisheries Service. 2010. Essential Fish Habitat Mapper Tool.
Online: http://sharpfin.nmfs.noaa.gov/website/EFH_Mapper/map.aspx

Other fish species that have been identified in marine waters around Amaknak and Unalaska Islands[42] are listed below:

- Snake prickleback (*Lumpenus sagitta*)
- White spot greenling (*Hexogrammos stelleri*)
- Crescent gunnel (*Pholis laeta*)
- Smallmouth ronquil (*Bathymaster leurolepis*)
- Sturgeon poacher (*Agonus acipenserinus*)
- Arctic shanny (*Sitchaeus punctatu*s)
- Dolly varden (*Salvelinus malma*)
- Pacific sand lance (*Ammodytes hexapterus*
- Pacific sand fish (*Trichodon trichodon*)
- Masked greenling (*H. octogrammus*)

4.4.2 Marine Mammals

Table 4.4-2 provides an overview of the marine mammals found regularly or sporadically in the marine waters surrounding Amaknak and Unalaska Islands and the Bering Sea. The table lists each species status, habitat, prey, and listing under the federal Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA). Exhibit 4.4-1 identifies locations of haul-out sites for harbor seals in the project area. Threatened and endangered species are discussed in more detail in Section 4.5, Federally Listed Threatened or Endangered Species. Of the sixteen species listed in the table, seven are commonly found in these waters: harbor seal, Dall's porpoise, harbor porpoise, killer whale, gray whale, minke whale, and northern sea otter.

4.4.3 Birds

The bird community in the Unalaska area is representative of the marine environments of the eastern Aleutian Islands. Approximately 140 species of birds have been recorded in the region (see Attachment 1 in Appendix E-3); over half are species that spend most of their life cycle in marine, estuarine, or freshwater habitats. Twenty-two species of shorebirds, which use the interface between terrestrial and aquatic habitats, account for another 14 percent of the bird community. The diversity of land bird species is lower than on mainland Alaska, largely due to the treeless landscape, with many species recorded only as casual or rare occurrences. Forty-one bird species are known to breed in the area, including at least ten species of seabirds; five species of waterfowl; five species of raptors, including owls; four species of shorebirds; three species of gulls and terns; and fourteen species of land birds, including ptarmigan and raven. An additional four seabird species may breed in the Unalaska area, but have not been confirmed to do so.

Of the ten to fourteen species of seabirds that may breed in the region, many use the nearshore waters adjacent to the Airport, but no breeding colonies of seabirds are located nearby. Colonies within 2 miles of the Airport, composed primarily of pigeon guillemots and

42 U.S. Army Corps of Engineers. 2004. *Navigation Improvements Integrated Feasibility Report and Final Environmental Impact statement, Unalaska, Alaska.* Volume 1. U.S. Army Corps of Engineers Alaska District.

horned puffins, are located on the Hay Islands and on the southern shore of Amaknak Island.[43]

TABLE 4.4-2
Marine Mammals Potentially in the Region and Their Federal/State Status

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

Notes:
ESA = Federal Endangered Species Act; MMPA = Marine Mammal Protection Act; N.A. = Not applicable.
Source: Allen, B.M and R.P. Angliss. 2010. *Alaska Marine Mammal Stock Assessments, 2009.* U.S. Dept. of Commerce. NOAA Technical Memorandum NMFS-AFSC-206, 276 p.

43 U.S. Fish and Wildlife Service. 2007. "North Pacific Seabird Colony Database" Web site. Online: http://alaska.fws.gov/mbsp/mbm/northpacificseabirds/colonies/default.htm

0 0.25 0.5 1
Nautical Miles

Harbor Seal Sites

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Harbor Seal Haul-Out Sites

Exhibit 4.4-1

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Unalaska is an important wintering area for many bird species, with as many as 81 bird species occurring on or adjacent to Unalaska Island in the winter. The ten most abundant wintering species, according to National Audubon Society Christmas Bird Count (CBC) data, include emperor geese, harlequin ducks, bald eagles, Steller's eiders, common murres, common ravens, American [black] scoters, glaucous-winged gulls, white-winged scoters, and long-tailed ducks.[44] All of these ten species averaged more than 200 sightings each since 1993, with emperor geese and harlequin ducks averaging nearly 1,000 sightings each. Bald eagles, Steller's eiders, and common ravens average around 500 sightings each. The number of wintering birds in the region increases through January, peaking in February, and decreasing through spring migration in March and April. Most of these species occur throughout the winter in nearshore waters adjacent to the Airport, although their foraging and roosting habitats differ. In general, murres, American and white-winged scoters, greater scaup, cormorants (pelagic, double-crested, and red-faced), and murrelets (marbled and Kittlitz's) are found farther from shore, but emperor geese, long-tailed ducks, harlequin ducks, and Steller's eiders regularly forage in shallow and intertidal areas immediately adjacent to the Airport. Data pertaining to the Unalaska Airport vicinity from bird counts completed by the USACE during winter months from 2000-2003 are summarized in Appendix E-3.

Bald eagles are abundant in the Unalaska area in all seasons, typically nesting on cliffs in this treeless habitat. Exhibit 4.4-2 shows records of 15 bald eagle nests identified by the U.S. Fish and Wildlife Service (USFWS)[45] and three additional nest locations from 2007 were identified by the DOT&PF.[46]

These nest locations were identified opportunistically and do not represent the results of a comprehensive survey. The abundance of wintering eagles in the vicinity of the harbors is believed to affect the wintering distribution of foraging and roosting waterfowl and seabirds.[47]

4.4.3.1 Potential Bird Hazards at the Unalaska Airport

Little is known about the movements of birds in the vicinity of the Airport, but the 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 possible feeding and resting areas. Such movements can cause bird strike hazards to aircraft operating at the Airport. The U.S. Department of Agriculture (USDA) wildlife strike database, which covers military and civilian aircraft records from 1990–2006, records nine reported strikes: one glaucous- winged gull, four gulls (species not identified), three bald eagles, and one unknown species.[48] Wright reported that, of the nine strikes, three caused damage to an aircraft, two caused substantial damage (unidentified gull and glaucous-winged gull), and one caused minor damage (bald eagle).

