U.S. Department of
Homeland Security

**United States
Coast Guard**

ARCTIC OPERATIONS AND TRAINING EXERCISES

COMBINED BIOLOGICAL EVALUATION

- NATIONAL MARINE FISHERIES SERVICE
- U.S. FISH AND WILDLIFE SERVICE

United States Coast Guard
District 17
Juneau, Alaska

April 2014

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TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS VI

1 EXECUTIVE SUMMARY 1-1

2 DESCRIPTION OF THE ACTION AND ACTION AREA 2-1

2.1 BACKGROUND 2-1
2.2 ACTION AREA 2-4
2.3 PURPOSE AND NEED FOR ACTION 2-4
2.3.1 COAST GUARD MISSIONS 2-5
2.3.1.1 Ports, Waterways, and Coastal Security 2-5
2.3.1.2 Drug Interdiction 2-5
2.3.1.3 Aids to Navigation 2-6
2.3.1.4 Search and Rescue 2-6
2.3.1.5 Living Marine Resources (Fisheries Law Enforcement) 2-6
2.3.1.6 Marine Safety 2-6
2.3.1.7 Defense Readiness 2-7
2.3.1.8 Migrant Interdiction 2-7
2.3.1.9 Marine Environmental Protection 2-7
2.3.1.10 Ice Operations 2-8
2.3.1.11 Other Law Enforcement 2-8
2.3.2 COAST GUARD ASSETS SUPPORTING ARCTIC OPERATIONS 2-9
2.4 PROPOSED ACTION 2-10
2.4.1 SHORE OPERATIONS 2-10
2.4.1.1 Forward Operating Locations and Logistics/Staging Locations 2-10
2.4.1.2 Inspections and Safety 2-12
2.4.2 AIR OPERATIONS 2-14
2.4.2.1 Search and Rescue 2-14
2.4.2.2 Routine Patrols and Arctic Domain Awareness Flights 2-14
2.4.3 SEA OPERATIONS 2-14
2.4.3.1 Search and Rescue 2-14
2.4.3.2 Icebreaking 2-14
2.4.3.3 Safety Zones 2-15
2.4.3.4 Routine Patrols 2-16
2.4.4 AT-SEA AND SHORESIDE BERTHING AND SUPPORT FACILITIES 2-16
2.4.5 TRAINING EXERCISES 2-17
2.4.5.1 Rescue Exercises 2-18
2.4.5.2 Flight Training 2-18
2.4.5.3 Small Boat Training 2-18
2.4.5.4 Oil Recovery Training Exercises 2-19
2.4.6 TRIBAL AND GOVERNMENT ENGAGEMENT 2-21

2.4.7 BEST MANAGEMENT PRACTICES AND CONSERVATION MEASURES 2-22
2.4.7.1 Coast Guard Guidance 2-22
2.4.7.2 Biological Resources 2-24
2.4.7.3 Cultural Resources 2-27
2.4.7.4 Hazardous Materials and Substances 2-28

3 LISTED SPECIES, CRITICAL HABITAT, AND ESSENTIAL FISH HABITAT 3-29

3.1 ENDANGERED SPECIES ACT-LISTED SPECIES INCLUDED IN ANALYSIS 3-29
3.2 ENDANGERED SPECIEAS ACT-LISTED SPECIES EXCLUDED FROM FURTHER ANALYSIS 3-30
3.2.1 BLUE WHALE (*BALAENOPTERA MUSCULUS*) 3-30
3.2.2 SEI WHALE (*BALAENOPTERA BOREALIS*) 3-31
3.2.3 SPERM WHALE (*PHYSETER MACROCEPHALUS*) 3-31
3.3 ENDANGERED SPECIES ACT-LISTED SPECIES AND ESSENTIAL FISH HABITAT UNDER NATIONAL MARINE FISHERIES SERVICE JURISDICTION 3-31
3.3.1 CRITICAL HABITAT 3-31
3.3.2 CETACEANS 3-31
3.3.2.1 Bowhead Whale (*Balaena mysticetus*) 3-32
3.3.2.2 Fin Whale (*Balaenoptera physalus*) 3-36
3.3.2.3 Humpback Whale (*Megaptera novaeangliae*) 3-38
3.3.2.4 North Pacific Right Whale *(Eubalaena japonica)* 3-43
3.3.3 PINNIPEDS 3-47
3.3.3.1 Bearded Seal (*Erignathus barbatus nauticus*) 3-48
3.3.3.2 Ringed Seal (*Pusa hispida*) 3-51
3.3.3.3 Steller Sea Lion (*Eumetopias jubatus*) 3-53
3.3.4 ESSENTIAL FISH HABITAT 3-58
3.3.4.1 Bering Sea and Aleutian Islands Groundfish 3-59
3.3.4.2 Bering Sea and Aleutian Islands King and Tanner Crabs 3-64
3.3.4.3 Salmon Fisheries in the Exclusive Economic Zone 3-65
3.3.4.4 Arctic Management Area 3-71
3.4 ENDANGERED SPECIES ACT-LISTED SPECIES UNDER UNITED STATES FISH AND WILDLIFE SERVICE JURISDICTION 3-75
3.4.1 CRITICAL HABITAT IN THE ACTION AREA 3-75
3.4.2 MARINE MAMMALS 3-75
3.4.2.1 Pacific Walrus (*Odobenus rosmarus divergens*) 3-75
3.4.2.2 Polar Bear (*Ursus maritimus*) 3-77
3.4.3 BIRDS 3-80
3.4.3.1 Short-tailed Albatross (*Phoebastria albatrus*) 3-80
3.4.3.2 Spectacled Eider (*Somateria fischeri*) 3-82
3.4.3.3 Steller's Eider (*Polysticta stelleri*) 3-87
3.4.3.4 Yellow Billed Loon (*Gavia adamsii)* 3-90

4 EFFECTS OF THE ACTION 4-1

4.1 FACTORS USED TO ASSESS THE SIGNIFICANCE OF EFFECTS 4-1
4.2 ACTIVITIES ASSOCIATED WITH THE PROPOSED ACTION 4-1
4.2.1 SHORE OPERATIONS 4-2
4.2.1.1 Forward Operating Locations 4-2
4.2.1.2 Inspections and Safety Ashore 4-4
4.2.2 AIR OPERATIONS AND TRAINING 4-6
4.2.2.1 Routine Patrols, Arctic Domain Awareness Flights, and Flight Training 4-9
4.2.2.2 Search and Rescue 4-11
4.2.3 SEA OPERATIONS AND TRAINING 4-15
4.2.3.1 Routine Sea Patrols, Enforcement of Safety Zones, and Small Boat Training 4-25
4.2.3.2 Search and Rescue Operations and Training 4-28
4.2.3.3 Passing and Towing and Mass Recue Operation Rescue Exercises 4-30
4.2.3.4 Icebreaking 4-32
4.2.3.5 Oil Recovery Training Exercises 4-40
4.2.3.6 At-Sea and Shoreside Berthing and Support Facilities 4-44
4.3 CRITICAL HABITAT 4-45
4.3.1 NATIONAL MARINE FISHERIES SERVICE JURISDICTION 4-45
4.3.1.1 North Pacific Right Whale 4-45
4.3.1.2 Steller Sea Lion 4-45
4.3.2 UNITED STATES FISH AND WILDLIFE SERVICE JURISDICTION 4-46
4.3.2.1 Spectacled Eider 4-46
4.3.2.2 Steller's Eider 4-46
4.4 ESSENTIAL FISH HABITAT 4-47
4.4.1 SEARCH AND RESCUE MISSIONS 4-47
4.4.2 ICEBREAKING 4-48
4.4.3 RESCUE EXERCISES 4-48
4.4.4 OIL RECOVERY TRAINING EXERCISES 4-49
4.4.4.1 Spilled Oil Recovery System and Vessel of Opportunity Skimming System Exercises 4-49
4.4.4.2 Spilled Oil in Ice Recovery Capabilities Demonstration 4-49

5 CUMULATIVE EFFECTS 5-1

5.1 ACTIVITIES AND PROCESSES ANALYZED FOR CUMULATIVE EFFECTS 5-1
5.1.1 SUBSISTENCE HUNTING AND FISHING 5-2
5.1.2 COMMERCIAL FISHING 5-3
5.1.3 SCIENTIFIC RESEARCH 5-3
5.1.4 MARINE TRAFFIC 5-3
5.1.5 AIR TRAFFIC 5-4
5.1.6 OIL AND GAS EXPLORATION 5-4
5.1.7 OIL AND GAS EXTRACTION 5-4
5.2 CUMULATIVE IMPACTS ANALYSIS 5-5

6 CONCLUSIONS 6-1

6.1 NATIONAL MARINE FISHERIES SERVICE JURISDICTIONAL SPECIES 6-1
6.1.1 MARINE MAMMALS 6-1
6.1.2 ESSENTIAL FISH HABITAT 6-1
6.2 UNITED STATES FISH AND WILDLIFE SERVICE JURISDICTIONAL SPECIES 6-2

7 LITERATURE CITED 7-1

8 LIST OF PREPARERS 8-1

APPENDIX A – BIRD INTERACTION PROTOCOL AND REPORTING A-1

LIST OF FIGURES

FIGURE 2-1: PROPOSED ACTION AREA 2-2
FIGURE 2-2 SEA ICE EXTENT AND ARCTIC ACTIVITIES IN 1992 2-3
FIGURE 2-3 SEA ICE EXTENT AND ARCTIC RESOURCES AND ACTIVITIES IN 2012 2-3
FIGURE 2-4 CURRENT AND POTENTIAL FORWARD OPERATING LOCATIONS IN THE ACTION AREA 2-13
FIGURE 2-5 EXISTING OIL AND GAS LEASE BLOCKS IN THE CHUKCHI AND BEAUFORT SEAS 2-16
FIGURE 2-6 MOBILE SEA BASE 2-17
FIGURE 2-7 CREWMEMBERS TESTING THE VESSEL'S SPILLED OIL RECOVERY SYSTEM 2-20
FIGURE 2-8 SPILLED OIL IN ICE RECOVERY DEMONSTRATION CONCEPT 2-21
FIGURE 3-1: WESTERN STELLER SEA LION DISTINCT POPULATION SEGMENT CRITICAL HABITAT IN THE ACTION AREA 3-55
FIGURE 3-2: ESSENTIAL FISH HABITAT DESIGNATED FOR WALLEYE POLLOCK IN THE ACTION AREA 3-60
FIGURE 3-3: ESSENTIAL FISH HABITAT FOR PACIFIC COD IN THE ACTION AREA 3-61
FIGURE 3-4: ESSENTIAL FISH HABITAT FOR YELLOWFIN SOLE IN THE ACTION AREA 3-62
FIGURE 3-5: ESSENTIAL FISH HABITAT FOR FLATHEAD SOLE IN THE ACTION AREA 3-63
FIGURE 3-6: ESSENTIAL FISH HABITAT FOR ALASKA PLAICE IN THE ACTION AREA 3-64
FIGURE 3-7: ESSENTIAL FISH HABITAT FOR RED KING CRAB IN THE ACTION AREA 3-65
FIGURE 3-8: ESSENTIAL FISH HABITAT FOR ALL SALMON SPECIES IN THE ACTION AREA 3-66
FIGURE 3-9: ESSENTIAL FISH HABITAT FOR ARCTIC COD IN THE ACTION AREA 3-72
FIGURE 3-10: ESSENTIAL FISH HABITAT FOR SAFFRON COD IN THE ACTION AREA 3-73
FIGURE 3-11: ESSENTIAL FISH HABITAT FOR SNOW CRAB IN THE ACTION AREA 3-74
FIGURE 3-12: SPECTACLED EIDER CRITICAL HABITAT IN THE ACTION AREA 3-84
FIGURE 4-1: TYPICAL DESIGN FOR AN EXPENDABLE SELF-LOCATING BUOY 4-12
FIGURE 4-2: ROUTES OF THE COAST GUARD CUTTER HEALY MISSIONS FROM 2009 -2012 4-35

LIST OF TABLES

TABLE 1-1: DETERMINATION FOR ENDANGERED SPECIES ACT-LISTED SPECIES UNDER NATIONAL MARINE FISHERIES SERVICE JURISDICTION 1-1
TABLE 1-2: DETERMINATION FOR ESSENTIAL FISH HABITATS UNDER NATIONAL MARINE FISHERIES SERVICE JURISDICTION 1-2
TABLE 1-3: DETERMINATION FOR ENDANGERED SPECIES ACT-LISTED AND CANDIDATE SPECIES UNDER UNITED STATES FISH AND WILDLIFE SERVICE JURISDICTION 1-2
TABLE 2-1 AIRPORTS, AIRSTRIPS, AND DEW LINES FOR POSSIBLE FUTURE USE 2-12
TABLE 3-1. ENDANGERED SPECIES ACT-LISTED SPECIES POTENTIALLY OCCURRING IN THE ACTION AREA 3-29
TABLE 3-2: ENDANGERED SPECIES ACT-LISTED SPECIES EXCLUDED FROM FURTHER EVALUATION 3-30
TABLE 3-2: ABUNDANCE, STATUS, AND SEASONAL OCCURRENCE OF ESA-LISTED CETACEANS IN THE ACTION AREA 3-32
TABLE 3-3: ABUNDANCE, STATUS, AND SEASONAL OCCURRENCE OF ESA-LISTED PINNIPEDS IN THE ACTION AREA 3-47
TABLE 4-1: ACTIVE ACOUSTIC SOURCES ASSOCIATED WITH SEA OPERATIONS AND TRAINING 4-16

TABLE 4-2: FUNCTIONAL HEARING RANGES FOR MARINE MAMMALS 4-17
TABLE 4-3: EXAMPLE SONAR TYPES (20 – 200 KHZ) POTENTIALLY USED IN THE ACTION AREA 4-20
TABLE 4-4: RANGES TO ACOUSTIC THRESHOLDS FOR SONAR EFFECTS 4-21
TABLE 4-5: SCIENTIFIC SONAR SYSTEMS INSTALLED ON THE COAST GUARD CUTTER HEALY 4-33
TABLE 4-6: EXAMPLE LASER SYSTEMS 4-41
TABLE 5-1: REASONABLY FORSEEABLE ACTIVITIES IN THE ACTION AREA 5-2
TABLE 6-1: DETERMINATION FOR ENDANGERED SPECIES ACT-LISTED SPECIES UNDER NATIONAL MARINE FISHERIES SERVICE JURISDICTION 6-1
TABLE 6-2: DETERMINATION FOR ENDANGERED SPECIES ACT-LISTED SPECIES UNDER UNITED STATES FISH AND WILDLIFE SERVICE JURISDICTION 6-2

ACRONYMS AND ABBREVIATIONS

ADF&G	Alaska Department of Fish and Game
BE	Biological Evaluation
BMP	best management practice
CFR	Code of Federal Regulations
CGC	Coast Guard Cutter
CGD17INST	Coast Guard District 17 Instruction
Coast Guard	United States Coast Guard
COMDTINST	Commandant Instruction
CV	coefficient of variation
DEW	Distant Early Warning
DPS	Distinct Population Segment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FOL	Forward Operating Location
ft	foot/feet
GOA	Gulf of Alaska
HAPC	Habitat Area of Particular Concern
Hz	Hertz
kHz	kiloHertz
km	kilometer
km^2	square kilometer
kts	knots or nautical miles per hour
m	meter
mi	mile
mi^2	square mile
mm	milimeter
MMPA	Marine Mammal Protection Act
MRO	Mass Rescue Operation
MSA	Magnuson-Stevens Fishery Conservation and Management Act
nm	nautical miles
NMFS	National Marine Fisheries Service
NPFMC	North Pacific Fishery Management Council
SAR	Search and Rescue
SONS	Spill of National Significance
SORS	Spilled Oil Recovery System
TOWEX	Passing and Towing Exercise
U.S.	United States
UAV	Unmanned Aerial Vehicle
USC	United States Code
USFWS	United States Fish and Wildlife Service
UUV	Unmanned Underwater Vehicle
VOSS	Vessel of Opportunity Skimming System
yd	yards

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1 EXECUTIVE SUMMARY

In accordance with Section 7(a)(2) of the Endangered Species Act (ESA) of 1973 (16 USC § 1531 et seq.), as amended, the United States Coast Guard (Coast Guard) is required to consult with the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS) for those actions it has determined may affect ESA-listed species or critical habitat under the jurisdiction of NMFS or USFWS. Section 7 assures that federal actions are not likely to jeopardize the continued existence of any threatened, endangered, or proposed species, or result in the destruction or adverse modification of critical habitat. The Coast Guard intends to carry out the action described in Section 2 (Description of the Action and Action Area) in accordance with sections 5013 and 5062 of Title 10, United States Code.

This Biological Evaluation (BE) addresses proposed Coast Guard operations and training exercises in and on the shores of the Bering, Chukchi, and Beaufort Seas, and provides the Coast Guard's assessment of those activities in the Action Area that the Coast Guard has determined may affect ESA-listed species. The species that may be affected are shown in Tables 1-1and 1-3. Species considered but excluded from further analysis due to their rarity within the Action Area are the blue whale, sperm whale, and sei whale.

ESA designated critical habitat for Steller sea lions and spectacled eiders occurs within the Action Area; determinations are shown in Tables 1-1and 1-3.

This BE also assesses effects of the Proposed Action on Essential Fish Habitat (EFH) in the Action Area; no significant effects to EFH are anticipated (Table 1-2).