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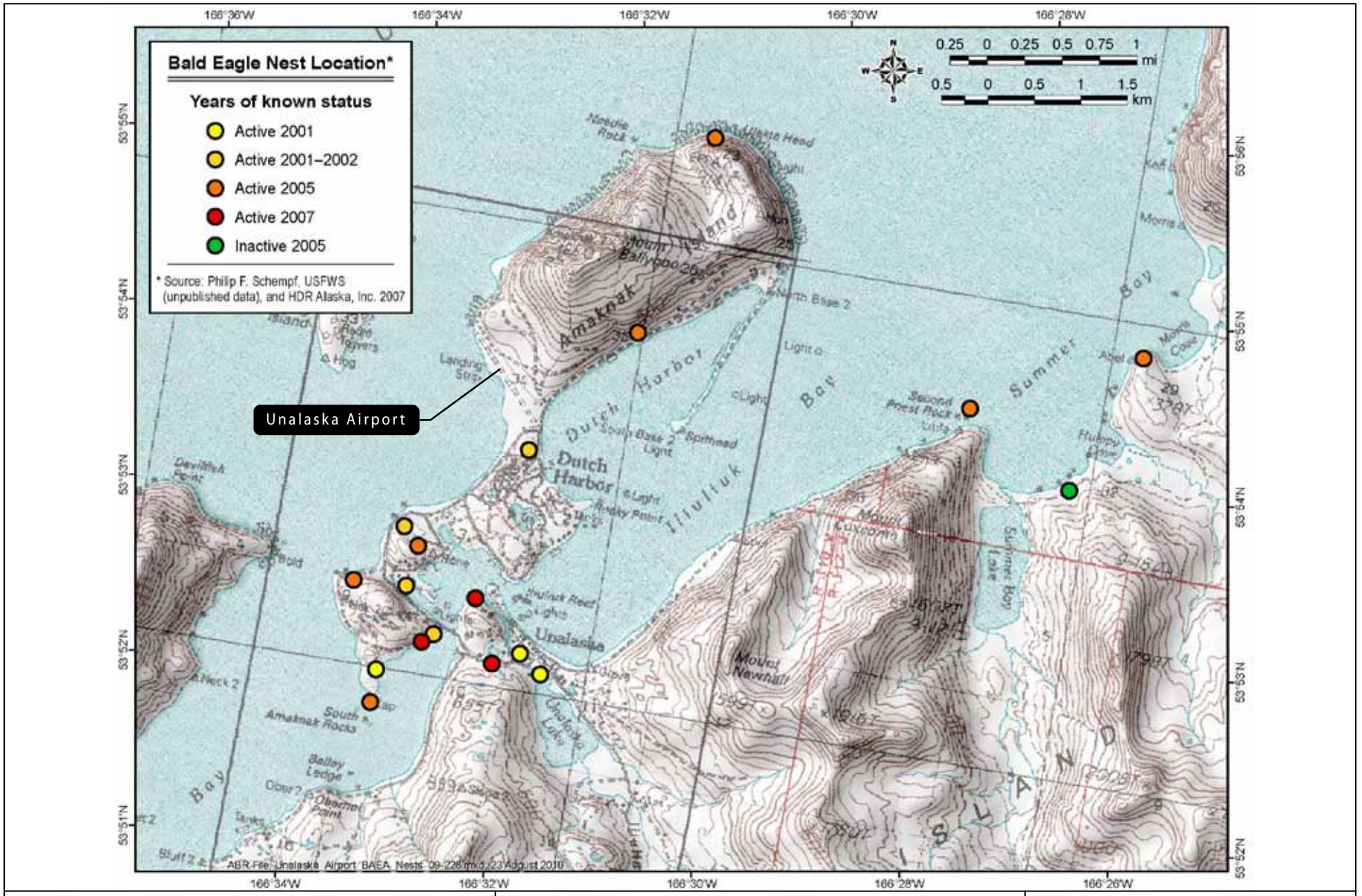
44 National Audubon Society. 2010. "Historical Results: Data for a CBC Count Circle" Web site. Online: http://audubon2.org/cbchist/count_table.html. Site accessed August 2010.

45 P. Schempf, USFWS. Unpublished data.

46 HDR Alaska, Inc. 2007. *Bald eagle nest monitoring summary report for Unalaska: South Channel Bridge Project.* Report for Alaska DOT&PF and American Civil Constructors, West Coast, Inc. Anchorage, AK.

47 Reed, J. A. and P. L. Flint. 2007. "Movements and foraging effort of Steller's eiders and harlequin ducks wintering near Dutch Harbor, Alaska." *Journal of Field Ornithology* 78: 117–125.

48 S. Wright, USDA. Personal communication.



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Bald Eagle Nest Locations

Exhibit 4.4-2

TBG102810153627ANC 332661 UAP_EA_BaldEagleNest_02.ai cts

Because reporting wildlife strikes is not mandatory, the FAA estimates that only about 20% of all strikes are ever reported.[49] Maintaining runway verges and areas adjacent to the Airport to reduce their attractiveness to birds can help reduce the potential for bird collisions with aircraft.

4.4.4 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, although spruce trees imported and planted 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 have been introduced at various times by Russians and Americans for the fur industry. The largest endemic species is the red fox, and other small mammals that have been introduced include the arctic fox, Norway rat, lemmings, and the arctic ground squirrel.

4.5 Federally Listed Threatened or Endangered Species

Although no federally listed threatened or endangered species occur on the Airport property, Unalaska Bay and Dutch Harbor do provide habitat for listed species.

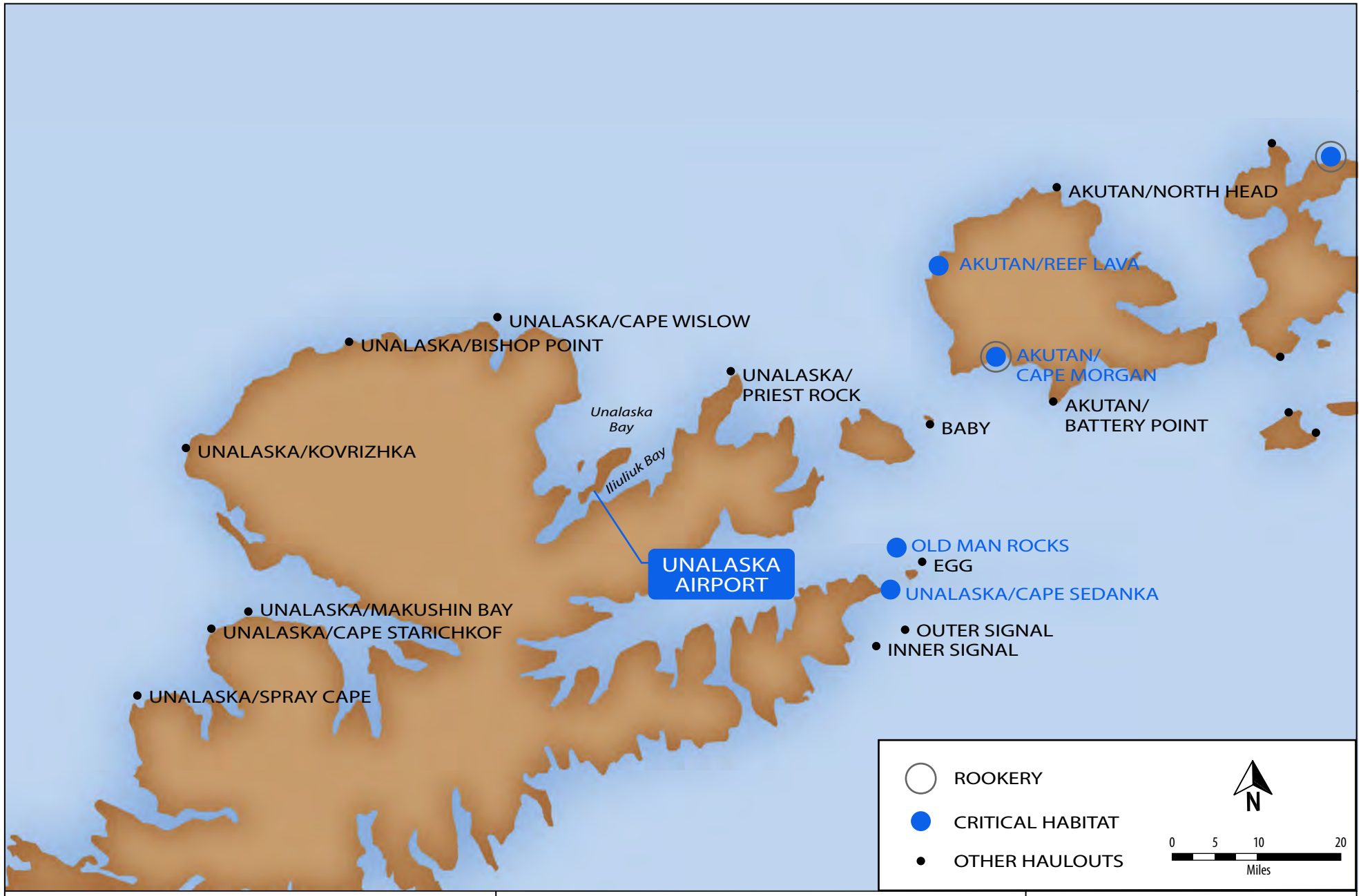
4.5.1 Marine Mammals

Table 4.4-2 identifies six marine mammal species in the study area that are listed as endangered or threatened under the Endangered Species Act: (1) Steller sea lion, (2) humpback whale, (3) fin whale, (4) sei whale, (5) northern right whale, and (6) northern sea otter.

Steller sea lions. Two stocks of Steller sea lions in Alaska are listed under the ESA: an eastern U.S. stock including animals east of Cape Suckling, Alaska, which are listed as threatened, and a western U.S. stock including animals at and west of Cape Suckling, which are listed as endangered.[50] 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. Haul-outs and rookery sites are numerous throughout the breeding range, and those located in the region of the project area are shown in Exhibit 4.5-1. The project area occurs within "critical habitat" for two haul-outs but not for any rookeries; NMFS defines Steller sea lion critical habitat by a 20-nm radius (straight line distance) encircling a haul-out or rookery (see Exhibit 4.5-2). Two haul-outs (Old Man Rocks and Cape Sedanka) are approximately 16 nm (straight line distance) from the project area. The actual navigable distance between the haul-outs and the project area is over 20 nm, since Unalaska Island is between the haul-outs and the project area. The closest rookery is Akutan/Cape Morgan, which is just over 20 nm from the project area.