Table 1-1: Determination for Endangered Species Act-Listed species under National Marine Fisheries Service Jurisdiction

Species	Population	Federal Status	Coast Guard Determinations	
			Species	Critical Habitat
Cetaceans				
Bowhead whale	Western Arctic stock	E	NLAA	N/A
Fin whale	Alaska (Northeast Pacific) stock	E	NLAA	N/A
Humpback whale	Western North Pacific stock and Central North Pacific stock	E	NLAA	N/A
North Pacific right whale	Eastern North Pacific stock	E	NLAA	No effect
Pinnipeds				
Bearded seal	Alaska stock/Beringia DPS	T	NLAA	N/A
Ringed seal	Alaska stock/Arctic subspecies	T	NLAA	N/A
Steller sea Lion	Western U.S. stock/ Western DPS	E	NLAA	NLAA

DPS: Distinct Population Segment; E: endangered; N/A: not applicable; NLAA: may affect, not likely to adversely affect; T: threatened; U.S.: United States

Table 1-2: Determination for Essential Fish Habitats under National Marine Fisheries Service Jurisdiction

Fishery	Species	Coast Guard Determination
Bering Sea and Aleutian Island Groundfish	Walleye pollock	NLAA
	Pacific cod	NLAA
	Yellowfin sole	NLAA
	Flathead sole	NLAA
	Alaska plaice	NLAA
Bering Sea and Aleutian Islands King and Tanner Crabs	Red king crab	NLAA
Salmon fisheries	Pink salmon	NLAA
	Chum salmon	NLAA
	Sockeye salmon	NLAA
	Chinook salmon	NLAA
	Coho salmon	NLAA
Arctic Management Area	Arctic cod	NLAA
	Saffron cod	NLAA
	Snow crab	NLAA

NLAA: may affect, not likely to adversely affect

Table 1-3: Determination for Endangered Species Act-Listed and Candidate species under United States Fish and Wildlife Service Jurisdiction

Species	Population	Federal Status	Coast Guard Determinations	
			Species	Critical Habitat
Marine Mammals				
Pacific walrus	Alaska stock	C	NLAA	N/A
Polar bear	Chukchi/Bering Sea stock; Southern Beaufort Sea stock	T	NLAA	N/A
Birds				
Short-tailed albatross		E	NLAA	N/A
Spectacled eider		T	NLAA	No effect
Steller's eider		T	NLAA	No effect
Yellow-billed loon		C	NLAA	N/A

C: candidate for listing; T: threatened; E: endangered; N/A: not applicable; NLAA: may affect, not likely to adversely affect

The Proposed Action includes the following components:

- Operations:
  - Shore Operations, including staging for aircraft and personnel required to support mission requirements in the Alaskan Arctic and safety standard enforcement and education in ports and villages.
  - Air Operations, including search and rescue (SAR) missions, routine patrols, and awareness flights to identify and document human contacts and gather scientific data. Aircraft include fixed-wing planes and helicopters, which serve different purposes.
  - Sea Operations, including SAR missions; icebreaking as required for scientific data gathering, safety, and community assistance; establishment and enforcement of safety zones around any navigational hazards; routine patrols; icebreaking activities; and berthing and facilities for support personnel. Oil or hazardous materials spill response is not a part of the Proposed Action addressed in this BE.
- Training Exercises:
  - Rescue exercises, including passing and towing for distressed vessels and Mass Rescue Operation (MRO) training. MRO exercises could include a table-top simulation of a SAR mission involving large numbers of people, and an at-sea training. MRO exercises use surface assets and equipment to simulate a realistic evacuation of a stricken ship.
  - Flight training is required for flight crews in fixed-wing aircraft and helicopters. MH-60T and MH-65D helicopters would be flown when weather permits.
  - Small boat training involves launching and maneuvers of small boats near forward operating locations. Exercises may involve the use of helicopters or larger ships, which can launch and recover small boats.
  - Oil Recovery Exercises, including table-top simulations and coordination with other government entities; deployment of oil recovery and skimming systems; and a spilled oil recovery capabilities demonstration. These exercises could use simulated spill products to facilitate realistic training.
- Tribal and Government Engagement
  - Governmental Outreach and Relations: formal and informal relations and outreach with community leaders and governments, including coordination of training events to avoid interfering with subsistence harvests.
  - Educational and training outreach would include classes on boating safety and commercial vessel standards.

The purpose of the Proposed Action is to provide consistent and reliable Coast Guard presence in the Arctic to fulfill the Coast Guard's Arctic Strategy, guided by direction from the President of the United States, including the National Security Strategy, National Military and Maritime Strategies, National Strategy for the Arctic Region, Arctic Region Policy NSPD-66/HSPD-25,

National Strategies for Homeland Security and Maritime Domain Awareness, National Ocean Policy, and Executive Order 13580. For purposes of analysis the activities assessed in this BE are organized by location (shore, air, or sea) and mission fulfillment (operations or training exercises).

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2 DESCRIPTION OF THE ACTION AND ACTION AREA

The Arctic region is very dynamic and strategically important to global transportation, resource management, and international cooperation. The United States Coast Guard's (Coast Guard) vision for the Arctic Region is to "ensure safe, secure, and environmentally responsible maritime activity in the Arctic" (U.S. Coast Guard 2013a). This document presents the anticipated effects from United States Coast Guard (Coast Guard) operations and training exercises that occur at sea and over land in the Alaskan Arctic region. For the purposes of this Biological Evaluation (BE), the Arctic is defined as the waters of the United States (U.S.) and the U.S. Exclusive Economic Zone (EEZ) and adjacent shoreline areas of Alaska from latitude 62.5˚N westward to the U.S. and Russian border, northward into the Chukchi and Beaufort Seas and eastward to the U.S. and Canadian border (Figure 2-1).

This BE has been prepared by District 17 of the Coast Guard to evaluate the biological effects of the Proposed Action, in compliance with Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended. Section 7 of the ESA requires that, through consultation with the National Marine Fisheries Service (NMFS) and United States Fish and Wildlife Service (USFWS), federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species or result in the destruction or adverse modification of critical habitat. This BE evaluates the potential effects of the proposed Arctic operations, training exercises, and enforcement of all applicable laws and regulations, on species that are federally listed under the ESA and fall under the jurisdiction of NMFS or USFWS. This BE also includes an Essential Fish Habitat (EFH) assessment as required under the Magnuson-Stevens Fishery Conservation and Management Act.

2.1 BACKGROUND

There has been a progressive, year-by-year decline in the thickness and extent of Arctic sea ice. Figure 2-2 and Figure 2-3 compare Arctic sea ice extent, human activities, and natural resources in 1992 versus 2012. The retreat of ice has created routes through what is now called the Northwest Passage and Northern Sea Route (Figure 2-3). Arctic sea ice reached a record minimum of 3.61 million square kilometers (km^2) (1.39 million square miles [mi^2]) in September 2012 (NSIDC 2012).

Vessel activity in the Arctic has increased with the retreating sea ice. Expanding commercial ventures in the Arctic have increased maritime traffic in the Bering Strait. From 2008 to 2012, traffic through the Bering Strait increased by 118 percent (U.S. Coast Guard 2013a). These activities include a broad range of vessels including icebreakers, research, oil industry, ore carriers, coastal resupply, cruise ships, recreational/adventurer vessels, and commercial fishing boats. With increased traffic comes an increased potential for search and rescue (SAR), water pollution, illegal fishing, and infringement on the U.S. Exclusive Economic Zone.

The world's eight Arctic nations are Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the United States. These nations are developing agreements to operate effectively in the area, while pushing toward further aggressive growth of commercial shipping, exploration, and tourism. International energy companies with U.S. subsidiaries have reinvigorated their plans to conduct drilling operations in the Chukchi Sea and Beaufort Sea.

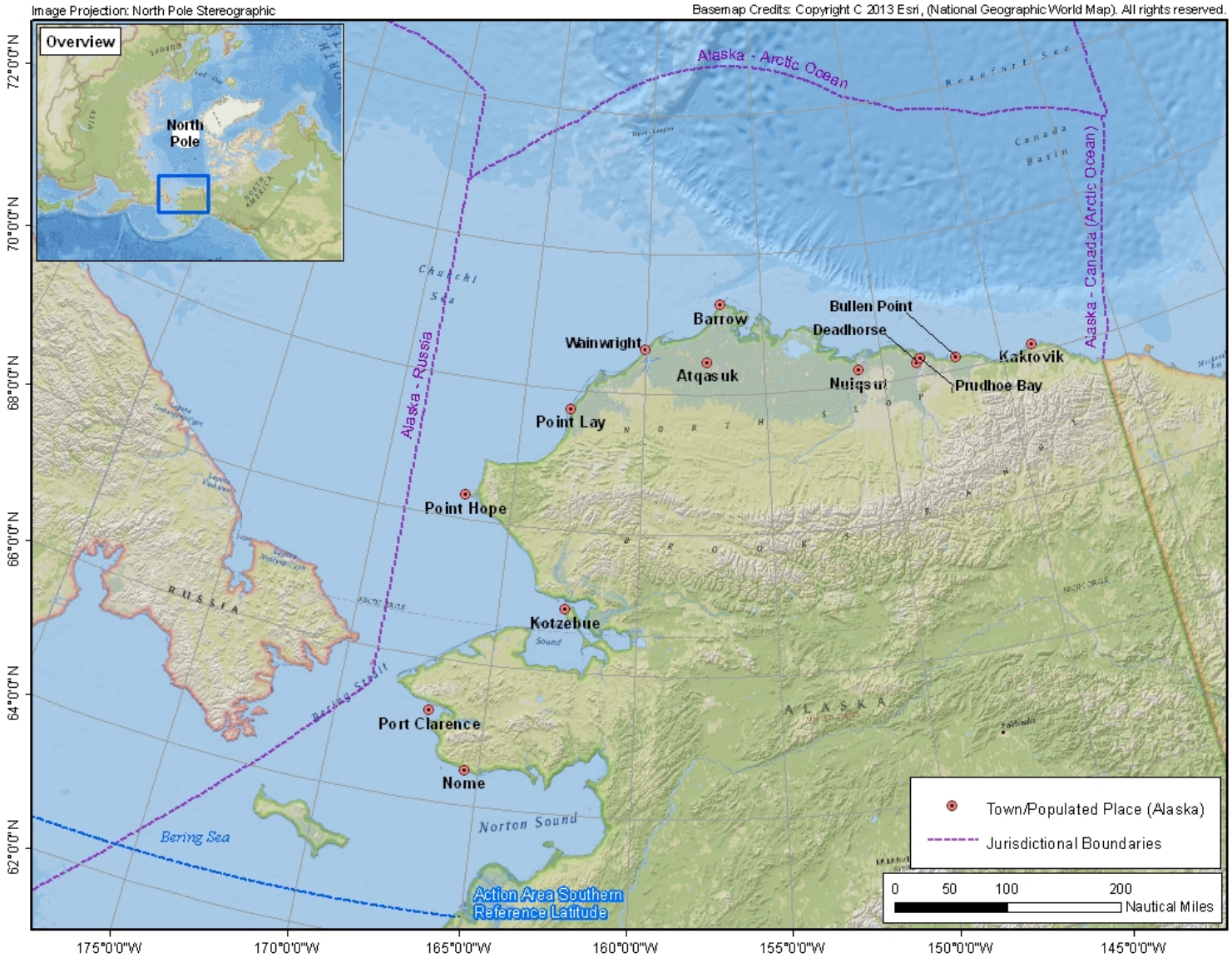

Figure 2-1: Proposed Action Area

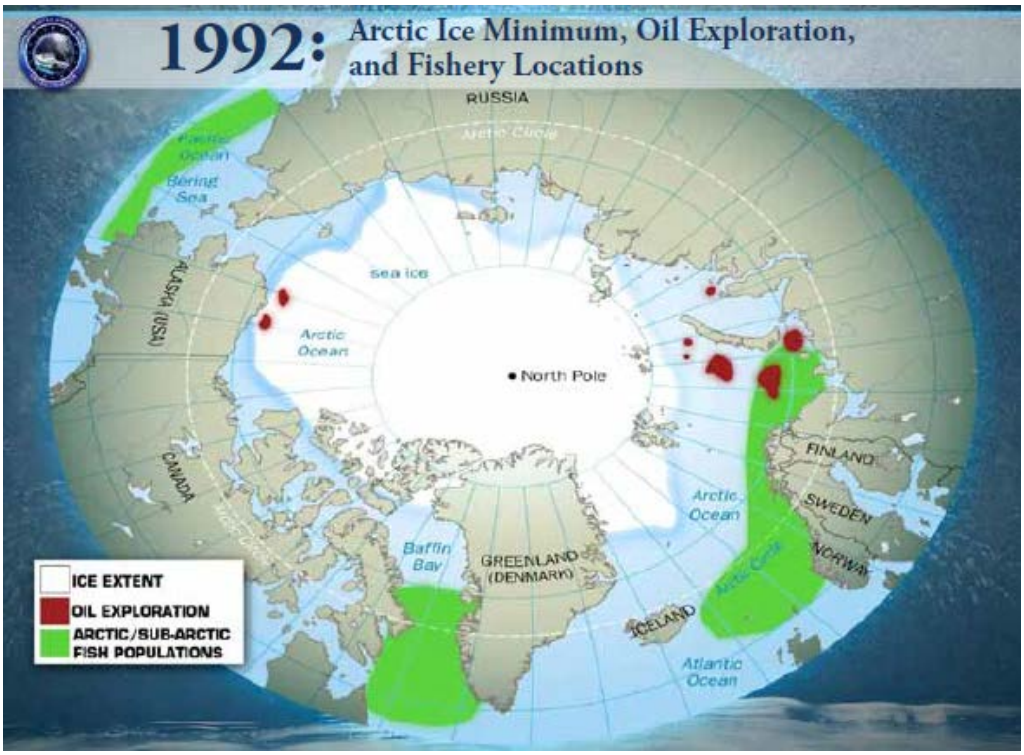

Figure 2-2 Sea ice extent and Arctic activities in 1992

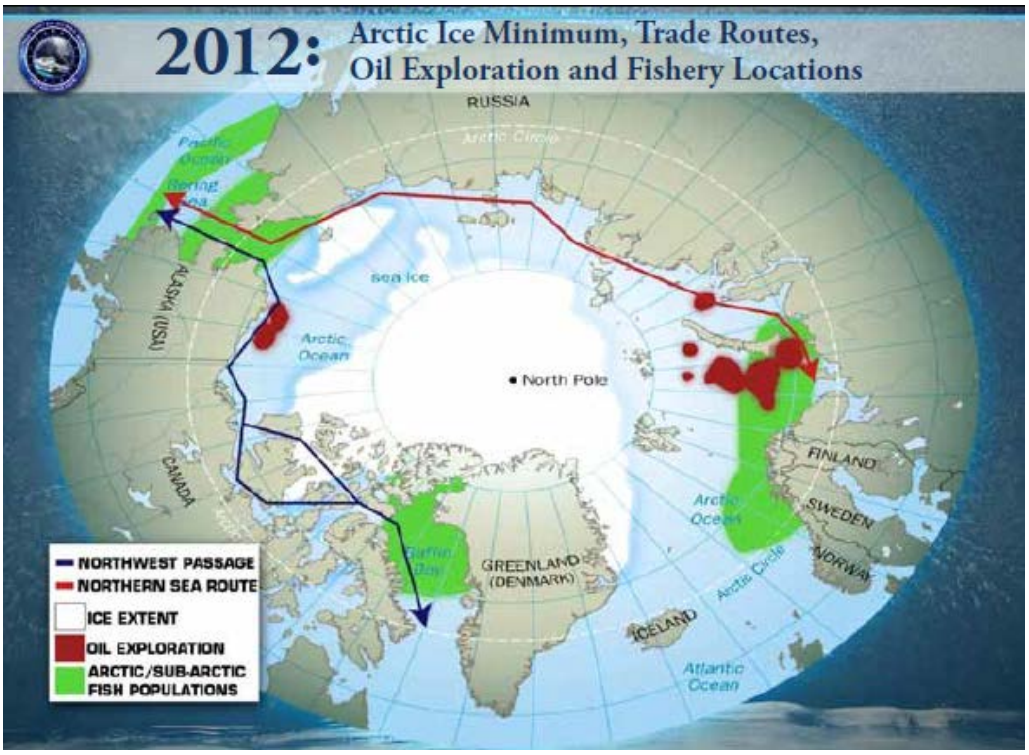

Figure 2-3 Sea ice extent and Arctic resources and activities in 2012

2.2 ACTION AREA

The Action Area for the 2014 – 2019 Arctic Operations and Training Exercises program is defined as the waters of the U.S. and the U.S. Exclusive Economic Zone and adjacent shoreline areas of Alaska from latitude 62.5˚N westward to the U.S. and Russian border, northward into the Chukchi and Beaufort Seas and eastward to the U.S. and Canadian border (Figure 2-1).

2.3 PURPOSE AND NEED FOR ACTION

Though U.S. Coast Guard cutter HEALY has operated in the Arctic for over a decade, Coast Guard District Seventeen has routinely conducted exercises, trained personnel, and tested equipment in the Arctic for only six years. These activities have occurred by overcoming obstacles to communications, logistics, and harsh weather. The lessons learned have informed the Coast Guard about the specific requirements needed to succeed in this environment. In 2012 and 2013 the Coast Guard increased the tempo of training and exercises through Operation Arctic Shield.

Arctic Shield 2012 focused on operations, outreach and an assessment of the Coast Guard's capabilities above the Arctic Circle. The forward operating location (FOL) in Barrow consisted of two Kodiak-based MH-60 Jayhawk helicopters with supporting air, ground, and communications crews. The Coast Guard deployed several surface assets to the Arctic that provided a persistent operational presence and command and control capability in an area where the Coast Guard lacks the permanent infrastructure of a coastal sector. Two light-ice capable 225-foot (ft) sea-going buoy tenders, a 282-ft medium endurance cutter, and a 378-ft high endurance cutter were also deployed to the region to increase offshore operational capability, ensure the safety of mariners, patrol international borders, and provide additional SAR capabilities.

As part of Arctic Shield 2013, the Coast Guard opened its seasonal FOL in Kotzebue, Alaska in preparation for the anticipated increase of maritime activities in western Alaska and the Bering Strait. Deploying helicopters and personnel at the Alaska National Guard hangar in Kotzebue afforded the opportunity to leverage existing infrastructure and strategically positioned the Coast Guard to conduct standard operations and effectively respond to maritime emergencies in the Arctic area.