49 S. Wright, USDA. Personal communication.

50 62 CFR 30772, June 5, 1997; Allen and Angliss, 2010



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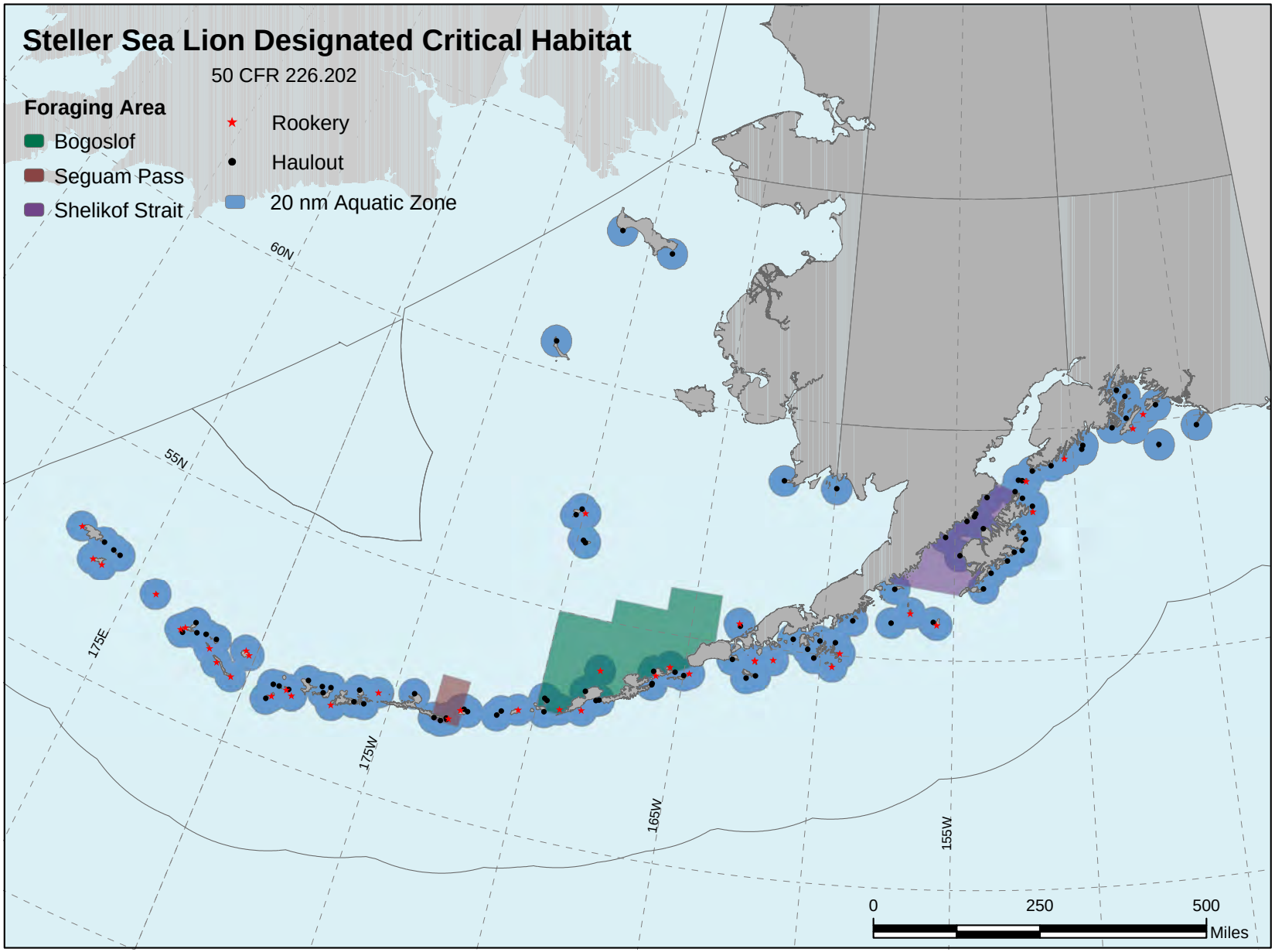
Steller Sea Lion Haul-Out Areas

Exhibit 4.5-1

Source: Tom Gilatt and Lowell Fritz of the National Marine Mammal Laboratory, Seattle, WA. (modified from original version)

TBG01131015010 9ANC 332661 UAP_EA_StellarSeaLionHaulOut_07.ai 12/6/11 cts



Environmental Assessment for Unalaska Airport

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N

Steller Sea Lion Critical Habitat

Exhibit 4.5-2

Source: http://www.alaskafisheries.noaa.gov/protectedresources/stellers/maps/criticalhabitat_map.pdf

TBG01131015010 9ANC 332661 UAP_EA_StellarSeaLionMap_01.ai 3/22/11 cts

Humpback whales. This species is found worldwide in all ocean basins, though less common in arctic waters. Two stocks occur in Alaska waters: the western North Pacific stock occurs west of Kodiak Island, and the central North Pacific stock east and south of Kodiak Island. The distribution of the two stocks may partially overlap in the Gulf of Alaska and possibly the Bering Sea.[51] The western North Pacific stock is estimated to number over 900 animals.[52]The Bering Sea is primarily the summer feeding grounds for the North Pacific stock, which winters and calves in the lower latitudes off Japan.[53] Surveys conducted in 1983, 1987, and 2002[54] indicate that humpback whales are not likely to occur in the study area except possibly when they migrate through Unimak Pass in the spring and fall.

Fin whales. Members of this species range from subtropical to arctic waters and are usually found in high-relief area along the continental shelf break or edges of submarine canyons where productivity of euphasiids, copepods, fish, and squid is likely high.[55] Most whales are believed to migrate seasonally from relatively low latitude wintering habitats where breeding and calving take place to high latitude summer feeding areas. In Alaska, fin whales occur year-round in the Bering Sea, with peak numbers occurring in spring. Surveys conducted over the last 27 years[56] indicate that fin whales occur north of the project area year-round in or near areas of high relief, and may enter the study area while migrating through Unimak Pass while transiting between the Gulf of Alaska and the Bering Sea in spring and fall. A rough estimate of the population size of fin whales east of the Kenai Peninsula is over 5,500 animals.[57]

Sei whales. In Alaska this species is most common in temperate pelagic waters, and they only occasionally venture into the Bering Sea from the Gulf of Alaska. They inhabit deepwater areas of open ocean, most commonly over the continental slope.[58] They migrate to lower latitudes for breeding and calving in winter, and to higher latitudes in summer for feeding on tiny crustaceans, fish, and squid.[59] Sei whales have been reported in the Gulf of Alaska and Aleutian Islands during summer,[60] with the highest number of sightings south of

51 Allen and Angliss, 2010

52 Allen and Angliss, 2010

53 Allen and Angliss, 2010

54 Brueggeman, J.J., R.A. Grotefendt, and A.W. Erickson. 1983. *Endangered whale surveys of the Navarin Basin, Alaska.* Prepared for the Minerals Management Service, Alaska OCS Office. Envirosphere Company, Bellevue, WA.

Brueggeman, J.J., G.A. Green, R.A. Grotefendt, and D.G.Chapman. 1987a. *Aerial surveys of endangered cetaceans and other marine mammals in the northwestern Gulf of Alaska and southeastern Bering Sea.* Prepared for the Minerals Management Service, Alaska OCS Office. Envirosphere Company, Bellevue, WA.

Brueggeman, J.J., G.A. Green, R. Grotefendt, and D. Chapman. 1987b. *Aerial surveys of sea otters in the northwestern Gulf of Alaska and southeastern Bering Sea.* Prepared for Minerals Management Service, Alaska OCS Office. Envirosphere Company, Bellevue, WA.

Moore, S.E., J.M. Waite, N.A. Friday, and T. Honkalehto. 2002. "Cetacean distribution and relative abundance on the central-eastern and southeastern Bering Sea Shelf with reference to oceanographic domains." *Progress in Oceanography* 55(2002):249-261.