To help develop and integrate the Coast Guard into existing Arctic international, federal, and state policy forums, Coast Guard District 17 hired a full-time Arctic planner to ensure Coast Guard activities align more efficiently to address interests in the area.

Coast Guard District 17 serves and safeguards the public, protects the environment and its resources, and defends the nation’s interests in the Alaskan maritime region. District 17 has 3,000 active duty, reserves, auxiliarists, and civilians supporting operations in Alaska, including more than 33,000 miles of coastline.

The purpose of the Proposed Action is to provide consistent and reliable Coast Guard presence in the Arctic to fulfill the Coast Guard’s Arctic Strategy, guided by direction from the President of the United States, including the National Security Strategy, National Military and Maritime Strategies, National Strategy for the Arctic Region, Arctic Region Policy NSPD-66/HSPD-25, National Strategies for Homeland Security and Maritime Domain Awareness, National Ocean Policy, and Executive Order 13580. The need for the Proposed Action is to meet the Coast Guard’s mandated missions in the Arctic where, to date, except for U.S. Coast Guard cutter

HEALY, there has not been a consistent, established Coast Guard presence. The increased levels of human activity in the Arctic will result in an increase in maritime activities, particularly during the mid-March to mid-November seasonal surge.

2.3.1 Coast Guard Missions

The legal basis for the Coast Guard is Title 14 of the United States Code (USC), which states: "The Coast Guard as established January 28, 1915, shall be a military service and a branch of the armed forces of the United States at all times."

Coast Guard District 17's overarching mission is to serve and safeguard the public, protect the environment and its resources, and defend the Nation's interest in the Alaskan maritime region. To do this, the Coast Guard has 11 statutory missions (6 USC § 468), each described in more detail below:

1. Ports, Waterways, and Coastal Security
2. Drug Interdiction
3. Aids to Navigation
4. Search and Rescue
5. Living Marine Resources Law Enforcement
6. Marine Safety
7. Defense Readiness
8. Migrant Interdiction
9. Marine Environmental Protection
10. Ice Operations
11. Other Law Enforcement

2.3.1.1 Ports, Waterways, and Coastal Security

The statutory mission described as ports, waterways and coastal security includes the following elements:

- Develop maritime security regimes,
- Detect, deter, and disrupt maritime terrorist attacks, sabotage, or subversive acts,
- Respond to and recover from attacks that may occur, and
- Work with port partners and review vessel and facility security plans to ensure responsible security planning in the private sector.

2.3.1.2 Drug Interdiction

The statutory mission described as drug interdiction includes the following elements:

- Reduce the supply of illegal drugs entering the United States via maritime routes through interdiction of smugglers and their illicit cargos at sea, and

- Counter drug trafficking organizations through the use of counterdrug bi-lateral agreements with partner nations.

2.3.1.3 Aids to Navigation

The statutory mission described as aids to navigation includes the following elements:

- Provide visual and electronic navigational aids, navigation information, and vessel traffic management services for U. S. navigable waterways, and
- Ensure that bridges and causeways allow for the safe passage of waterborne commerce and other marine traffic.

2.3.1.4 Search and Rescue

The statutory mission described as SAR includes the following elements:

- Provide response to save lives and property in peril to minimize loss of life, injury, and property damage,
- Coordinate SAR efforts of afloat and airborne Coast Guard assets with those of other federal, state, and local responders,
- Coordinate response efforts on waterways after accidents or disasters, exercising our Captain of the Port authorities and responsibilities, and
- Partner with the world's merchant fleet to rescue mariners in distress around the globe through the Automated Mutual-assistance Vessel Rescue system.

2.3.1.5 Living Marine Resources (Fisheries Law Enforcement)

The statutory mission described as living marine resources law enforcement includes the following elements:

- Project federal law enforcement presence over the entire U.S. Exclusive Economic Zone, covering nearly 3.4 million mi^2 of ocean,
- Ensure compliance with fisheries and marine protected species regulations on domestic vessels,
- Prevent over-fishing, reduce mortality of protected species, and protect marine habitats by enforcing domestic fishing laws and regulations, and
- Enforce the Marine Mammal Protection Act (MMPA) and the ESA.

2.3.1.6 Marine Safety

The statutory mission described as marine safety includes the following elements:

- Enforce safe and environmentally sound operation of U.S. flagged vessels throughout the world,
- Assert authority over foreign vessels operating in U.S. waters to enforce safe, secure, and environmentally sound operations in U.S. waters,
- Issue licenses and documents to qualified mariners, and promote competency through a combination of training courses, requisite experience, and examinations,
- Conduct inspections of U.S. and foreign vessels, marine facilities, and review plans for vessel construction, alteration, equipment, and salvage, and
- Develop and monitor vessel construction and performance.

2.3.1.7 Defense Readiness

The statutory mission described as defense readiness includes the following elements:

- Support U.S. Combatant Commanders including:
    - Deploying law enforcement teams aboard U.S. Navy ships to stem the flow of illegal drugs,
    - Train foreign nations in maritime law enforcement, security, and SAR, and
    - Conduct alert, intercept, communication, surveillance, and escort activities for National Air Defense.
- Provide capabilities and resources in support of naval warfare mission areas, and
- Function as a service under the Navy in time of war or when directed by the President.

2.3.1.8 Migrant Interdiction

The statutory mission described as migrant interdiction includes the following elements:

- Reinforce the Nation's border security by providing a layered defense to deter, detect, and interdict undocumented migrants attempting to enter the United States illegally, and
- Preserve safety of life at sea and respect the human rights of migrants while aboard Coast Guard assets.

2.3.1.9 Marine Environmental Protection

The statutory mission described as marine environmental protection includes the following elements:

- Stop unauthorized ocean dumping and regulate the discharge of oil, hazardous substances, and other shipboard wastes into U.S. and international waterways,
- Protect marine mammals,
- Regulate the introduction of invasive species into waterways,
- Respond to oil and hazardous substance accidents and reduce their impact on the marine environment, and
- Develop environmental regulations and standards for domestic vessels and marine facilities.

Oil or hazardous materials spill response is not a Coast Guard action that is addressed in this BE. Spill response planning in Alaska is accomplished through a series of inter-related plans. The National Contingency Plan provides the overarching framework and sets up procedures that are designed to minimize the imminent threat to human health or the environment from an uncontrolled release of oil or other hazardous substances. The Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges/Releases EPA uses the framework and priorities set forth in the National Contingency Plan and applies them in the context of Alaska. The EPA and Coast Guard are the federal agencies responsible for the implementation of the Alaska Contingency Plan. The Alaska Contingency Plan is supplemented by ten subarea contingency plans, which provide greater detail for local response planning in large inland and coastal areas of Alaska. The final level of response planning occurs at the local level and includes vessel- and facility-specific plans.

The EPA and Coast Guard are currently in consultation with the US Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service, under the authority of Section 7 of the ESA, regarding the potential for actions or planning processes conducted under the authority of the Alaska Contingency Plan, that lead to decisions to initiate actions that may affect protected species and habitats.

2.3.1.10 Ice Operations

The statutory mission described as ice operations includes the following elements:

- Keep critical U.S. waterways open for commercial traffic, assist vessels transiting in ice-filled waterways, free vessels stuck in ice, and break ice dams to prevent ice related flooding,
- Provide the means in ice-laden waters to allow scientific research, and
- Broadcast information on iceberg locations to vessels transiting Arctic waters.

2.3.1.11 Other Law Enforcement

The statutory mission described as other law enforcement includes the following elements:

- Enforce foreign fishing vessel laws,

- Patrol the U.S. Exclusive Economic Zone boundary areas to reduce the threat of foreign poaching of U.S. fish stocks,
- Monitor compliance with international living marine resource regimes and international agreements, and
- Deter and enforce efforts to eliminate fishing using large drift-nets, a method of high seas fishing considered to be one of the main obstacles to sustainable world fisheries and healthy ocean ecosystems.

2.3.2 Coast Guard Assets Supporting Arctic Operations

Air and surface assets for Arctic operational support may come from Coast Guard District 17 covering the state of Alaska, or other Coast Guard areas of operation. These vessels may include air assets such as fixed wing aircraft and helicopters, and surface assets such as cutters, small boats, buoy tenders, and icebreakers.

Coast Guard District 17 aviation resources include both fixed-wing aircraft and helicopters. The HC-130H fixed-wing aircraft are used for long-range search, surveillance (i.e., usually law enforcement searches to locate a specific vessel or concentration of vessels), and support. Helicopters perform short and medium range rescue, recovery, coastal surveillance, and aids to navigation support roles. All of these could potentially operate in the Arctic, but it is more likely that these assets would be dispersed on various missions including the Arctic, more southern areas of Alaska, or forward deployed to other districts (continental U.S. or Hawaii) at any given time.

Surface assets could include National Security Cutters, High Endurance Cutters, or Medium Endurance Cutters. Cutters also usually have a motor surf boat and/or a rigid hull inflatable boat on board. The Cutters are commissioned vessels of the Coast Guard. They are 65 feet or greater in length, have a permanently assigned crew, and have accommodations for the crew to live onboard. There are three main types of large Cutters within the Coast Guard's command. National Security Cutters are 418 feet in length, and are the largest and most technologically sophisticated cutters in the Coast Guard. Each National Security Cutter is capable of operating in the most demanding open ocean environments. The 378-foot High Endurance Cutters are equipped with a helicopter flight deck, retractable hangar, and the facilities to support helicopter deployment. The Medium Endurance Cutters vary in length from 210 to 282 feet, and have supported Coast Guard missions around the world throughout their time in service. All National Security Cutters, High Endurance Cutters, and Medium Endurance Cutters are flight deck equipped. Helicopters are assigned on flight-deck equipped cutters on a case-by-case basis, but typically all the large cutters will have a Coast Guard helicopter detachment assigned to them when working with the District 17 area.

Other cutters that may operate in the action area are not flight deck equipped. Currently, 110' Island-class patrol boats may operate in the action area and are used for search and rescue and law enforcement. In the near future, Coast Guard District 17 will likely acquire Sentinel-class fast response cutters. The Sentinels have been commissioned to help meet the Coast Guard's need for additional patrol boats. They are 154 ft long, with crew capabilities to hold 24 people. It will enhance Coast Guard response times with a top speed of 28 kts, an improvement over the existing patrol boat speeds of 26 kts. The fast response cutter will be able to operate in rougher sea states compared with the 110' Island-class patrol boats, which will allow the fast response

cutter to patrol a larger area and remain on patrol longer during heavier weather than the current patrol boats.

During Arctic Shield 2013, several Coast Guard cutters were deployed to the Arctic, including: the ice breakers POLAR STAR and HEALY (homeported in Seattle, Washington); the National Security Cutter WAESCHE (homeported in Alameda, California); the patrol boat NAUSHON (homeported in Ketchikan, Alaska); and the seagoing buoy tender SPAR (homeported in Kodiak, Alaska).

The 225-foot Seagoing Buoy Tender is equipped with a single controllable pitch propeller, bow and stern thrusters, which give the cutter the maneuverability it needs to tend buoys offshore and in restricted waters. A Dynamic Positioning System can hold the vessel within a 10 meter circle using the Global Positioning System allowing the crew to service and position floating aids to navigation more efficiently in winds up to 30 knots and 8-foot seas.

The largest cutters operated by the Coast Guard are the icebreakers. These cutters, specifically designed for open-water icebreaking have reinforced hulls, special icebreaking bows, and a system that allows rapid shifting of ballast water to increase the effectiveness of their icebreaking. The POLAR SEA and POLAR STAR were built in the 1970s and the newest and most technologically advanced icebreaker, the Cutter HEALY was added to the fleet in November 1999. At this time POLAR SEA is not operational and is not expected to be so in the near future. They serve in the Arctic and Antarctic, serving science and research as well as providing supplies to remote stations. Polar Class icebreakers also carry an Arctic Survey Boat and Landing Craft on board, and are flight deck equipped. On the Polar Class vessels, helicopter support is likely to be contracted or civilian helicopter support for specific scientific missions while in the Arctic.

2.4 PROPOSED ACTION

This chapter describes the Coast Guard's Proposed Action for meeting increased mission demands in the Arctic. This chapter also includes a discussion of best management practices (BMPs) included in the Proposed Action.

The Proposed Action is to conduct increased operations and training exercises in the Arctic to meet Coast Guard mission responsibilities due to the increase of national and international activities in the area. This objective would provide a shore, air, and sea Coast Guard presence to meet the seasonal surge mission requirements, typically mid-March through mid-November. These activities support the Arctic Strategy and enable the Coast Guard to fulfill its 11 mandated missions as described in Section 2.3.1, Coast Guard Missions. Oil or hazardous waste spill response is not a part of the Proposed Action, as described earlier in Section 2.3.1.9.

2.4.1 Shore Operations

2.4.1.1 Forward Operating Locations and Logistics/Staging Locations

Several locations do, or may, serve as temporary Coast Guard home bases for sea and air support during the seasonal surge of Arctic activities, mid-March to mid-November. Locations are shown in Figure 2-4.

Barrow is a FOL for deployment of air assets supporting Coast Guard seasonal missions using leased hangar facilities. Barrow serves as a refueling station for Coast Guard aircraft and up to two helicopters. Missions include support for SAR and Arctic domain awareness flights. Coast

Guard may also provide support for drug interdiction at the request of the Western Alaska Alcohol and Narcotics Team or local authorities.

The Coast Guard may construct permanent facilities on a previously disturbed site in close proximity to existing infrastructure to support air operations. This may include installing a temporary 40-ft Fanlite™ high frequency antenna on a developed gravel or asphalt area, an 80- to 120-ft permanent antenna, and a radio room. As further specifics are developed, environmental documentation and permit applications with applicable details will be prepared, as necessary.

Flight and service crews resided in hotels during Arctic Shield 2012 and 2013. In the future, the Coast Guard may build permanent, fixed facilities near existing facilities and services to support 30 or more personnel for berthing, dining, support, and recreational services. As further specifics are developed, environmental documentation and permit applications with applicable details will be prepared, as necessary.

Nome and Kotzebue may serve in the future as FOLs in a capacity similar to that of Barrow. Both locations have good potential for deep-water ports with close proximity to outer continental shelf oil and gas endeavors and potential mining operations. In April of 2012, Alaska House Bill 286 awarded $10,000,000 in state bonds for Port Design and Construction to each locality (USACE 2013). Development of deep-water ports would require adding aids to navigation and the accompanied increase in commercial shipping would increase the need for Coast Guard presence and development of facilities to meet mission requirements.

In January of 2012, Nome was the focus of international attention and awareness for the need of Coast Guard presence when the U.S. Coast Guard icebreaker HEALY carved a path through the frozen Bering Sea for the RENDA, a Russian tanker carrying 1.3 million gallons of emergency gasoline and diesel fuel.

During the Coast Guard's Arctic Shield 2013, personnel from Coast Guard Base Kodiak and Air Station Kodiak spent 9 days operating out of an Alaska Army National Guard hangar as part of an FOL in Kotzebue. An MH-60 Jayhawk helicopter crew and support staff flew throughout the region to increase the Coast Guard's knowledge about Western Alaska and met with local leaders to strengthen the Coast Guard's bonds with the community.

Port Clarence. Previously a Coast Guard long-range navigation station, Port Clarence is now a likely candidate for development into a deepwater port as a logistics and staging location for vessel maintenance, refueling, and resupplying. Port Clarence has the deepest natural harbor in the Bering Strait region and has a runway, fuel tanks, several buildings, and generators in caretaker status.

Airports, airstrips, and distant early warning (DEW) line sites. Within the study area, numerous airports with services and facilities may serve as FOLs for deployment of air assets. Additionally, repairs to support air operations may occur on DEW line sites and other airstrips with limited or no facilities. The following airports, airstrips, and DEW line sites in Table 2-1 and Figure 2-4 are under consideration as future FOLs or logistics and staging locations for deployment of air assets in support of Coast Guard seasonal missions. Missions could include support for SAR and Arctic domain awareness flights. Some of the airports are Long Range Radar Stations or Short Range Radar Sites. DEW line sites in the Arctic region have useable or

upgradable infrastructure such as runways, generators, fuel tanks, and hangars. Many of these DEW line sites are currently not operational.

Cold Bay, Dutch Harbor, and Unalaska. Though not within the defined Arctic region, these locations provide support for activities that further the Coast Guard's efforts in the Arctic. For short durations, the Coast Guard may deploy additional air assets using existing leased facilities to support missions such as SAR and law enforcement in the Arctic.

Table 2-1 Airports, airstrips, and DEW lines for possible future use

Point Hope Airport	CD-3 Airstrip
Cape Lisburne LRRS Airport	Helmericks Airport
Cape Sabine DEW Line Station	Oliktuk Point DEW Line Station
Point Lay LRRS Airport	Oooguruk Island Heliport
Icy Cape DEW Line Station	Pioneer Helipad
Wainwright Air Force Station	Northstar Heliport
Wainwright DEW Line Station	Seal Island Heliport
Wiley Post-Will Rogers Memorial Airport	Deadhorse Airport
Point Barrow DEW Line Station	Prudhoe Bay Landing Strip
Lonely DEW Line Station	Bullen Point Air Force Station Landing Strip
Kogru DEW Line Station	Brown Low Point Landing Strip
Nuiqsut Landing Strip	Barter Island DEW Line Station
Port Clarence Airstrip	

DEW: distant early warning; LRSS: Long Range Radar Stations

2.4.1.2 Inspections and Safety

The Coast Guard would conduct inspections of vessels in major ports in Alaska to ensure cargos are as claimed, safety standards are intact, and construction or maintenance plans meet established standards. Inspections of both commercial and non-commercial vessels further the missions of drug and migrant interdiction and marine safety. Lasers (described in Section 4.2.3.5, below) could be used during underwater inspections. These lasers are typically used at ranges less than 20 ft to detect damage and screen for explosives. The Coast Guard would discuss boating safety with recreational boaters during port facility inspections or in a public school classroom setting.

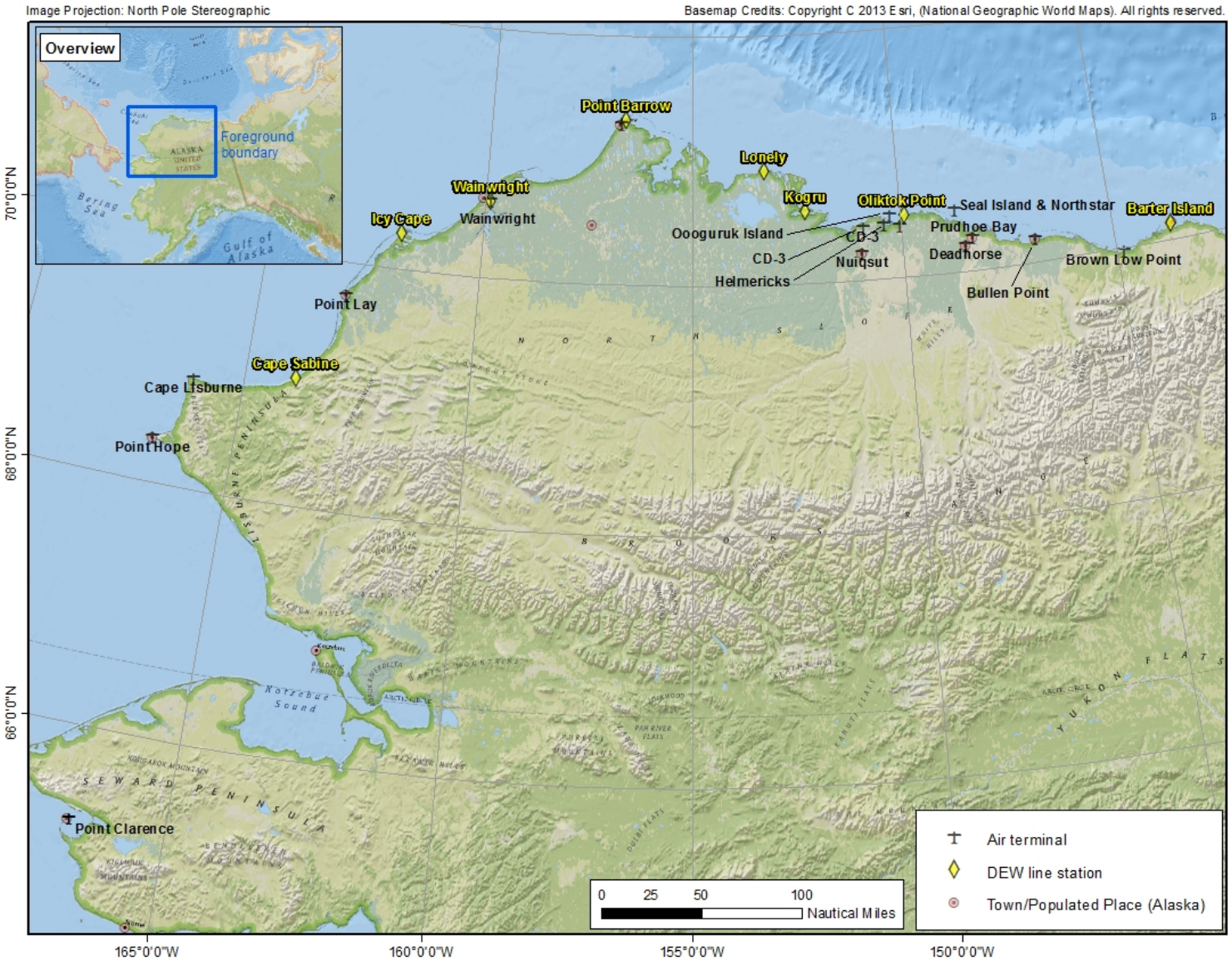

Figure 2-4 Current and Potential Forward Operating Locations in the Action Area

2.4.2 Air Operations

2.4.2.1 Search and Rescue

SAR missions are those that have the goal of preventing the loss of life and property. Because of the vast area of Coast Guard SAR responsibilities in Alaska, an aircraft often is sent to find the vessel and report its location and status before a Coast Guard vessel is sent for the rescue. Air searches for persons in the water must be performed at an altitude below 500 ft to be effective. Recovering persons in the water and dropping rescue equipment must also be done while the helicopter is hovering below 500 ft. Materials that may be left behind during an SAR operation include dye packs, life rafts, and flares.

2.4.2.2 Routine Patrols and Arctic Domain Awareness Flights

These operations serve to locate, identify, and document human contacts north of the Arctic Circle. The flights would also gather and verify data on coastal erosion, ice observation, and other scientific data requests (e.g., carcass surveys and walrus haulout locations). Arctic domain awareness flights provide an opportunity for pilot and crew familiarization with the Arctic Circle and can be the only safe opportunity for media coverage of events. Routine patrols and Arctic domain awareness flights are typically performed above 500 ft, weather permitting.

2.4.3 Sea Operations

All Coast Guard vessels are equipped with standard navigational technologies, including radar and navigational sonars (described in Section 4.2.3, below). These devices allow ships to operate safely in the complex Arctic environment, and will be used by all relevant platforms during standard operations, training, and other missions. Additionally, unmanned underwater vehicles (UUVs) used in emergency response and training operations may be equipped with sonar equipment to aid in obstacle detection.

2.4.3.1 Search and Rescue

When air support provides the location, Coast Guard vessels can transit to the rescue location of a vessel in distress. Flight deck equipped vessels provide logistical support to aircraft.

When a vessel carrying a large number of passengers requires rescue, one or more Coast Guard vessels must get to the site quickly because helicopters cannot carry numerous additional passengers due to space and weight limitations. Island class patrol boats currently support SAR, and Fast Response Cutters are likely to support Arctic SAR efforts in the reasonably foreseeable future.

2.4.3.2 Icebreaking

The Coast Guard operates two icebreakers in Arctic waters: the heavy polar icebreaker POLAR STAR and the medium polar icebreaker HEALY. Both icebreakers are homeported in Seattle, Washington. They operate in the Arctic between March and November each year, mainly in the Chukchi Sea west to the Russian border and in the Beaufort Sea east to the Canadian border. The main mission of the HEALY is oceanographic and meteorological research. More information on the HEALY and science missions can be found at www.icefloe.net. Icebreakers also participate in a few SAR and law enforcement missions each year, and are prepared to collaborate with the domestic sector in ship escort, towing, and oil-spill response activities. Most expeditionary missions last approximately 60 days, although missions of 180 - 200 days will routinely occur on the HEALY.

Each icebreaker carries two HH-65C helicopters for ice reconnaissance, logistics supply, and support of specific science projects, and several boats up to a length of about 37 ft. The icebreakers have a cruising speed of 10 to 12 kts and a maximum speed of about 17 kts. During icebreaking operations, they usually travel at 3 to 8 kts, and may travel even slower when breaking heavy ice. The general method for icebreaking is simply driving the ship up on top of the ice until the weight of the ship breaks the ice. The blunted bow of the icebreaker enables it to ride up on top of the ice while the stern sinks lower in the water. The force of buoyancy acting on the submerged portion of the stern creates a lever-like action bringing the icebreaker's weight down onto the ice and breaking it. Another lesser-used and less preferable method of icebreaking is backing and ramming, which is repeatedly striking the ice in a controlled manner to break through a ridge.

Helicopters conduct reconnaissance flights to detect open water leads in the ice, through which the icebreaker can more easily transit. Additionally, personnel use a combination of satellite imagery, ice reports from the National Weather Service, and cameras on unmanned aerial vehicles (UAVs) to identify leads and areas of reduced ice coverage or thickness. During reconnaissance flights, helicopters operate at altitudes between 400 ft and 1,500 ft, depending on conditions and mission requirements.

The primary mission of the icebreakers in Arctic waters is scientific research. The POLAR STAR serves as a scientific research platform with five laboratories and accommodations for up to 20 scientists. Cranes and work areas near the stern and port side of ship give scientists the capability to do at-sea studies in the fields of geology, vulcanology, oceanography, sea-ice physics and other disciplines. The HEALY conducts a wide range of research activities, providing more than 4,200 ft^2 of scientific laboratory space, numerous electronic sensor systems, oceanographic winches, and accommodations for up to 50 scientists. The POLAR STAR is able to ram through ice up to 21 ft thick and steam continuously through 6 ft of ice at 3 kts and operate at -60° Fahrenheit. The HEALY can ram through ice 8 ft thick and break 4.5 ft of ice continuously at 3 kts and able to operate in temperatures as low as -50° Fahrenheit. Scientific equipment may include 3-24 kHz bottom mapping echosounders and Acoustic Doppler Current Profilers in the 38-150 kHz range used for mapping and obstacle detection tasks. Unless the icebreaker's mission specifically involves investigating an endangered species, the icebreaker will plan its passage through the ice to avoid any known sanctuaries or feeding grounds. Trained crewmembers look specifically for marine mammals during operations. Their reports provide scientists and biologists invaluable information on endangered and threatened species and their habitats. When marine mammals are spotted, the icebreaker avoids them or uses its foghorn in advance to displace the animals from the path of the vessel. After consulting with local communities, the ships avoid active subsistence hunting areas during the spring and fall bowhead whale migrations so as not to interfere with subsistence hunts.

2.4.3.3 Safety Zones

A 500-m safety zone may be established around offshore oil exploration vessels actively engaged in drilling operations in agreement with the Outer Continental Shelf Lands Act, 43 USC § 1331 et seq., usually from July through October. Figure 2-5 shows the lease blocks established in the Chukchi and Beaufort Seas by the U.S. Department of the Interior.

The establishment of the zones would be conducted in accordance with the Notice of Proposed Rulemaking Process and has been published in the Federal Register with an appropriate time for

public comment. These safety zones are intended to ensure the safe navigation of all vessels transiting in the area. The safety zones would establish an area that is intended to be clear of other vessels and people who may intentionally or unintentionally interfere with permitted exploratory drilling operations. The Coast Guard would actively monitor and enforce the established safety zones. No physical markers are used to delineate safety zones, but a Notice to Mariners is issued.

Other safety zones would be enforced as needed to protect divers and vessel interference during salvage work, enforce flight restrictions, and maintain standoff distances to any other event that presents a hazard to navigation. Flight restrictions are communicated through Notice to Airmen and Federal Aviation Administration bulletins and could be in place where high tempo Coast Guard operations are occurring.

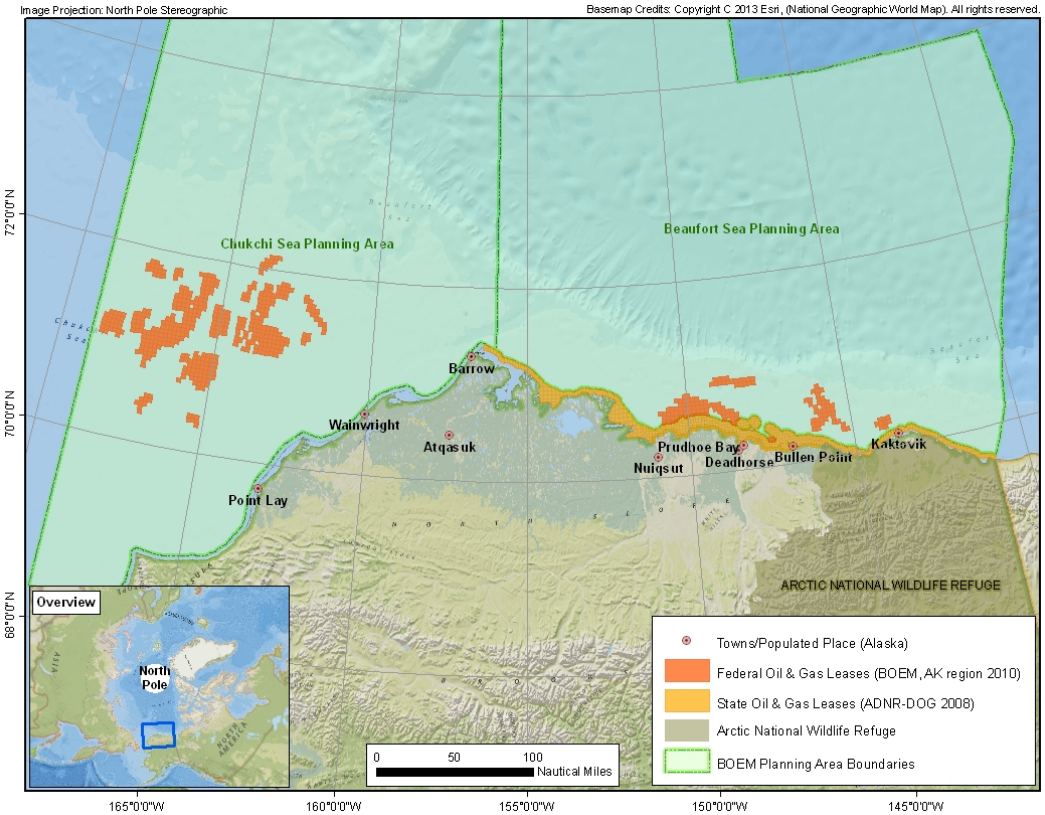

Figure 2-5 Existing Oil and Gas Lease Blocks in the Chukchi and Beaufort Seas

2.4.3.4 Routine Patrols

The Coast Guard would routinely patrol Arctic waters to detect, deter, and disrupt maritime terrorist attacks, sabotage, or subversive acts; detect and investigate violations of the MMPA and ESA; and to reduce the threat of foreign poaching of U.S. natural resources such as fish stocks or mineral deposits.

2.4.4 At-Sea and Shoreside Berthing and Support Facilities

Lack of infrastructure, long distances, and limited at-sea endurance of vessels requires that the Coast Guard obtain at-sea direct support capability for Arctic contingency operations. The

acquisition of support barges or obtaining access to support vessels will make the difference in the ability to persist on-scene and conduct an effective response to increasing needs within the Action Area. Various considerations to increase operational capacity and personnel support are under consideration such as:

- Construct joint-use modular thirty-man messing, berthing, and recreation facility with radio room and installed antenna at Barrow and other locations. Mobile communication detachments may also be deployed and supported due to a lack of an available Coast Guard high-frequency antenna and communications facilities;
- Acquire ocean-capable barges to use for operational staging and support, thereby providing faster response time during contingency operations; and
- Mobile sea bases could support spill response operations by assembling a floating island of barges to serve as a mobile base of operations. These would provide command and control, messing and berthing, helicopter support, decontamination and logistics staging for the operational personnel (Figure 2-6).

The placement of an at-sea mobile sea base would not be located in any sensitive areas, including critical habitat, subsistence use, or areas of heavy marine traffic. As plans for use of a mobile sea base would require additional planning efforts, the Coast Guard would reinitiate consultation and further analysis with the Services for these activities.

Figure 2-6 Mobile Sea Base

2.4.5 Training Exercises

The Coast Guard must continually assess the capability of personnel, assets, and resources operating in the Arctic. Training is required for ice navigation, oil spill response[1], and practicing

[1] Oil Spill Response activities fall under a different authority and are addressed through the Alaska Unified Plan and associated environmental analysis documents by the Coast Guard and other federal agency partners.

Arctic logistics exercises for sea, land, and air. Training is essential in order for Coast Guard personnel to develop and maintain the skills needed to successfully accomplish mission objectives, and to allow the Coast Guard to accurately assess current capabilities and future needs. As Arctic operations expand, more joint service exercises will likely occur. Involved agencies could include the National Oceanic and Atmospheric Administration and all branches of the Department of Defense.

2.4.5.1 Rescue Exercises

Historically, Coast Guard rescue training exercises have been mostly confined to U.S. resources; however, it is becoming increasingly likely that these exercises involve coordination with other nations, such as Canada and Russia.

Passing and towing exercise (TOWEX). TOWEX involves the use of a Coast Guard vessel to tow a distressed ship to safety. In these exercises the vessel in distress would be simulated by another Coast Guard vessel. The training involves passing tow lines between the distressed and rescue vessels and coordinating movements of the two ships. Towing would proceed at maximum safe speed for the two vessels moving together, which is substantially slower than a single Coast Guard vessel on a SAR mission.

Mass Rescue Operation (MRO) table-top exercise. An MRO table-top exercise trains Coast Guard personnel how to coordinate with federal, state, local, and international entities in an office setting, and does not involve a field component. The exercise simulates a SAR mission involving a large number of persons in distress, such that the assets normally available to SAR authorities (e.g., a single helicopter and a single vessel) are inadequate due to the scale of the event.

MRO exercise. An MRO exercise trains Coast Guard personnel how to conduct a mass rescue operation in the field. The exercise involves the use of a surface asset, typically a cutter, to simulate a stricken ship that must deploy boats and life rafts to simulate evacuation of passengers. Emergency Medical Technician and fire safety equipment are used to increase exercise realism to the fullest extent possible. Materials such as dye packs or flares could be expended during these exercises.

2.4.5.2 Flight Training

Flight crews would be required to log in-flight hours to meet ongoing training requirements while at their FOL. As weather permits, MH-60T and MH-65D helicopters would be flown in the FOL area to meet this requirement. Flight crews would coordinate with local tribes to ensure their proposed flight paths would not interfere with subsistence harvest activities.

2.4.5.3 Small Boat Training

Small boat training would include boat launching and maneuvers, typically in the vicinity of small boat stations. The majority of small boat training will be from cutter deployed boats, as no small boat stations exist in the Arctic. Some shore-based boats may be transported to facilities by air and then launched via vehicle on a case-by-case basis. Specific exercises include coxswain training, SAR, and vessel boarding and inspections. All cutters have a training need to conduct Deck Landing Qualifications or deck hoists, for those cutters that are not flight deck equipped. Hoist altitude depends on the height of any obstacles in the area, but is anywhere between 25 to 100 feet above the surface where the hoist is being conducted.