55 Brueggeman et al., 1983.

56 Brueggeman et al., 1983; Brueggeman et al., 1987a; Moore et al., 2002; Brueggeman, J.J., G.A. Green, R.W. Tressler, and D.G. Chapman. 1988. *Shipboard surveys of endangered cetaceans in the northwestern Gulf of Alaska.* Prepared for Minerals Management Service, Alaska OCS Office. Envirosphere Company, Bellevue, WA. 59 p.

57 Allen and Angliss, 2010

58 Braham, H.W. and D.W. Rice. 1984. "The right whale." *Marine Fisheries Review* 46(4):38-47.

59 Kawamura, A. 1980. *A review of food of Balaenopterid whales.* Scientific reports of the Whale Research Institute 32. Tokyo, Japan: Whales Research Institute. p. 155-197.

60 Reeves, R.R., G.K. Silber, and P.M. Payne. 1998. *Draft recovery plan for the fin whale and sei whale.* Silver Springs MD:USDOC/NOAA/NMFS, Office of Protected Species. 65 p.

the western Aleutian Islands off the Kamchatka Peninsula to the Commander Islands.[61] Extensive surveys conducted in the Bearing Sea and Gulf of Alaska indicate that few, if any, sei whales would be expected in the project area.[62]

Northern right whales. The distribution and migratory patterns of this species are largely unknown. Right whales summer in the high-latitudes and migrate to more temperate waters to winter.[63] Right whales calve in coastal waters during winter, but no calving grounds have been found in the eastern North Pacific Ocean.[64] There is historic and recent evidence of right whale occurrence in the Gulf of Alaska and Bering Sea that indicates that right whales could occur in the project area, particularly as they migrate through Unimak Pass in the spring and fall.[65] There are no reliable population estimates for the North Pacific right whale, but the number is thought to be less than 200.[66]

Northern sea otter. The Southwest Alaska stock of the northern sea otter includes animals found off the Alaska Peninsula and Bristol Bay coasts, and on the Aleutian, Barren, Kodiak, and Pribilof Islands. Although other sea otter stocks in Alaska are considered stable, the Southwest Alaska stock has declined dramatically over the past 10-20 years, causing the USFWS to list the population as threatened under the ESA on August 9, 2000.[67] Critical habitat was designated for the stock by the USFWS throughout its range.[68] Sea otters occur in nearshore coastal waters generally less than 40 m (130 ft) depth and 1-2 km (0.6 – 1.2 miles) from shore, as they need frequent access to subtidal and intertidal zones for feeding.[69] Sea otters in Alaska are not migratory and do not normally travel over long distances. Distribution is nearly continuous from Attu Island in the western Aleutians to the Alaska Peninsula. Exhibit 4.5-3 shows the sea otter distribution around Unalaska Island based on aerial survey data collected in 2000. An estimated 9,000 sea otters inhabit the Aleutian Islands.[70] Exhibit 4.5-4 shows critical habitat around Unalaska Island as defined by all contiguous waters from the mean high tide line to the 20-m (65.6-ft) depth contour as well as waters within 100 m (328.1 ft) of the mean high tide line that occur adjacent to the island.

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61 Nasu, K. 1963. "Oceanography and the whaling grounds in the subarctic regions of the Pacific Ocean." *Scientific Reports of the Whales Research Institute* 17:105-156.

62 Brueggeman, J.J., T. Newby, and R.A. Grotefendt. 1986. "Catch records of twenty North Pacific right whales taken between 1917 and 1937." *Arctic* 39:43-46.

Brueggeman et al., 1987a; Brueggeman et al., 1987b; Brueggeman et al., 1988.

63 Braham and Rice, 1984

64 Scarff, J.E. 1986. "Historic and present distribution of the right whale in the eastern North Pacific south of 50 N and east of 80 W." Rep. *Int. Whal. Comm.* (special issue 10):43-63.

65 Mellinger, D.K., K.M. Stafford, S.E. Moore, L.M. Munger, and C.G. Fox.2004. "Detection of North Pacific right whales call in the Gulf of Alaska." *Marine Mammal Sci.* 20:872-879.

Brueggeman et al., 1986.

66 Allen and Angliss, 2010.

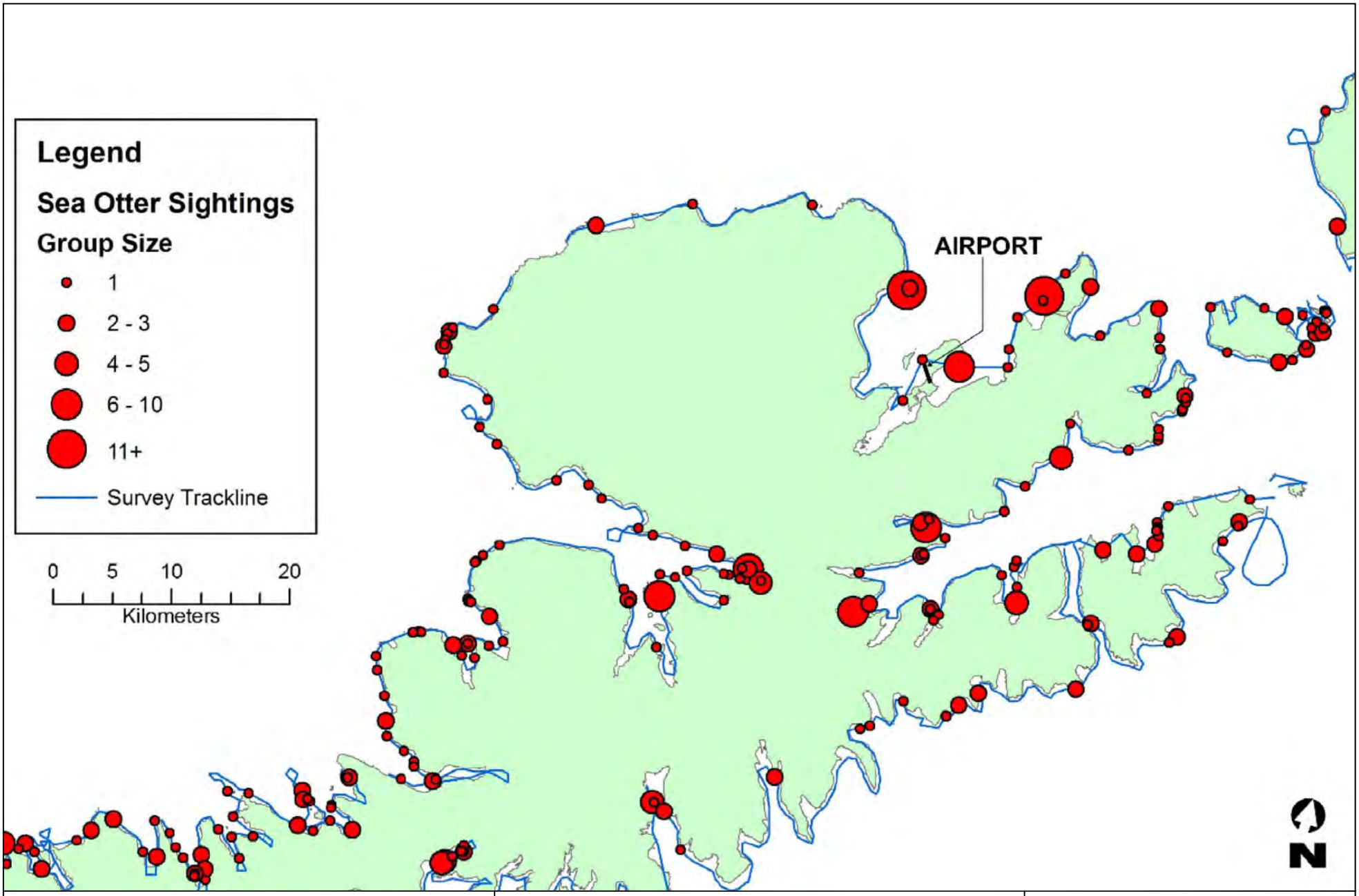
67 U.S. Fish and Wildlife Service. 2005. 50 CFR Part 17. *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Southwest Alaska Distinct Population Segment of the Northern Sea Otter* (Enhydra lutris kenyoni). *Final Rule.* August 2005. 22 pp.

Doroff, A.M., J.A. Estes, M.T. Tinker, D.M. Burn, and T.J. Evans. 2003. "Sea otter population declines in the Aleutian archipelago." *J. Mammal:* 84(1):55-64.

68 U.S. Fish and Wildlife Service. 2009. FWS-R7-ES-2008-0 105. *Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Southwest Alaska Distinct Population Segment of the Northern Sea Otter. Final Rule.* September 2009. 110 pp.

69 Green, G.A. and J.J. Brueggeman. 1991. "Sea otter diets from a declining population in Alaska." *Mar. Mamm. Sci.* 7:395-401.

70 Allen and Angliss, 2010.



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Sea Otter Distribution (2000)

Exhibit 4.5-3

Source: Sea otter distribution along Unalaska Island based on aerial survey data collected in 2000 and reported by Doroff et al (2003)

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4.5.2 Birds

Four species of birds on the federal Endangered Species List occur in the Unalaska–Dutch Harbor area: short-tailed albatross (endangered), Steller's eider (threatened), Kittlitz's murrelet (candidate species), and yellow-billed loon (candidate species).[71]

4.5.2.1 Short-tailed Albatross

The short-tailed albatross is found in the offshore marine waters around Unalaska Island,[72] but the nearest reported sightings of short-tailed albatross in the North Pacific Pelagic Seabird Database are 26 miles from the Unalaska Airport.[73] The short-tailed albatross is unlikely to venture into the Airport project area, is unlikely to be affected by the project, and is not discussed further in this EA.

4.5.2.2 Steller's Eider

Steller's eider occur abundantly during winter months (typically mid-November through early April), and large numbers occasionally occur in the project area, both southwest of the Airport in Unalaska Bay and off the eastern and northeastern edges of the Airport in Dutch Harbor.[74] USACE conducted winter counts of seaducks and other waterbirds in the winters of 2000–2003 to provide baseline information for a proposed new boat harbor,[75] and their primary focus was to determine the distribution and abundance of the federally threatened Steller's eider. These winter surveys included waters within 350 m (1,150 ft) of the shorelines of both Unalaska Bay southwest of the Airport and the shorelines of Dutch Harbor east and northeast of the Airport (see Exhibit 4.5-5).

Wintering Steller's eider are not distributed uniformly throughout nearshore waters in the project area. Foraging habitats of wintering Steller's eiders are limited to shallow waters in which they make relatively shallow foraging dives to capture predominantly benthic, invertebrate prey. The distribution of Steller's eiders in the area also is affected by the outfalls of gurry from local fish processors.[76, 77, 78] When gurry is too thick or opaque, Steller's eiders may not forage, but generally eiders and other seaducks are attracted to the foraging opportunities created by the artificially enhanced populations of invertebrate prey near these nutrient-rich outfalls. Steller's eiders are attracted to such outfalls in Unalaska Bay southwest of the Airport, and at the base of the spit in Dutch Harbor on the Iliuliuk Bay side. The movements of eiders may be affected by the local abundance of predatory bald eagles, but the home range size of 5.1 square kilometers (about 1.7 square miles) observed in a recent survey[79] indicates relatively little movement between foraging areas. The highest

71 USFWS. 2010. "Endangered, Threatened, Proposed, Candidate, and Delisted Species in Alaska" Web site. Online: http://ecos.fws.gov/tess_public/pub/stateOccurrenceIndividual.jsp?state=AK.

72 Piatt, J.F., G.S. Drew, and D.B. Irons. 2006. *Atlas of seabird distribution at sea in Alaska.* Unpublished report. USGS Alaska Science Center & USFWS, Anchorage, AK. 33 pp.

73 NPPSD. 2005. North Pacific Pelagic Seabird Database, Short-tailed Albatross, Ver. 2005.06.07, USGS Alaska Science Center & U.S. Fish and Wildlife Service, Anchorage, Alaska. Online: www.absc.usgs.gov/research/NPPSD/.