2.4.5.4 Oil Recovery Training Exercises

Oil or hazardous materials spill response is not a Coast Guard action that is addressed in this EA. Spill response planning in Alaska is accomplished through a series of inter-related plans. The National Contingency Plan provides the overarching framework and sets up procedures that are designed to minimize the imminent threat to human health or the environment from an uncontrolled release of oil or other hazardous substances. The Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges/Releases EPA uses the framework and priorities set forth in the National Contingency Plan and applies them in the context of Alaska. The EPA and Coast Guard are the federal agencies responsible for the implementation of the Alaska Contingency Plan. The Alaska Contingency Plan is supplemented by 10 subarea contingency plans, which provide greater detail for local response planning in large inland and coastal areas of Alaska. The final level of response planning occurs at the local level and includes vessel- and facility-specific plans.

EPA and Coast Guard are currently in consultation with the US Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service, under the authority of Section 7 of the ESA, regarding the potential for actions or planning processes conducted under the authority of the Alaska Contingency Plan, that lead to decisions to initiate actions pursuant that may affect protected species and habitats.

Historically, oil recovery exercises have been mostly confined to U.S. resources; however, it is becoming increasingly prudent that these exercises involve coordination with other nations, such as Canada and Russia. The field exercises could use simulated spill products that include buoyant, organic, and biodegradable items, such as moss or fruit, or fluorescein or rhodamine water-tracing dye. Use of these products provides the Coast Guard with the opportunity to study spill drift and practice skimming.

Spill of National Significance table-top exercise. The Coast Guard would conduct a joint exercise with federal, state, and local participants in an office setting to evaluate incident command procedures for response to a Spill of National Significance.

Deployment of a Spilled Oil Recovery System (SORS) and Vessel of Opportunity Skimming System (VOSS). These skimming systems would be deployed over the side of vessels to practice skimming spills and debris for planning purposes and future use in response to an environmental emergency (Figure 2-7).

Figure 2-7 Crewmembers testing the vessel's Spilled Oil Recovery System

Research and Development Center (RDC) Capabilities Demonstrations. Coast Guard Research and Development Center (RDC) would conduct tests of various technologies that would enhance Coast Guard mission effectiveness and/or efficiency. Technologies would include unmanned underwater vehicles (UUVs) and UAVs to search and detect targets of interest under, in, and on ice (Spilled oil in ice is an example shown in Figure 2-8). UUVs would use downward and upward directed sensors and UAVs would use radars, optics and infra red detectors to search for the targets of interest. Lasers could also be used for detection, but would operate within 20 feet of a given target. Other sensors that would be used include sonars (> 50 kHz), and fluorometers. RDC Center would also conduct tests of various skimming systems for recovering spilled oil in, around, and from under ice. RDC testing would be discrete test evolutions of 2 weeks or less annually (the number of test days would depend on the nature of the capability being evaluated). Testing would be tweaked annually.

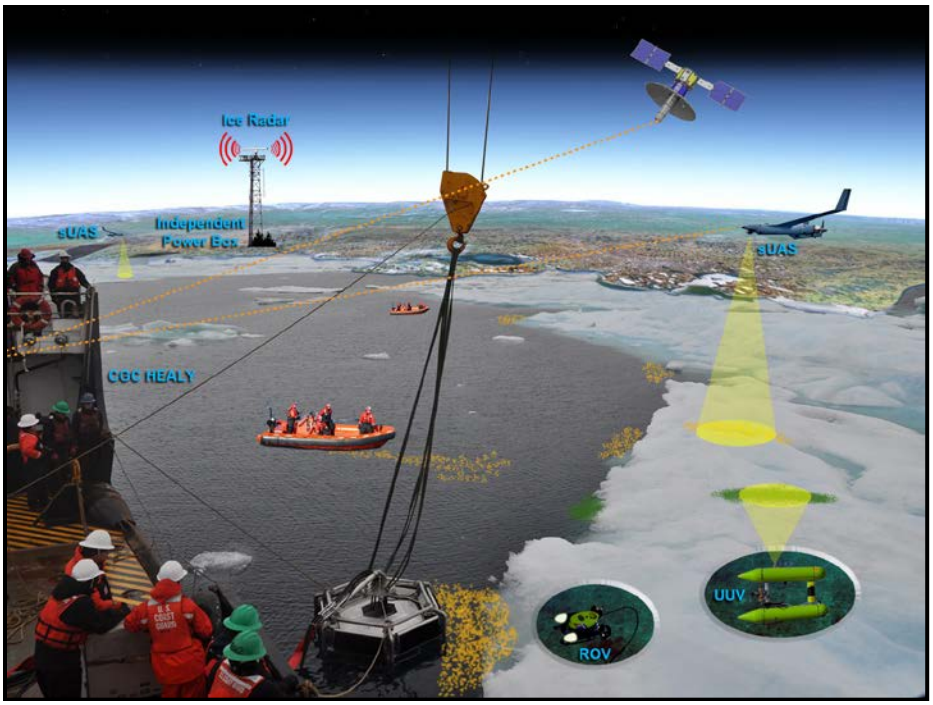

Figure 2-8 Spilled oil in ice recovery demonstration concept illustrating use of biodegradable oil substitute (fruit).

2.4.6 Tribal and Government Engagement

Formal and informal government-to-government and community engagement with tribes and local community leadership is vital to all of the Coast Guard's missions. Engagement categories include:

a. Governmental outreach and relations,
b. Educational and training outreach, and

Governmental Outreach and Relations. Coordinators, usually Coast Guard senior representatives, would initiate communication efforts with village mayors, tribal elders, and other leaders in several communities prior to Coast Guard actions in or near tribal or village areas. Year-round sustained engagement through conferences, meetings, personal communication, and symposiums would occur. During the summer surge of Coast Guard activities, this would involve regular, sometimes daily communications of Coast Guard actions and how they may interact with subsistence resources.

Educational and Training Outreach. The Coast Guard would reach out to tribes and villages and offer classes such as:

- Kids Don't Float - The Coast Guard would continue this program to maintain and supply remote communities with proper safety equipment to ensure youths can safely enjoy water and subsistence activities with their families.
- Water Safety - The Coast Guard would educate children on water safety to ensure that they understand proper water safety techniques and fewer lives are put at risk.

- Commercial Fishing Vessel Standards Outreach - The Coast Guard would provide additional outreach efforts, including dock side exams, town hall meetings, and forums in remote communities to increase knowledge of Commercial Fishing Vessel Standards requirements, including new requirements that will go into place in the next few years.

2.4.7 Best Management Practices and Conservation Measures

The Proposed Action would require all Coast Guard staff, contractors, and subcontractors to employ BMPs during Arctic activities to avoid or minimize potential impacts on the environment and cultural resources. All BMPs and conservation measures will be implemented to the fullest extent possible considering safety of personnel and equipment. However, during national security, SAR or urgent law enforcement activities, the Coast Guard will prioritize mission success over BMPs and conservation measures.

2.4.7.1 Coast Guard Guidance

The Coast Guard will conduct activities in accordance with the following Coast Guard guidance:

- Marine Protected Species Program for the Gulf of Alaska, Bering Sea/Aleutian Islands, and Arctic (Coast Guard District 17 Instruction [CGD17INST] 16214.2A) (U.S. Coast Guard 2011) – CGD17INST 16214.2A outlines procedures for avoiding marine mammals and protected species; reporting whale and protected species sightings, strandings, and injuries; and enforcing the MMPA and ESA.

- Vessel Environmental Manual (Commandant Instruction [COMDTINST] M16455.1) – Chapter 11 of the Vessel Environmental Manual describes measures for protection of marine wildlife applicable to all waterborne Coast Guard assets. In accordance with this instruction, all Commanding Officers and Officers in Charge must plan and act to protect marine mammals during operations and planning. Whale avoidance measures are prescribed, including requiring that vessels be especially alert for activity, and proceed with caution, in areas of known whale migration routes or high animal density, and that vessels do not approach whales head on during non-emergency maneuvering. Right Whales are to be avoided by 500 yards (yd) and all other species by 100 yd, except when assisting in an animal rescue effort or enforcing the ESA.

  The manual states ballasting and de-ballasting shall be conducted in a manner to minimize the introduction of non-native species and reduce their impact. Ballast water taken on board from a location more than 200 nautical miles (nm) (370 km) from any shore and in water of a depth greater than 200 m may be discharged without restriction. Ballast water taken on board within 200 nm (370 km) from any shore or in water less than 200 m deep, must be managed through step-wise protocol that ranges from ballast water exchange in waters more than 200 nm from any shore and more than 200 m deep, to discharge at an approved receiving facility. In all cases, the minimum distance for de-ballasting shall be 12 nm (22 km) from land. Any ballast water taken on board would likely be released (ballast tanks cycled) in the Bering Sea, prior to entering any port (e.g., Dutch Harbor, Nome) for refueling. Should any invasive species be in the ballast water, these species would be released in the open ocean to minimize the potential for introduction into another area.

- Coast Guard Air Operations Manual (COMDTINST M3710.1G) – The Air Operations Manual prescribes measures for protection of wildlife applicable to all Coast Guard air assets. In accordance with this instruction, Commanding officers shall implement standard operating procedures to prevent unnecessary over-flight of sensitive environmental habitat areas, to include, but not be limited to, critical habitat designated under the ESA, migratory bird sanctuaries, marine mammal haul-outs and rookeries, and sea turtle nesting beaches. Environmentally sensitive areas will be properly annotated on pilot's charts as required. When it is necessary to fly over such areas, an altitude of 2,000 ft above ground level shall be maintained, except during emergency or enforcement operations. The amount of time spent at low altitudes should be limited to what is necessary to accomplish the particular emergency or reconnaissance operation.

- U.S. Coast Guard Approach, Vessel Speed and Strike Response Guidance (COMPACAREA R142308Z DEC 11) – This guidance prescribes that vessel operators shall use caution, be alert, maintain a vigilant lookout and reduce speeds, as appropriate, to avoid collisions with whales during the course of normal operations. Appropriate reduced speeds should be based on specific factors (see rule 6 [safe speed] of the international/inland navigation rules). During routine operations, when whales are sighted or known to be in the immediate vicinity, operators are required to employ all possible precautions to avoid interactions or collisions with whales, including the following:
    - Reducing speed,
    - Posting additional dedicated lookouts to assist in monitoring whales' location,
    - Avoiding sudden changes in speed and direction, or if a swimming whale is spotted, attempting to parallel the course and speed of the moving whale so as to avoid crossing its path, and
    - Avoiding approach of sighted whales head-on, or from directly behind. Right whales shall not be approached within 500 yd; when feasible, the same restriction will apply to bowhead whales. The minimum approach distance to all other whales is no closer than 100 yd. In the Bering Sea and Gulf of Alaska (GOA), a whale should be treated as a right whale unless the whale is positively identified as another whale species.

- Maritime Law Enforcement Manual (COMDTINST 16247.1) – In accordance with this manual, during all maritime law enforcement activities the Coast Guard shall seek to avoid collision with a whale during the course of normal operations, operators of Coast Guard vessels transiting critical habitat, migratory routes, and high-use areas use caution, remain alert, and reduce speeds, as appropriate. Additional reductions in speed are considered when a whale is sighted or known to be in the vicinity or within 5 nm (9 km) of the vessel.

- Protected Living Marine Resources Program (COMDTINST 16475.7) – This instruction outlines Coast Guard actions, during Coast Guard operations, to support the recovery of protected living marine resources through internal compliance with and enforcement of Federal, State, and international laws designed to preserve marine protected species.

In addition, included in the Proposed Action are a number of conservation measures developed through coordination with NMFS and USFWS during previous consultations and preparation of this BE. BMPs and conservation measures that are part of the Proposed Action are described for each resource, as applicable, below. These measures may not apply during an emergency operation involving national security, SAR operations, or urgent law enforcement activities. The Coast Guard also maintains an active marine mammal sighting and reporting program in cooperation with NMFS and USFWS.

2.4.7.2 Biological Resources

Personnel involved in the Proposed Action would be made aware of these operating guidelines through the Operational Order guiding Coast Guard participation in activities in the Arctic. The following measures, developed by the Coast Guard in consultation with the USFWS and NMFS, are included in the Proposed Action (and in addition to the guidance already outlined in Section 2.4.1) in order to avoid significant adverse effects on biological resources, and will be followed to the maximum extent practical without jepordizing mission success, particularly during national security, SAR and urgent law enforcement activities.

- An Interim Polar Bear Interaction Plan is under development in consultation with the USFWS. The purpose of the plan is to avoid changing the behavior of bears from helicopters, cutters, or small boat operations. The plan includes specific requirements for personnel training, avoidance and encounter procedures, hazing, waste management, monitoring requirements, etc., and will be approved by the USFWS.

- Crew members will be trained in marine mammal identification and alert the Command of the presence of marine mammals and initiate adaptive mitigation responses including reducing vessel speed, posting additional dedicated lookouts to assist in monitoring whales' location, avoiding sudden changes in speed and direction, or if a swimming whale is spotted, attempting to parallel the course and speed of the moving whale so as to avoid crossing its path, and avoiding approach of sighted whales head-on, or from directly behind (see COMDTINST M16247.1).

- Vessels must maintain the maximum distance possible from concentrations of walruses or polar bears. No vessels will approach within a 0.5 mi (805 m) radius of walruses or polar bears observed on land or ice.

- Vessel operators must take every precaution to avoid harassment of concentrations of feeding walruses when a vessel is operating near these animals. Vessels will reduce speed and maintain a minimum 0.5 mi (805 m) operational exclusion zone around feeding walrus groups. Vessels will not be operated in such a way as to separate members of a group of walruses from other members of the group. When weather conditions require, such as when visibility drops, vessels will adjust speed accordingly to avoid the likelihood of injury to walruses.

- All vessels and aircraft will avoid areas of active or anticipated walrus or polar bear hunting activity as determined through community consultations.

- When traveling in icy waters or near barrier islands, vessel crews will not engage in activities that could potentially attract polar bears to the vicinity of the vessel (e.g., cooking meat on deck). This measure is inteneded to prevent polar bears, which are sensitive to scents from distances of more than a mile away, from abandoning high-value habitat or natural feeding opportunities to investigate the scent.

- Aircraft will, at all times, conduct their activities at the maximum distance possible from concentrations of walruses or polar bears.

- Aircraft will not operate at an altitude lower than 1,500 ft (457 m) within 0.5 mi (805 m) of polar bears observed on ice or land. Helicopters may not hover or circle above such areas or within 0.5 mi of such areas. When weather conditions do not allow a 1,500 ft flying altitude, such as during severe storms or when cloud cover is low, aircraft may be operated below the 1,500 ft altitude stipulated above. However, when aircraft are operated at altitudes below 1,500 ft because of weather conditions, the operator must avoid areas of known polar bear concentrations and will take precautions to avoid flying directly over or within 0.5 mi (805 m) of these areas.

- Fixed-wing aircraft will not operate at an altitude lower than 2,000 ft (610 m) within 0.5 mi (805 m) of walrus observed on ice or land. Helicopters will not operate at an altitude lower than 3,000 ft (914 m) within one mile (1610 m) of walrus observed on ice or land, and may not hover or circle above such areas or within one mile of such areas. When weather conditions do not allow these minimum flying altitudes, such as during severe storms or when cloud cover is low, aircraft may be operated below the 2,000 ft (610 m) altitude stipulated above. However, when aircraft are operated at altitudes below 2,000 ft (610 m) because of weather conditions, the operator must avoid areas of known walrus concentrations and will take precautions to avoid flying directly over or within one mile (1610 m) of these areas.

- Avoid the following known concentration areas for Pacific walruses along the coast to the maximum extent practicable during training and routine flight activities:
    - Cape Lisburne (68° 52’ 53” N, 160° 11' 39” W)
    - Corwin Bluff (68° 52’ 30” N, 165° 06' 02” W)
    - Point Lay (69° 45 '39” N, 163° 03 20” W)
    - Icy Cape (70° 19’ 45” N, 161° 52' 55” W)

- Each time a walrus or polar bear is sighted; an interaction form will be filled out and submitted to the USFWS.

- Reductions in vessel speed will be considered when a whale is sighted or known to have been sighted within 5 nm. Vessels will use navigationally prudent courses to avoid striking the whale and, if necessary, reduce speed to bare steerageway or come to a stop. A dedicated marine mammal lookout after the initial sighting will be recommended.

- To avoid potential impacts to seabirds from vessel lights, the Coast Guard will keep deck lights at the minimum necessary for safety.

- Vessels that encounter flocks of spectacled eiders along their path will maintain a steady speed (typically 3 to 9 kts) and divert around these flocks to avoid unnecessary disturbance.

- Helicopters will avoid approaching flocks of spectacled eiders and other birds; aircraft will maintain an altitude of at least 500 ft above sea level when flying over molting spectacled eider flocks (late July through October, in the Chukchi Sea in Ledyard Bay).

- Coast Guard flight crews will coordinate with tribal representative to ensure proposed flight paths will not interfere with planned terrestrial mammal (i.e. caribou and musk oxen) hunts.

- To the extent possible, icebreakers avoid active subsistence hunting areas during the spring and fall bowhead whale migrations so as not to interfere with subsistence hunts.

- At least one trained crewmember will be posted on an icebreaker during operations or training to observe for marine mammals. When marine mammals are observed, the icebreaker will take the necessary precautions to avoid them. In addition, unless the icebreaker's mission involves specifically investigating an endangered species, the icebreaker will plan its passage through the ice to avoid any known sanctuaries or feeding grounds.