74 Chris Hoffman, USACE. Unpublished data.

75 Chris Hoffman, USACE. Unpublished trip reports and data.

76 Chris Hoffman, USACE. Personal communication.

77 Miles, A.K., P.L. Flint, K.A. Trust, M.A. Ricca, S.E. Spring, D.E. Arrieta, T. Hollmen, and B.W. Wilson. 2007. "Polycyclic aromatic hydrocarbon exposure in Steller's eiders (*Polysticta stelleri*) and Harlequin Ducks (*Histrionicus histrionicus*) in the eastern Aleutian Islands, Alaska, USA." *Environmental Toxicology and Chemistry* 26(12): 2,694–2,703.

78 Reed and Flint, 2007.

79 Reed and Flint, 2007.

AMAKNAK ISLAND

DUTCH HARBOR

100M

100M

BRL

OFA

OFA

12

12

30

EAST POINT ROAD

BIORKA DR.

UNALASKA BAY

Legend:

- MHW @ 2.25FT
- 100M SEAWARD OF MHW
- SEA OTTER HABITAT
- ENCROACHED SEA OTTER HABITAT
- NEW CONSTRUCTION

N (TRUE)

TBG01131015010 9ANC 322661 UAP_EA_CriticalSOHabitat_03.ai 03/22/11 cts

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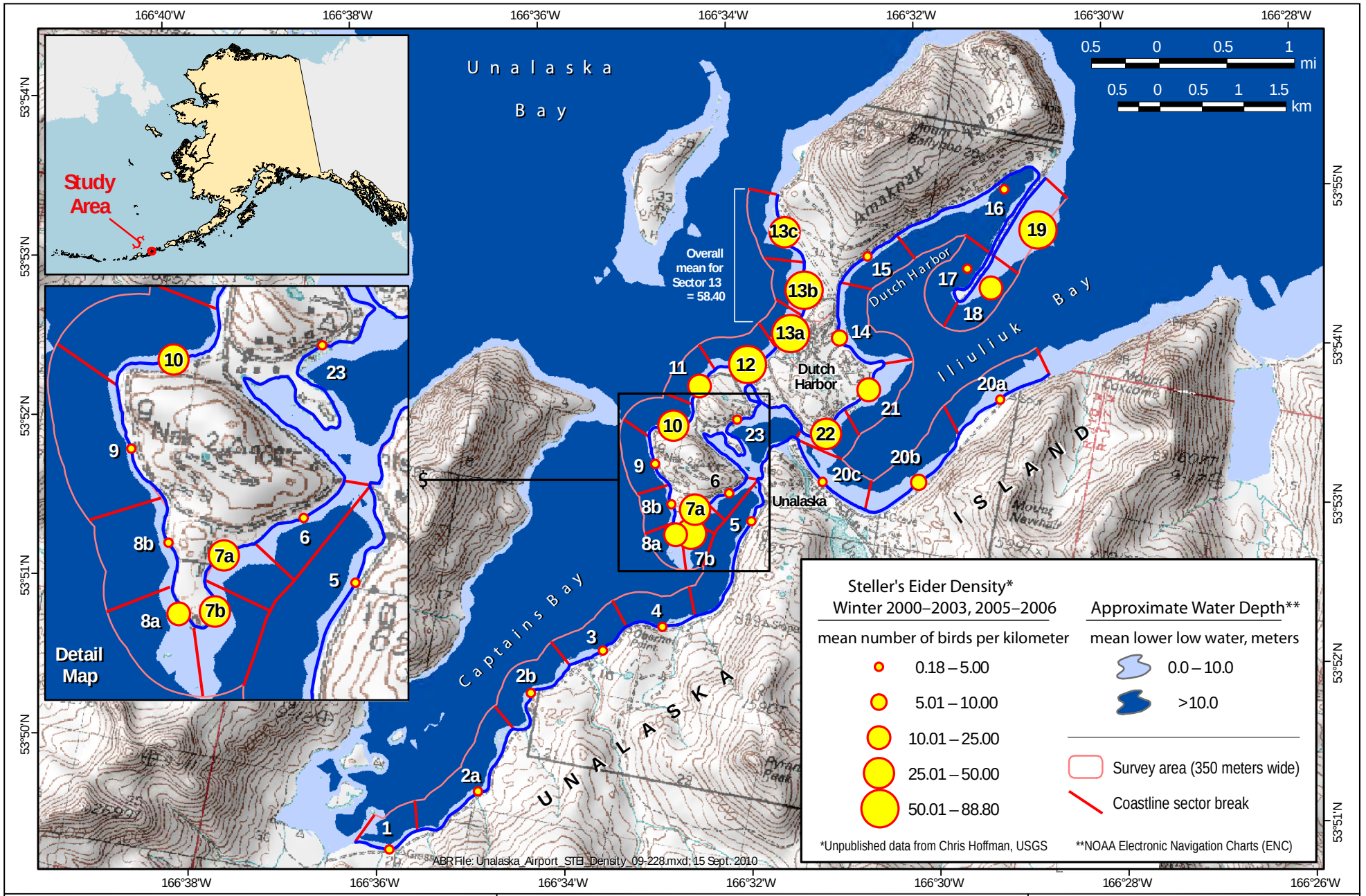
Critical Sea Otter Habitat

Exhibit
4.5-4



TBG102810153627ANC 332661 UAP_EA_StellersEiderDensity_02.ai cts

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N

Steller's Eider Density

Exhibit 4.5-5

densities of Steller's eiders occur along Airport Beach just southwest of the Airport (and just north of a gurry outfall), far north of the Airport in Iliuliuk Bay, and outside of the project area (and near another gurry outfall). Although the northern end of the surveyed area ends at the northwest end of runway, observations indicate that few Steller's eiders use habitats off the end of the runway or north of that point on Amaknak Island, presumably because the bottom drops off steeply in those areas, providing no foraging habitat.[80]

4.5.2.3 Kittlitz's Murrelet

Kittlitz's murrelets occur in the project area in both summer and winter, including in the Amaknak Island–Dutch Harbor area,[81] although they are outnumbered by marbled murrelets, and accurate numbers are difficult to obtain due to similarity of plumages of some individuals of both species in all seasons. Densities of both species combined are shown in Exhibit 4.5-6. Zeillemaker's 1987 survey found the average density of Kittlitz's murrelets to be lower than for marbled murrelets.