Mobile sonar science applications may require additional analysis beyond the scope of this BE. However, during echosounder activities (excluding use of navigational sonar), the following mitigation measures will be followed, as outlined in the Final Programmatic Environmental Assessment for the Nationwide Use of High Frequency and Ultra High Frequency Active SONAR Technology (U.S. Coast Guard 2013b):

- Coast Guard personnel would monitor the appropriately sized marine mammal mitigation zone at all times of deployment. The size of the marine mammal mitigation zone would be determined through sound propagation loss modeling based on empirical data and sonar specifications, which will result in estimates of distance from source that sound will dissipate to levels unlikely to cause harassment. All monitors would have marine mammal monitoring training per Coast Guard standard lookout training, and vessels would be equipped with whale wheels to aid in identification.

- During a short-term emergency, if a marine mammal is observed in or approaching the marine mammal mitigation zone, the operational commander would take prudent measures to avoid impacting the wildlife, such as shutting down the system, moving away from the animal, or slowing down the platform, tactical situation permitting. Prudent measures are based on the operational commander's knowledge and professional

assessment of the situation with respect to safety and feasibility as to whether or not to operate the sonar in the presence of a marine mammal.

- If a threatened or endangered species of marine mammal is affected (i.e., "take" as defined by the Endangered Species Act [ESA] or Level A or B harassment, as defined by Marine Mammal Protection Act [MMPA]) during longer-term (i.e., more than two weeks), emergency operational missions, the Coast Guard would conduct emergency consultation with the National Marine Fisheries Service (NMFS) or U.S. Fish and Wildlife Service (USFWS), as appropriate, and as provided for under 50 CFR §402.05. During emergency consultation, the NMFS or USFWS can provide recommendations on how to minimize or avoid adverse effects on listed species during the emergency response. Such recommendations are strictly advisory and are to be implemented at the discretion of the emergency response personnel. If, during an emergency situation, an unauthorized take under the MMPA should occur, Coast Guard would conduct activities that are necessary to protect human lives but consult with NMFS immediately to investigate the circumstances of the unauthorized take and jointly consider the steps that should be taken to avoid similar occurrences in the future.

- For training exercises and research and development missions, if a marine mammal is detected within or approaching the marine mammal mitigation zone, sonar systems would be shut down until the marine mammal has left the area or marine mammal mitigation zone.

- Except for short-term emergency situations during which initial response time is crucial, the marine mammal mitigation zone would be visually monitored for 30 minutes prior to turning on the sonar device to ensure that marine mammals are not present.

- Ramp-up (also known as soft-start) would entail the gradual increase in intensity of a sound source. When the operational situation allows, ramp-up or soft-start procedures would be used prior to operating the sonar. Ramp up will take place over no less than 10 minutes.

- Sonar systems would not be employed in a location that interferes with obvious marine mammal movements, or prevents entry or exit of marine mammals into and out of an area (e.g., the mouth of a bay or narrow chokepoints), where sonar could deter them from traveling through or by. The only exception to this is under rare circumstances that require deployment for emergency purposes. If the emergency is more than two weeks, the Coast Guardwill engage in emergency consultation as appropriate, and as provided for under 50 CFR §402.05.

2.4.7.3 Cultural Resources

Since some subsistence hunting and fishing activities in the area of operations are unpredictable due to yearly conditions, the Coast Guard District 17 Tribal Liaison has coordinated with

resource managers and representatives of subsistence users, and would continue to coordinate with subsistence users throughout the period of operations, to ensure that any conflicts are avoided during planning, or any that may arise during the course of operations are addressed or avoided. Interactions with subsistence activities and marine mammal sightings are entered into operational summaries for data tracking and follow up with tribes and communities impacted by the interactions.

2.4.7.4 Hazardous Materials and Substances

The following BMPs and federal, state, Coast Guard, and local laws and regulations pertaining to hazards and hazardous materials and substances would be adhered to as follows:

- The Coast Guard would comply with Occupational Safety and Health Administration regulations regarding safety measures and precautions in the workplace as appropriate.

- The Coast Guard would handle all hazardous materials and substances in accordance with applicable Federal regulations.

Support for fueling aircraft and surface assets would be provided by existing facilities on shore, for example, the airport in Barrow and ports in Dutch Harbor and Nome. Any required maintenance would be performed at these existing facilities. Any solid or hazardous waste generated would be disposed of by Coast Guard facilities supporting this mission, or by existing local facilities that have these capabilities.

3 LISTED SPECIES, CRITICAL HABITAT, AND ESSENTIAL FISH HABITAT

3.1 ENDANGERED SPECIES ACT-LISTED SPECIES INCLUDED IN ANALYSIS

The species occurring within the Action Area which may be affected by the Proposed Action are shown in Table 3-1 along with their Endangered Species Action (ESA) listing status. Species are organized according to management jurisdiction and taxonomic class.

Table 3-1. Endangered Species Act-Listed Species Potentially Occurring in the Action Area

Common Name	Scientific Name	Federal Status	Critical Habitat / in Action Area	Habitat and Distribution
National Marine Fisheries Service Jurisdiction				
Cetaceans				
Bowhead whale	*Balaena mysticetus*	E	Not designated	Chukchi and Beaufort Seas
Fin whale	*Balaenoptera physalus*	E	Not designated	Chukchi and Bering Seas, Gulf of Alaska, and North Pacific Ocean
Humpback whale	*Megaptera novaeangliae*	E	Not designated	Bering Sea, Gulf of Alaska, and North Pacific Ocean
North Pacific right whale	*Eubalaena japonica*	E	Yes / No	Bering Sea, Gulf of Alaska, and North Pacific Ocean
Pinnipeds				
Bearded seal	*Erignathus barbatus nauticus*	T	Not designated	Bering, Chukchi, and Beaufort Seas
Ringed seal	*Phoca hispida hispida*	T	Not designated	Bering, Chukchi, and Beaufort Seas
Steller sea lion	*Eumetopias jubatus*	E	Yes/Yes	Bering Sea, Gulf of Alaska, and North Pacific Ocean
United States Fish and Wildlife Service Jurisdiction				
Marine Mammals				
Pacific walrus	*Odobenus rosmarus divergens*	C	Not designated	Continental shelf waters of the Bering and Chukchi Seas
Polar bear	*Ursus maritimus*	T	Not designated	On sea ice and coastline of Chukchi and Beaufort Seas
Birds				
Short-tailed albatross	*Phoebastria albatrus*	E	Not designated	U.S. Territorial waters, Gulf of Alaska, Aleutian Islands, Bering Sea Coast, Japan, Russia, high seas
Spectacled eider	*Somateria fischeri*	T	Yes / Yes	Western and northern Alaska in coastal environments
Steller's eider	*Polysticta stelleri*	T	Yes / No	Southwestern, western and northern Alaska
Yellow-billed loon	*Gavia adamsii*	C	Not designated	Arctic Coastal Plain, Seward Peninsula, St. Lawrence Island, and all coastal waters

E: endangered; T: threatened; C: candidate species for listing
Source: National Marine Fisheries Service, Listed Species in Alaska (NMFS 2013);

The narratives in this section summarize the biology and ecology of the threatened and endangered species in the Action Area that are relevant to the effects analysis in this Biological Evaluation (BE). Summaries of the global status and trends of each species are presented to provide a foundation for the analysis. The narratives are organized by agency jurisdiction and major taxonomic group.

3.2 ENDANGERED SPECIEAS ACT-LISTED SPECIES EXCLUDED FROM FURTHER ANALYSIS

ESA-listed species are evaluated in Sections 3.3 and 3.4. Those excluded from further analysis and the bases for their exclusion are summarized in Table 3-2.

Table 3-2: Endangered Species Act-Listed Species Excluded from Further Evaluation

SPECIES	SUMMARY BASIS FOR EXCLUSION
Marine Mammals	
Blue whale (*Balaenoptera musculus*)	Very rare occurrence in the Bering Sea, and no reported sightings or acoustic detections north of the Bering Strait in the Chukchi or Beaufort Seas.
Sei whale (*Balaenoptera borealis*)	Few to no sightings north of the Aleutian Islands; species is generally restricted to more temperate waters (NMFS 2011).
Sperm whale (*Physeter macrocephalus*)	Commonly observed in the southern Bering Sea near the Aleutian Islands (Mizroch and Rice 2013) but no records north of St. Lawrence Island, and no reported sightings or acoustic detections north of the Bering Strait in the Chukchi or Beaufort Seas.

3.2.1 Blue whale (*Balaenoptera musculus*)

Blue whales are listed as endangered under the ESA and a recovery plan has been prepared (NMFS 1998b). The Eastern North Pacific stock is designated depleted and classified as strategic under the Marine Mammal Protection Act (MMPA). The species is thought to summer in high latitudes and move into the subtropics and tropics during the winter. A discovery tag placed on a blue whale by whalers off Vancouver Island in May 1963 was recovered a year later in June 1964 just south of Kodiak Island and a blue whale photo-identified south of Prince William Sound was identified five times between 1995 and 1998 off southern California. Blue whale calls, with a strong seasonal pattern, have been acoustically detected in the Gulf of Alaska (GOA) in mid-July to mid-December with the peak occurrence from August through November (Moore et al. 2006, DoN 2006). These occurrences support the hypothesis that blue whales seasonally migrate to and from feeding areas in the GOA (DoN 2006).

While the National Marine Fisheries Service (NMFS) defines the blue whales' range as including all of the Bering Sea, there have been very few sightings or acoustic detections of blue whales north of the Aleutian Islands (Reilly et al. 2013). There are no existing sightings or acoustic detections of blue whales north of the Bering Strait in the Chukchi or Beaufort seas. Because of the extremely unlikely overlap between blue whale habitat and United States Coast

Guard (Coast Guard) activities in the Bering Sea, this species has been excluded from further analysis.

3.2.2 Sei whale (*Balaenoptera borealis*)

Sei whales are listed as endangered under the ESA and designated as depleted under the MMPA. A final recovery plan for the species was published in December 2011 (NMFS 2011). Sei whales are found from sub-tropical to sub-polar waters in both Northern and Southern latitudes. In the North Pacific Ocean, most sei whale sightings occur south of the Aleutian Islands, with few reports of sei whales in the Bering Sea (NMFS 2011). There are no exisiting sightings of sei whales north of the Bering Strait. Because of the extremely unlikely overlap between sei whales and Coast Guard activities in the Bering Sea, this species has been excluded from further analysis.

3.2.3 Sperm whale (*Physeter macrocephalus*)

Sperm whales are listed as endangered under the ESA and designated as depleted under the MMPA. The North Pacific stock is classified as strategic. A draft species recovery plan has been prepared (NMFS 2006a). Sperm whales are found throughout the North Pacific and are distributed broadly from tropical and temperate waters to the Bering Sea as far north as Cape Navarin (Allen and Angliss 2013). Summer surveys in the coastal waters around the central and western Aleutian Islands have found sperm whales to be the most frequently sighted large cetacean (Allen and Angliss 2013). Acoustic surveys have detected the presence of sperm whales year-round in GOA although about twice as many are present in summer as in winter (Mellinger et al. 2004, Moore et al. 2006). Fewer detections in winter reflect the documented seasonal movement of whales from Canada and Japan to the GOA/Bering Sea/Aleutian Islands region (Allen and Angliss 2013).

Mizroch and Rice (2013) analyzed historical data and mark-recapture data on sperm whales in the north Pacific, finding seasonal concentrations of whales in the subtropical frontal zone (~28˚N - 34˚N) and the subarctic frontal zone (~40˚N - 43˚N), with some adult males found around the Aleutian Islands and the Bering Sea Shelf edge. No sperm whales have been detected in the northern Bering, Chukchi, or Beaufort seas, and this species has therefore been excluded from further analysis.

3.3 ENDANGERED SPECIES ACT-LISTED SPECIES AND ESSENTIAL FISH HABITAT UNDER NATIONAL MARINE FISHERIES SERVICE JURISDICTION

3.3.1 Critical Habitat

Critical habitat has been designated for two of the seven species under NMFS jurisdiction, one of which overlaps with the Action Area. For North Pacific right whales, there is no overlap between designated critical habitat and the Action Area. Within the Action Area, critical habitat for the western population of Steller sea lions has been designated at either end of St. Lawrence Island and is described in Section 3.3.3.3.3.

3.3.2 Cetaceans

The ESA-listed cetaceans found in the Action Area are listed in Table 3-2 and discussed in the following sections, along with their estimated abundance (for a given stock), MMPA regulatory status, and seasonal occurrence according to the NMFS stock assessments. Species listed as

"common" indicate that they occur routinely, species listed as "rare" have sporadic sightings, and species listed as "very rare" are very few in number and are unlikely to be present in the Action Area.

Table 3-2: Abundance, Status, and Seasonal Occurrence of ESA-Listed Cetaceans in the Action Area

COMMON NAME (SCIENTIFIC NAME)	ABUNDANCE (CV)[1]	STOCK	ESA / MMPA STATUS	OCCURRENCE IN THE Action Area (Mar – Nov)
Bowhead whale (*Balaena mysticetus*)	12,631 (0.24)	Western Arctic	E / D, S	Common
Fin whale *(Balaenoptera physalus)*	Unknown (provisional N_{min} = 5,700 whales)	Alaska (Northeast Pacific)	E / D, S	Rare
Humpback whale *(Megaptera novaeangliae)*	7,469 (0.3)	Central North Pacific	E / D, S	Rare
	938 (0.3)	Western North Pacific	E / D, S	Rare
North Pacific right whale *(Eubalaena japonica)*	31 (0.226)	Eastern North Pacific	E / D, S	Very rare

CV: coefficient of variation; ESA: Endangered Species Act; MMPA: Marine Mammal Protection Act; E: endangered (under ESA); T: threatened (under ESA); D: depleted stock (under MMPA); S = strategic stock (under MMPA).

[1] Abundance and CV from Allen and Angliss 2013

3.3.2.1 Bowhead Whale (*Balaena mysticetus*)

3.3.2.1.1 Regulatory Status

The bowhead whale is listed as endangered under the ESA and is designated as depleted under the MMPA. Two geographically distinct bowhead whale stocks are recognized in the Pacific – the Sea of Okhotsk stock and the Western Arctic stock (also known as the Bering-Chukchi-Beaufort stock) (Allen and Angliss 2013). Of these, only the Western Arctic stock occurs within United States (U.S.) waters and is managed under NMFS jurisdiction.

3.3.2.1.2 Habitat Preferences

Bowheads are migratory, spending winter months at relatively low latitudes (~54˚N to 85˚N) and following the ice retreat north during the spring and summer months (Jefferson et al. 2008). The Western Arctic stock winters in the Bering Sea, and migrates North in the spring, moving through the Bering Strait in March and April (Citta et al. 2012). Whales follow the Alaskan coast westward through the Chukchi Sea, past Point Barrow, and onto summer feeding grounds in the Canadian Beaufort Sea (Allen and Angliss 2013). In the fall, bowheads leave the Beaufort Sea and swim westward across the Chukchi Sea to the Chukotka Peninsula in Russia, following the coast south through the Bering Strait by November and December (Citta et al. 2012; Allen and Angliss 2013).

Migration of the Western Arctic stock appears to be segregated by size class, with smaller whales (sub-adults) migrating earliest in both spring and fall, followed by medium and large whales and then females with calves (Moore and Reeves 1993). Whales in the Beaufort Sea were

observed changing their migratory routes in response to noise associated with oil production (Huntington 2009).

Habitat selection varies seasonally, with whales selecting different bathymetry and ice cover characteristics during summer and fall (Moore et al. 2000; Ferguson et al. 2010). Bowheads in the Western Arctic stock exhibit different habitat preferences than bowheads from the Baffin Bay area of Canada, selecting areas with higher ice coverage during both summer and winter months (Citta et al. 2012). Satellite tagging and aerial sightings of whales in the Beaufort and Bering Seas indicate that whales from this population are more likely to be associated with heavy ice cover (less than 90 percent) more than 100 kilometers (km) from the ice edge than open water areas (Citta et al. 2012). In contrast, whales in the Baffin Island stock were more commonly associated with low and medium ice cover areas (Ferguson et al. 2010).

Bowheads are found in continental slope waters during spring and summer while feeding on abundant zooplankton, including copepods and euphausid shrimps (Moore et al. 2000; Wiig et al. 2007). Feeding behavior has been observed in areas from the Bering Sea to the Beaufort Sea, with the highest concentration of feeding whales in the Beaufort Sea (Moore et al. 2000; Allen and Angliss 2013). Bathymetric features appear to drive summer habitat selection by bowheads; whales were observed most often in continental slope habitats (201 – 2000 meter [m] depth) in the Beaufort Sea (Moore et al. 2000). Fall habitat selection shifted to shallower continental shelf waters (Moore et al. 2000).

3.3.2.1.3 Critical Habitat

Critical habitat has not been designated for bowhead whales.

3.3.2.1.4 Population Size and Trends

Bowhead whales in the Western Arctic stock have been systematically counted since 1978 during the spring migration in Barrow, Alaska. Additional population counts have been conducted via photo-identification of individuals (Allen and Angliss 2013). Population estimates have ranged from 3,885 individuals in 1980 to 10,545 in 2001, the most recent year for which count data are available. Sight-resight results indicate a continued increase, with an estimate of 12,631 individuals in 2004 (coefficient of variation [CV] = 0.2442). The minimum population estimate for this stock in 2012 was 10,314 animals (Allen and Angliss 2013).

3.3.2.1.5 Distribution

Bowhead whales are found in arctic and subarctic regions of the Atlantic and Pacific oceans (55˚N to 85˚N); in the North Pacific, their range is limited to approximately 54˚N to 75˚N (Moore and Reeves 1993). Two geographically distinct bowhead whale stocks are recognized in the Pacific – the Sea of Okhotsk stock and the Western Arctic Stock (Allen and Angliss 2013). Of these, only the Western Arctic stock occurs within U.S. waters and is managed under NMFS jurisdiction. Stocks occupying areas near Canada and Greenland include the Hudson Bay – Foxe Basin stock, Baffin Bay – Davis Strait stock, and the Svalbard – Barents Sea stock (Heide – Jørgenson et al. 2012), though recent evidence indicates that these stocks may interbreed on a regular basis, and should be classified as a single stock (Allen and Angliss 2013). Changes in sea-ice coverage on a year-to-year basis may change habitat availability for this species, though bowheads are known to use habitat areas with less than 90 percent ice coverage (Moore et al. 2000; Rugh et al. 2003; Quakenbush et al. 2010; Citta et al. 2012).

Within the study area, there is only one bowhead stock. The Western Arctic stock winters in the Bering Sea, and migrates through the Chukchi Sea to summer feeding grounds in the Canadian Beaufort Sea (Allen and Angliss 2013). In the fall, this stock migrates westward, crossing the Chukchi Sea to the Russian Chukotka Peninsula, and south along the coast, through the Bering Strait for the winter (Allen and Angliss 2013). There is evidence that the range of the Western Arctic stock may overlap with that of the Baffin Bay – Davis Strait stock in Canadian waters during the summer and early fall months, particularly during years of low sea-ice cover, which may allow interbreeding of individuals that do not migrate back to their typical breeding areas during the winter (Heide –Jørgenson et al. 2012).

3.3.2.1.6 Life History

Bowheads feed by skimming the surface or sometimes near the seafloor (Rugh and Shelden 2009). Preferred prey are various species of copepods and euphausiids (Budge et al. 2008; Rugh and Shelden 2009; Wiig et al. 2007). Killer whales are the primary natural predator of the bowhead whale (George et al. 1994). Scars from killer whale attacks are observed on between 4.1 to 7.9 percent of harvested individuals (George et al. 1994; Jefferson et al. 2008; Rugh and Shelden 2009).

The maximum lifespan for bowhead whales is estimated at greater than 100 years, based on biochemical analyses and dating of harpoon heads recovered from bowheads killed in subsistence hunts (George et al. 1999; George and Bockstoce 2008). Females appear to become sexually mature at between 12 – 14.2 m of length, and males mature at between 12 and 13m (Koski et al. 1993). Male baleen whales tend to be smaller than females (Koski et al. 1993), and age at sexual maturity is estimated to range from 15 to 25 years of age for both sexes (George et al. 1999). Based on estimates of fetal size in harvested individuals and gestational length in related species, the mating season for this species appears to be late winter to early spring (Koski et al. 1993), with calving intervals estimated to be 3 – 5 years on average. Mating behavior has been reported in the Bering Sea, where bowheads spend the winter months. Neonates are reported in late spring and early summer, typically between April and June, with sizes of calves ranging from approximately 3.5 to 6 m in early summer.

3.3.2.1.7 Diving Behavior

Dive behavior of bowhead whales is poorly understood; most data come from satellite tags, aerial surveys, or traditional ecological knowledge from subsistence hunters. Bowheads exhibit “bouts” of dives of similar depth and duration (Krutzikowsky and Mate 2000; Wursig et al. 1984). Maximum dive depths of tagged sub-adult bowheads in the Chukchi and Beaufort seas exceeded 350m (Krutzikowsky and Mate 2000). Surfacing intervals are defined by short dives between breaths, with longer sounding dives at the end of each interval. In heavy ice cover (greater than 90 percent), surfacing rates decreased while overall surface interval duration increased (Krutzikowsky and Mate 2000).

3.3.2.1.8 Acoustics

Bowhead whales produce many different vocalizations, including simple calls, complex calls, and songs (Würsig and Clark 1993; Blackwell et al. 2007; Delarue et al. 2009). “Simple” bowhead calls are classified into five categories: (1) up, (2) down, (3) constant, and (4) inflected (“u” or “n” shaped) calls, typically within the 50 – 300 Hertz (Hz) range (Blackwell et al. 2007). Complex calls are variable in structure, and can include pulsed sounds, growls, squeals, and other sounds (Blackwell et al. 2007). Bowhead whales sometimes produce repetitive sequences

of calls lasting from a few minutes to up to an hour (Blackwell et al. 2007). The behavioral functions of most non-song bowhead vocalizations are unknown. Bowhead songs are presumed to serve a reproductive function on the winter breeding grounds (Delarue et al. 2009), but this hypothesis has not been experimentally tested.

There are no existing studies of hearing in bowhead whales, but morphometric analyses of the inner ear of the closely related North Atlantic right whale resulted in an estimated hearing frequency range of approximately 0.01 to 22 kiloHertz (kHz), based on established marine mammal models (Parks 2003).

3.3.2.1.9 Environmental and Human Effects

Direct threats to bowhead whales include natural mortalities from disease, starvation, and predation by killer whales on calves, and anthropogenic threats from entanglements, ship strikes, and subsistence whaling. Other factors, including habitat loss due to global climate change, pollution, and anthropogenic noise disturbance can also influence survival and reproduction of this species.

Natural mortalities in this species are poorly understood, because naturally dead bowheads are rarely encountered by humans. Predation from killer whales has been observed in bowhead populations in Greenland, and scars are apparent on whales in the Bering-Chukchi-Beaufort population (George et al. 1994; Reinhart et al. 2013). Other sources of natural mortality include disease and ice entrapment (Citta et al. 2013), but these are likely to be relatively small contributors to overall mortality (NMFS 2013).

Anthropogenic threats to bowhead whales include ship strikes, entanglement in fishing gear, subsistence whaling, contaminants, and anthropogenic noise, especially from offshore oil drilling (Richardson et al. 1986; Philo et al. 1992; Reeves et al. 2012; NMFS 2013). George et al. (1994) estimated that 1 percent of the Bering-Chukchi-Beaufort population showed evidence of vessel strikes; however, recent increases in shipping activity in the arctic may increase the risk of lethal strikes by large ships. The rate of bowhead whale interaction with commercial fishing gear is unknown (Allen and Angliss 2013), but there are several documented incidences of stranded bowheads found either entangled or with rope scars (Allen and Angliss 2013; Philo et al. 1992).

While there is currently no commercial whaling of bowhead whales, subsistence hunters in Alaska, Canada, and Russia take several individuals from the Bering-Chukchi-Beaufort population each year. The annual average subsistence take for all three countries during the 5-year period from 2006 to 2010 was 38 bowhead whales (Allen and Angliss 2013). Whales are typically hunted during the spring and fall migrations when they pass close to shore.

Noise from anthropogenic activities, particularly oil and gas exploration, may affect bowhead whale behavior. A number of studies have documented changes to bowhead whale vocalizations, dive behavior, and migration paths during exposure to noise from seismic surveys (Richardson et al. 1985; Blackwell et al. 2013; Robertson et al. 2013). While the effects of these changes are not well understood, alterations to normal behavior could interfere with foraging, intraspecific communication, and other essential behaviors.

3.3.2.2 Fin Whale (*Balaenoptera physalus*)

3.3.2.2.1 Regulatory Status

Fin whales are listed as endangered under the ESA. The Northeast Pacific stock is designated as depleted and classified as strategic under the MMPA (Allen and Angliss 2013). A species recovery plan for fin whales has been prepared (NMFS 2010).

3.3.2.2.2 Habitat Preferences

Fin whales are found in continental shelf, slope, and oceanic waters (Gregr and Trites 2001, Reeves et al. 2002). Globally, this species tends to be aggregated in locations where populations of prey are most plentiful, irrespective of water depth, although those locations may shift seasonally or annually (Payne et al. 1986, 1990, Kenney et al. 1997, Notarbartolo-di-Sciara et al. 2003). Littaye et al. (2004) determined that fin whale distribution in the Mediterranean Sea was linked to frontal areas and upwelling within large zooplankton patches. Fin whales in the north Pacific spend the summer feeding along the cold eastern boundary currents and appear to prefer krill and large copepods, but also eat schooling fish such as Pacific herring (*Clupea harengus pallasi*), walleye pollock (*Theragra chalcogramma*), and capelin (*Mallotus villosus*) (Nemoto and Kawamura 1977, Perry et al. 1999).

3.3.2.2.3 Critical Habitat

Critical habitat has not been designated for fin whales.

3.3.2.2.4 Population Size and Trends

In the north Pacific, the total pre-exploitation population size of fin whales is estimated at 42,000 to 45,000 whales (Ohsumi and Wada 1974). From whaling records, fin whales that were marked in winter 1962 to 1970 off southern California were later taken in commercial whaling operations between central California and the GOA in summer (Mizroch et al. 1984). In summer 2003, a cetacean survey in the Shelikof Strait (north of Kodiak), Cook Inlet, Prince William Sound and on the shelf between Kodiak and Montague Island detected 165 fin whales along the shelf break and having an average group size of 2.9 observed over 57 sightings (Waite 2003). The April 2009 Gulf of Alaska Line-transect Survey (GOALS) which sought to expand on the lack of abundance data for the GOA during this time period, had 24 visual observations of fin whale groups totaling 64 individuals during a 10-day period (Rone et al. 2009).

Currently there are no reliable estimates of current or historical abundance numbers for the Northeast Pacific fin whale stock. Fin whales have a worldwide distribution, with three distinct stocks recognized in the Pacific: (1) Alaska (Northeast Pacific), (2) California/Washington/ Oregon, and (3) Hawaii. Provisional estimates for the Northeastern Pacific based on surveys in 1999 and 2000 are 3,368 (CV = 0.18) for the central-eastern Bering Sea and 683 (CV = 0.32) for the eastern Bering Sea. The minimum population estimate for fin whales west of the Kenai Peninsula is 5,700 animals (Allen and Angliss 2013).

The population trend for this species estimated for 1987 to 2003 is reported as growing at 4.8 percent annually, which is consistent with estimated the growth rates of other large whales (Allen and Angliss 2013).

3.3.2.2.5 Distribution

Fin whales are broadly distributed throughout the world's oceans, usually in temperate to polar latitudes and less commonly in the tropics (Reeves et al. 2002). Single fin whales are most common, but they gather in groups, especially when good sources of prey are aggregated.

Fin whales in the North Pacific spend the summer feeding along the cold eastern boundary currents and have been observed as far north as the Chukchi and Bering Seas (Gambell 1985, Perry et al. 1999, DoN 2006, Allen and Angliss 2013). However, although fewer in number, fin whales have also been detected in the Bering Sea all winter (Mizroch et al. 1999). Acoustic signals from fin whales are detected year-round in the GOA with most calls from August through February (Moore et al. 2006, Mizroch et al. 2009). Near Kodiak Island in the GOA, fin whales have been observed year-round with most sightings from April to September (DoN 2006).

Fin whales have been sighted on a number of occasions in the Chukchi Sea, but little is known about their distribution or behavior in this area (Ireland et al. 2009; Funk et al. 2010). There are no records of fin whale sightings or acoustic detections in the Beaufort Sea (NMFS 2013b).

3.3.2.2.6 Life History

Fin whales become sexually mature between 6 to 10 years of age, depending on density-dependent factors (Gambell 1985). Reproductive activities for fin whales occur primarily in the winter. Gestation lasts about 12 months and nursing occurs for 6 to 11 months (Perry et al. 1999). Although fin whales are present in the Bering Sea in the winter, there are no known calving areas in this area (Mizroch et al. 2009) Peak calving is in October through January (Hain et al. 1992) and fin whales likely move south from feeding areas to give birth. There are no known areas used by fin whales for reproduction or calving in the Action Area.

3.3.2.2.7 Diving Behavior

Diving behavior of fin whales varies with behavioral context. Kopelman and Sadove (1995) found significant differences in blow intervals, dive times, and blows per hour between surface feeding and nonsurface-feeding fin whales. Various researchers have reported foraging fin whales have dive durations of approximately 4 to 15 minutes and to depths between approximately 200 and 500 feet (ft) (61 and 152 m) (DoN 2006). Dives are followed by sequences of four to five blows at 10- to 20-second intervals (CETAP 1982, Stone et al. 1992, Lafortuna et al. 2003).

3.3.2.2.8 Acoustics

Fin whales produce calls with the lowest frequency and highest source levels of all mysticetes. Fin whales produce a variety of sounds with a frequency range from 15 to 750 Hz. The long-patterned 15- to 30-Hz vocal sequence 1 second in duration with a source level of 184 to 200 dB re 1 Pa @ 1 m is most typically recorded (Richardson et al. 1995, Charif et al. 2002). Only males are known to produce infrasonic pulses, suggesting they may function as a male breeding display (Croll et al. 2002, Moore et al. 2006). Although data on hearing ability for fin whales are unavailable, it is hypothesized that based on their anatomy and vocalizations, fin whales have acute infrasonic hearing (Ketten 1997).

3.3.2.2.9 Environmental and Human Effects

Direct threats to fin whales in Alaska waters include natural mortalities from disease, starvation, and predation by killer whales, and anthropogenic threats from entanglements and ship strikes. Other factors, including climate change, pollution, and anthropogenic noise disturbance may also influence survival and reproduction of this species.

Natural sources and rates of mortality are largely unknown, but Aguilar and Lockyer (1987) suggest annual natural mortality rates may range from 0.04 to 0.06 (based on studies of northeast Atlantic fin whales). The occurrence of the nematode *Crassicauda boopis* appears to increase the potential for kidney failure in fin whales and may be preventing some fin whale stocks from recovering from whaling (Lambertsen 1992). Killer whale or shark attacks may result in serious injury or death in very young and sick whales (Perry et al. 1999), but there is little evidence of predatory attacks in the Northeastern Pacific population (NMFS 2010).

Anthropogenic threats to fin whales include ship strikes, entanglement in fishing gear, contaminants, and anthropogenic noise. There is no known historical or current subsistence hunting of fin whales from the Northeastern Pacific stock (Allen and Angliss 2013).

Fin whales are highly vulnerable to ship strikes. In areas with high ship traffic, fin whales are among the most commonly reported species struck and up to 33 percent of stranded fin whales show evidence of vessel strikes (NMFS 2010). Between 2006 and 2010, 3 fin whale strikes were recorded in Alaska waters (Allen and Angliss 2013).

Noise from anthropogenic activities can affect fin whale behavior. Low frequency sounds from airguns used in seismic surveys and from vessels overlaps the dominant frequency of fin whale vocalizations (~20 Hz), and may mask inter-animal communication. Additionally, closely related species of baleen whales have been shown to respond to anthropogenic sounds, including seismic airguns with changes to foraging and vocal behaviors (Croll et al. 2001; DiIorio and Clark 2010). Data on responses of fin whales to anthropogenic sound in the Arctic are not currently available, but given the prevalence of seismic airgun use in the Arctic environment and the long propagation ranges of such sounds, it is reasonable to assume that fin whales in the area may be exposed to these sounds on a regular basis.

3.3.2.3 Humpback Whale (*Megaptera novaeangliae*)

3.3.2.3.1 Regulatory Status

Humpback whales are listed as endangered under the ESA. They are designated as depleted throughout their range under the MMPA and the Western North Pacific stock is classified as strategic. A final species recovery plan has been prepared (NMFS 1991).

In addition to being listing as endangered, there are regulations that have been issued governing the approach to humpback whales in Alaska waters within 200 miles (mi) of the coast (NOAA 2001). These regulations were issued to manage the threat caused by whale watching activities by: (1) prohibiting approach to within 100 yards (yd) (91.4 m) of humpback whales; (2) implementation of a “slow safe speed” in proximity to humpbacks, and (3) creating exemptions for some vessels including military vessels engaged in “official duty” (training).

3.3.2.3.2 Habitat Preferences

Although humpback whales typically travel over deep, oceanic waters during migration, their feeding and breeding habitats are mostly in shallow, coastal waters over continental shelves

(Clapham and Mead 1999). Shallow banks or ledges with high sea-floor relief characterize feeding grounds (Payne et al. 1990, Hamazaki 2002). The habitat requirements of wintering humpbacks appear to be determined by the conditions necessary for calving and breeding consisting mainly of relatively shallow or protected areas around and between islands, over banks, and along continental coasts.

3.3.2.3.3 Critical Habitat

Critical habitat has not been designated for humpback whales in the North Pacific.

3.3.2.3.4 Population Size and Trends

Three stocks of humpback whales are recognized in the Pacific Ocean, including the Western North Pacific (WNP) stock, Central North Pacific (CNP) stock, and Eastern North Pacific stock (Calambokidis et al. 1997, Baker et al. 1998). In the entire North Pacific Ocean basin prior to 1905, it is estimated that there were 15,000 humpback whales basin-wide (Rice 1978). Whaling in the North Pacific by the Japanese and Soviet pelagic whaling fleets continued until 1976. After the end of commercial whaling, approximate humpback numbers were estimated to be between 1,200 to 1,400 whales (Calambokidis et al. 2008), although it is unclear if estimates were for the entire North Pacific or just the Eastern North Pacific. The population of humpbacks in the Pacific is increasing and has undergone substantial recovery since the end of whaling. The Structure of Populations, Levels of Abundance and Status of Humpback Whales in the North Pacific (SPLASH) study suggested the current (2008) best estimate for the overall abundance in the North Pacific is 18,302 (Calambokidis et al. 2008).

It has been recently estimated there are 3,000 to 5,000 humpback whales are in the GOA area (Calambokidis et al. 2008). The best abundance estimate for the Central North Pacific Stock is 4,005 (CV = 0.095) individuals (Allen and Angliss 2013). In summer 2003, a survey in the Shelikof Strait (north of Kodiak), Cook Inlet, Prince William Sound and between Kodiak and Montague Island detected 128 humpbacks whales along the shelf break and having an average group size of 2.7 (Waite 2003). An April 2009 survey in the Action Area had 11 visual observations of humpback groups totaling 20 individuals during a 10-day period (Rone et al. 2009).