4.5.2.4 Yellow-billed Loon

Yellow-billed loons are uncommon to rare in Unalaska Bay during winter months and are absent during the summer.[82] Since 1993, two yellow-billed loons have been recorded during the annual CBC, one in 1999 and another in 2005.[83]

4.5.2.5 Species of Conservation Concern

In addition to bird species listed under the Endangered Species Act, lists of species of conservation concern or sensitive species are maintained by federal and state agencies and non-governmental organizations (e.g., the Audubon Society). Of the approximately 140 species known to occur in the area, 41 are listed as species of conservation concern by at least one government agency or conservation organization (see Table 1 in Appendix E-3), including the four listed or candidate Threatened and Endangered species discussed above. Many of these species are listed primarily due to perceived vulnerability because of relatively small population size and world-wide distribution restricted to this region of Alaska (e.g., emperor goose, red-faced cormorant, whiskered auklet); others are listed because of small numbers and limited distribution in Alaska, although world-wide populations are healthy (e.g., rock ptarmigan, rock sandpiper, and song sparrow); and others are listed because of local, regional, or world-wide population declines (e.g., long-tailed duck, red-faced cormorant, Aleutian tern, ancient murrelet). Excluding casual and accidental species, there are about 33 species of conservation concern that may occur in the project area (see Table 3 in Appendix E-3), including several waterfowl and shorebird species that occur seasonally in habitats on or immediately adjacent to the Airport, including emperor geese, harlequin duck, long-tailed duck, black oystercatcher, wandering tattler, sanderling, western sandpiper, rock sandpiper, and dunlin. Most other waterfowl and the seabirds listed occur primarily in deeper waters farther from the Airport.

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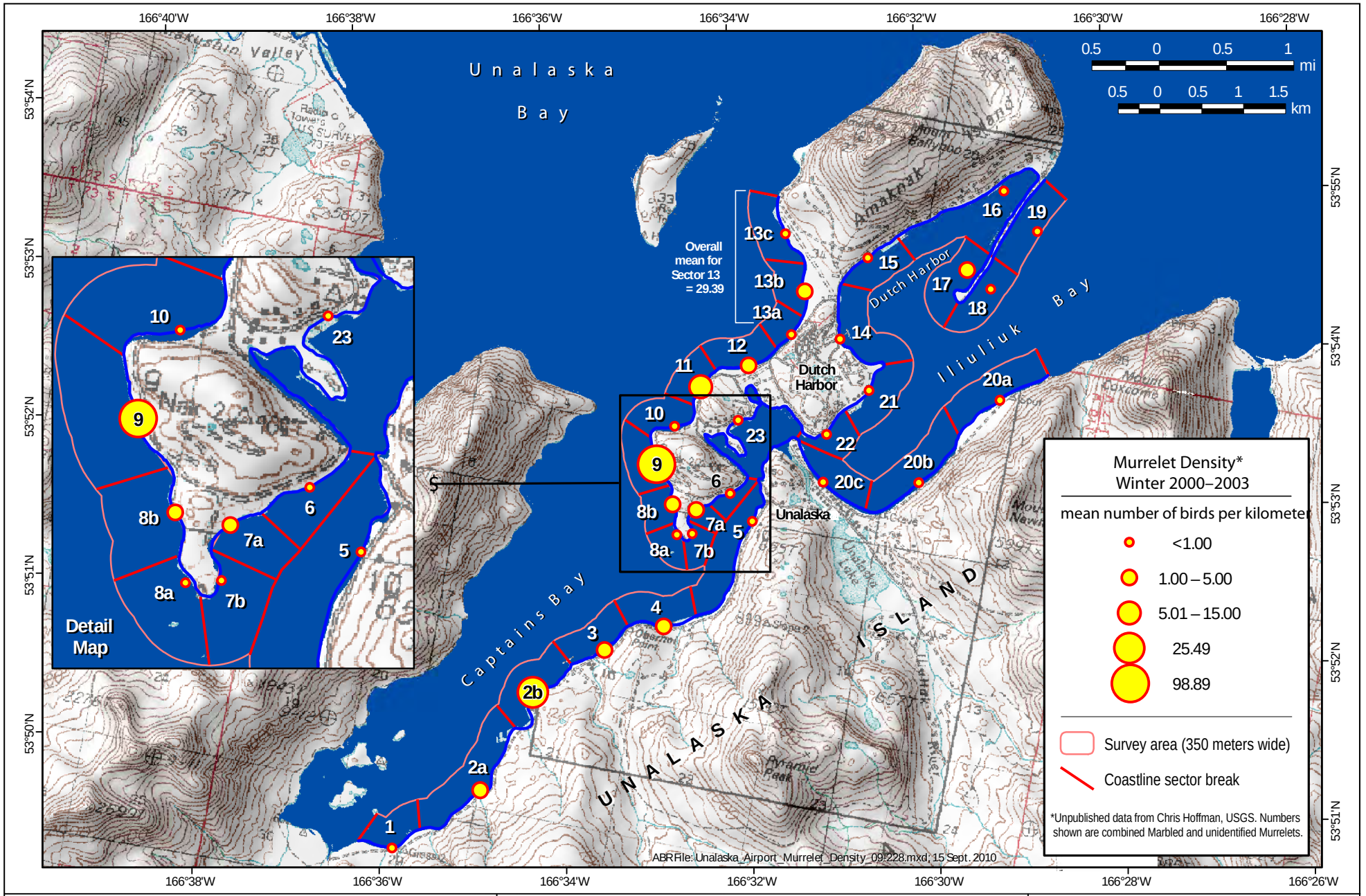
80 Paul Flint, USGS. Personal communication.

81 Zeillemaker, C. F. 1987. *Birds of fifteen locations on Amaknak (Dutch Harbor) and Unalaska Islands*, *Aleutian Islands*, *Alaska.* Unpublished report. U.S. Fish and Wildlife Service, Adak, AK. 5 pp.

82 Zeillemaker, 1987.

83 National Audubon Society, 2010.



TBG102810153627ANC 332661 UAP_EA_MurreletDensity_02.ai cts

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N

Murrelet Density

Exhibit 4.5-6