3.3.2.3.5 Distribution

Humpback whales live in all major ocean basins from equatorial to subpolar latitudes, migrating from tropical breeding areas to polar or subpolar feeding areas (Jefferson et al. 1993, NMFS 2006c). North Pacific humpback whales are distributed primarily in four more-or-less distinct wintering areas: the Ryukyu and Ogasawara (Bonin) Islands (south of Japan), the Hawaiian Islands, the Revillagigedo Islands off Mexico, and along the coast of mainland Mexico (Calambokidis et al. 2008). There is known to be some interchange of whales among different wintering grounds, and photo-identification matches between Hawaii and Japan and Hawaii and Mexico have been found (Calambokidis et al. 2008). However, it appears that the overlap is relatively small between the WNP, CNP, and Eastern North Pacific stock populations (Calambokidis et al. 2008).

During the summer, humpbacks in the Pacific are generally found on high-latitude feeding grounds in a nearly continuous band from southern California to the Aleutian Islands, Kamchatka Peninsula, and the Bering and Chukchi seas (Calambokidis et al. 2001, Ireland et al.

2008). Humpback whales have been detected in recent years (2009-2011) in the southern Chukchi Sea (Hashagen et al. 2009; Anonymous 2010; Goetz et al. 2010; Clarke et al. 2011a; Crance et al. 2011; NMML and PMEL 2011). Additionally, Hashagen et al. (2009) reported a sighting of a humpback mother-calf pair in the Beaufort Sea approximately 87 km (54.1 mi) east of Barrow, suggesting that higher sea surface temperatures and lower ice cover may be expanding the habitat available to this species. In the Pacific Ocean, the U.S./Canada border is an approximate geographic boundary between the California and Alaska feeding groups (Carretta et al. 2006). Although some site fidelity occurs, there is much interchange of whales among different feeding grounds and it is unclear which stocks animals seen in the Beaufort and Chukchi Seas originate from.

During the winter, humpbacks generally migrate to the tropics and subtropics where they can be found around islands, over shallow banks, and along continental coasts, where calving and breeding occur. Humpbacks have one of the longest migrations known for any mammal with individuals traveling nearly 4,320 nautical miles (nm) (8,000 km) between feeding and breeding areas (Clapham and Mead 1999). Most humpback whale sightings are in nearshore and continental shelf waters; however, humpback whales frequently travel through deep water during migrations such as the route to and from the Hawaiian Islands (Clapham and Mattila 1990, Calambokidis et al. 2001). Migratory transits between the Hawaiian Islands and southeastern Alaska have been documented to take as little as 36 to 39 days (Gabriele et al. 1996, Calambokidis et al. 2001).

3.3.2.3.6 Life History

During the summer, humpback whales are found on high-latitude foraging grounds, where they forage alone or in small groups (Cerchio and Dalheim 2001). Humpbacks primarily feed on small schooling fish and krill (Allen and Angliss 2013), though there is some evidence that humbacks in the North Atlantic Ocean may also engage in bottom-feeding (Hazen et al. 2009). The whales primarily feed along the shelf break and continental slope (Green et al. 1992, Tynan et al. 2005).

Humpback whales migrate to calving/breeding grounds (e.g., Hawaii and Central America) in the lower latitudes each winter (Calambokidis et al. 2008). Females with calves are among the first to leave northern feeding grounds in the fall, followed by subadult males, mature males, non-pregnant females, and pregnant females (Clapham 1996). On the northward migration this order is broadly reversed, with newly pregnant females among the first to begin the return migration to high latitudes.There are no known areas used by humpback whales for reproduction or calving in the Action Area.

3.3.2.3.7 Diving Behavior

Humpback whale diving behavior depends on the time of year (Clapham and Mead 1999). In summer, most dives last less than 5 min; those exceeding 10 minutes are atypical. Although humpback whales have been recorded to dive as deep as about 1,638 ft (500 m) (Dietz et al. 2002), on the feeding grounds they spend the majority of their time in the upper 400 ft (120 m) of the water column (Dolphin 1987, Dietz et al. 2002). In winter, dives average 10 to 15 min; dives of greater than 30 minutes have been recorded (Clapham and Mead 1999) and with recorded dives to 577 ft (176 m) (Baird et al. 2000).

3.3.2.3.8 Acoustics

Humpback whales produce three classes of vocalizations: (1) "songs" in the late fall, winter, and spring by males; (2) sounds made within groups on the wintering (calving) grounds; and (3) social sounds made on the feeding grounds (Thomson and Richardson 1995). The best-known types of sounds produced by humpback whales are songs, which are thought to be breeding displays used only by adult males (Helweg et al. 1992). Humpback song is an elaborate series of patterned vocalizations which are hierarchical in nature (Payne and McVay 1971). There is geographical variation in humpback whale song, with different populations singing different songs and all members of a population using the same basic song. However, the song evolves over the course of a breeding season but remains nearly unchanged from the end of one season to the start of the next (Payne et al. 1983). Components of the song range from under 20 Hz to 4 kHz and occasionally 8 kHz, with source levels measured between 151 and 189 dB re 1 μPa-m and high-frequency harmonics extending beyond 24 kHz (Au et al. 2001; Au et al. 2006). Singing is most common on breeding grounds during the winter and spring months but is occasionally heard outside breeding areas and out of season (Mattila et al. 1987; Gabriele et al. 2001; Gabriele and Frankel 2002; Clark and Clapham 2004).

Social calls range in frequency from 50 Hz to over 10 kHz, with dominant frequencies below 3 kHz (Silber 1986). Female vocalizations appear to be simple; Simão and Moreira (2005) noted little complexity. "Feeding" calls, unlike song and social sounds, are highly stereotyped series of narrow-band trumpeting calls. They are 20 Hz to 2 kHz, less than 1 second in duration, and have source levels of 162 to 192 dB re 1 μPa-m. The fundamental frequency of feeding calls is approximately 500 Hz (D'Vincent et al. 1985; Thompson et al. 1986).

While no measured data on hearing ability are available for humpback whales, Ketten (1997) hypothesized that mysticetes have acute infrasonic hearing. Houser et al. (2001) produced the first humpback whale audiogram (using a mathematical model), which was u-shaped and conformed to the typical mammalian presentation. The area of best hearing, or sensitivity, according to the model was observed between frequencies from 700 Hz to 10 kHz but the maximum range of hearing was identified between 200 Hz to 14 kHz. Au et al. (2006) noted that if the popular notion that animals generally hear the totality of the sounds they produce is applied to humpback whales, this suggests that its upper frequency limit of hearing is as high as 24 kHz.

3.3.2.3.9 Environmental and Human Effects

Direct threats to humpback whales in Alaska waters include natural mortalities from disease, starvation, ice entrapment, and predation by killer whales, and anthropogenic threats including entanglements and ship strikes. Other factors, including climate change, pollution, and anthropogenic noise disturbance may also influence survival and reproduction of this species.

Natural sources and rates of mortality for humpback whales from the CNP and WNP populations are largely unknown, but there have been documented mortalities from predation due to killer whale or shark attacks (Whitehead and Glass 1985; Dolphin1987; Florez-González et al. 1994; Perry et al. 1999; Naessig et al. 2004), poisoning by naturally-produced bio-toxins (Geraci et al. 1976; WHOI REPORT), and ice entrapments (NMFS 1991) in other populations. All of these natural sources of mortalities are potentially present in the Bering, Chukchi, and Beaufort Seas.

Anthropogenic threats to humpback whales in the Action Area include interactions with vessels and fishing gear, and the impacts of anthropogenic noise. Whaling has been noted as a threat in previous assessments; however, commercial whaling operations in the Pacific Ocean ceased in

1966, and there is no current subsistence whaling for humpbacks within the U.S. EEZ. Intensive commercial whaling removed more than 28,000 animals from the North Pacific during the 20th century. From 1961 to 1971, an additional 6,793 humpback whales were killed illegally by the former Soviet Union. Many animals during this time were taken from the GOA and Bering Sea; however, catches occurred across the North Pacific, from the Kuril Islands to the Queen Charlottes, and additional illegal catches in earlier years may have gone unrecorded (Allen and Angliss 2013).

The most substantial threats to humpback whales are interactions with fishing gear and vessels (including commercial shipping, oil and gas support vessels, commercial fishing, and other ships). Angliss and Allen (2013) have summarized known instances of entanglements or other interactions with fisheries, finding that two whales from the WNP stock died during interactions with the Bering Sea/Aleutian Islands pollock trawl (N=1) and the Bering Sea/Aleutian Islands flatfish trawl (N=1) fisheries between 2007 and 2010. Additional strandings of whales entangled in gear are not always attributable to a specific fishery. Between 1997 and 2009, 118 humpback entanglements were reported; of these, 96 were confirmed (NMFS 2013). Not all entanglements result in mortality. For the CNP stock between 2006 and 2010, there were 55 incidents involving commercial fishing gear, of which 18 resulted in serious injury or death (Allen and Angliss 2013). Estimated annual fisheries mortalities for the WNP and CNP stocks are 0.62 and 2.6 whales per year, respectively.

Vessel strikes are the other main anthropogenic threat to humpback whales. Of 123 humpback whales that stranded along the Atlantic Coast of the U.S. between 1975 and 1996, 10 (8.1 percent) showed evidence of collisions with ships (Laist et al. 2001). Between 1999 and 2005, there were 18 reports of humpback whales being struck by vessels along the Atlantic Coast of the U.S. and the Maritime Provinces of Canada (Cole et al. 2005, Nelson et al. 2007). Of these reports, 13 were confirmed as ship strikes which were reported as having resulted in the death of 7 humpback whales (Allen and Angliss 2013).

There were 108 reports of whale-vessel collisions in Alaska waters between 1978 and 2011. Of these, 93 involved humpback whales (Neilson et al. 2012). The majority of strikes were reported in southeastern Alaska, where the number of humpback whale collisions increased 5.8 percent annually from 1978 to 2011 (Neilson et al. 2012). Between 2001 and 2009, confirmed reports of vessel collisions with humpback whales indicated an average of five humpback whales struck per year in Alaska; between 2005 and 2009, two humpback deaths were attributed to ship strikes (NMFS 2010c). However, no vessel collisions or prop strikes involving humpback whales have been documented in the Chukchi Sea (BOEM 2011a).

Noise from anthropogenic activities can affect humpback whale behavior. Low frequency sounds from airguns used in seismic surveys and from vessels overlap the frequency of humpback whale vocalizations, and has the potential to mask inter-animal communication. Humpback whales are known to modify their vocal behavior during exposure to some types of sound (Miller et al. 2000), and closely related species of baleen whales have been shown to respond to anthropogenic sounds, including sounds from seismic airguns, with changes to foraging and vocal behaviors (Croll et al. 2001; Parks et al. 2007; DiIorio and Clark 2010). Data on responses of humpback whales to anthropogenic sound in the Arctic are not currently available, but given the prevalence of seismic airgun use in the Arctic environment and the long propagation ranges of such sounds, it is reasonable to assume that humpbacks in the area may be exposed to these sounds on a regular basis.

3.3.2.4 North Pacific Right Whale *(Eubalaena japonica)*

3.3.2.4.1 Regulatory Status

North Pacific right whales are classified as endangered under the ESA and are considered one of the most endangered large whale species, with fewer than 50 individuals remaining (Allen and Angliss 2013). Under the MMPA, the North Pacific right whale is designated as depleted and the Eastern North Pacific stock is classified as strategic (Allen and Angliss 2013).

3.3.2.4.2 Habitat Preferences

While there are not enough sightings of North Pacific right whales to reliably characterize current habitat preferences, the related North Atlantic and southern right whales are observed primarily in low-latitude shallow coastal waters during their winter calving season and in higher latitude shelf waters during the summer when distribution is most tightly linked to patchily distributed zooplankton prey (Winn et al. 1986; Perry et al. 1999; Gregr and Coyle 2009). Feeding habitat for right whales is defined by the presence of sufficiently high densities of prey, especially zooplankton (calanoid copepods). Development of those patches is essentially a function of oceanic conditions, such as stratification, bottom topography, and currents which concentrate zooplankton, and concentration is probably enhanced by the behavior of the organisms themselves (Napp and Hunt 2001; Baier and Napp 2003; Baumgartner et al. 2013). The apparent shift in Bering Sea right whale occurrences from deep waters in the mid-twentieth century to the mid-shelf region in the late 1900s was attributed to changes in the availability of optimal zooplankton patches, possibly relating to climatic forcing (variability in oceanic conditions caused by changes in atmospheric patterns). Sightings in the Bering Sea have been clustered in relatively shallow water (waters with a bottom depth of 164 to 262 ft (50 to 80 m). Information from a tagged individual documented movement between the middle and outer portions of the continental shelf in the Bering Sea, which is consistent with historical distributions (Wade et al. 2006).

North Pacific right whales in locations other than Alaska waters have been sighted in even deeper depths, as evidenced by a sighting off California with a bottom depth as deep as 5,577 ft (1,700 m). The International Whaling Commission (IWC) noted a surprising absence of evidence for coastal calving grounds, since right whales in the North Atlantic and in the Southern Hemisphere have calving grounds located in shallow bays, lagoons, or in waters over the continental shelf. There have been suggestions that the North Pacific right whale breeding grounds are in offshore areas in mid-latitudes, though no breeding aggregations have yet been located (Allen and Angliss 2013).

Sightings of North Pacific right whales in 1996 during an Alaska Fisheries Science Center groundfish assessment cruise led to intense photo-identification and vessel surveys from 1998 to 2004 in the southeastern Bering Sea. According to Moore et al. (2006), the sighting locations indicated that right whales preferred the relatively shallow waters of the southeastern Bering Sea middle shelf, which are approximately 230 ft (70 m) in depth. Also determined during these surveys was that right whale calls occurred from May through November, with the greatest number of calls recorded in September and October (Moore et al. 2006).

In July 1998, a lone North Pacific right whale was sighted among humpback whales during an aerial survey southeast of Kodiak Island. Acoustic surveys of this area produced very few North

Pacific right whale calls; however, unambiguous right whale calls were detected in August and early September in western GOA. In addition, calls were recorded from locations where right whales were formerly abundant but have not been seen in recent decades (Moore et al. 2006).

3.3.2.4.3 Critical Habitat

In May 2008, NMFS issued a final rule designating two areas as North Pacific right whale critical habitat, one in the GOA and one in the Bering Sea. Critical habitat in the Bering Sea is located approximately 285 nm (528 km) south of the Action Area. The final rule for this critical habitat designation notes consistent sightings of right whales—both single individuals and pairs—in specific areas in spring and summer over an extended period as an indicator of primary constituent element (dense concentrations of prey) in a feeding area. While sightings of right whales are fewer in number in the GOA than in the Bering Sea, just prior to the final rule three individuals were sighted in the critical habitat area in the GOA (Allen and Angliss 2013).

3.3.2.4.4 Population Size and Trends

There are no reliable estimates of current abundance or trends for right whales in the North Pacific, and the population may only number at least in the low hundreds (Allen and Angliss 2013). The population in the Eastern North Pacific is considered to be very small, perhaps only in the tens of animals (Allen and Angliss 2013). An analysis of both photo-identification and biopsy efforts in 2004 in the Bering Sea revealed 17 individuals. However, of 13 individual animals photographed during aerial surveys in 1998, 1999, and 2000, 2 have already been re-photographed. This photographic recapture rate is consistent with a very small population size (Angliss and Outlaw 2006). Over the past 40 years, most sightings in the eastern north Pacific have been of single whales. However, during the last few years, small groups of right whales have been sighted (such as the group of 17 documented in 2004; Allen and Angliss 2013). Observers in 2002 and 2004 reported one confirmed calf sighting and two probable calves (Allen and Angliss 2013).

Between 2007 and 2010, 12 individual right whales were sighted, with some individuals seen in multiple years. Biopsy samples taken between 1997 and 2004 revealed 21 distinct individuals, including 15 males and 6 females; additional biopsy data from 2008 and 2009 of four whales detected one individual (of the four samples) that had not been previously recorded (Allen and Angliss 2013).

Based on sightings and biopsy data, the population abundance estimate for the Eastern North Pacific stock of North Pacific right whales is 31 animals (CV = 0.226), with a minimum population estimate (N_{min}) of 25.7 individuals (Allen and Angliss 2013; NMFS 2013).

3.3.2.4.5 Distribution

Right whales occur in subpolar to temperate waters. They are generally migratory, with at least a portion of the population moving between summer feeding grounds in temperate or high latitudes and winter calving areas in warmer waters (DoN 2006). However, right whale calls have been detected as early as May and as late as November in southeast Bering Sea region (Munger et al. 2008).

Current distribution patterns and migration routes of North Pacific right whales are not known. Historical whaling records provide virtually the only information on North Pacific right whale distribution. North Pacific right whales historically occurred across the Pacific Ocean north of 35˚N, with concentrations in the GOA south of Kodiak Island, the eastern Aleutian Islands,

south-central Bering Sea, Okhotsk Sea, and the Sea of Japan. Presently, sightings are extremely rare, occurring primarily in the Okhotsk Sea and the eastern Bering Sea. There is evidence that the GOA was used as a feeding ground, and recent surveys suggest that some individuals continue to use the shelf east of Kodiak as a feeding area, which has now been designated as critical habitat. It is not known whether there is an interchange between the Bering Sea and GOA areas; for example, an individual right whale that was photographed off Kodiak Island did not match to any photographs of individuals seen in the Bering Sea (DoN 2006, Moore et al. 2006).

The area of densest concentration of North Pacific right whales in the GOA is roughly east from 170˚W to 150˚W and south to 52˚N. (DoN 2006). In the GOA off Kodiak Island, sightings of a single lone right whale have occurred in 1998, 2004, 2005, and 2006 (Allen and Angliss 2013).

One right whale was sighted near Maui, Hawaii in April 1996 and re-sighted that same year in the Bering Sea (Salden and Mickelsen 1999); other sightings of right whales near Hawaii are rare (none between 1979 and 1996), and this area is presumed to be extralimital for this species (Allen and Angliss 2013).

3.3.2.4.6 Life History

Feeding habitat for right whales is defined by the presence of sufficiently high densities of prey, especially calanoid copepods (Baumgartner et al. 2013). Development of those patches is essentially a function of oceanic conditions, such as stratification, bottom topography, and currents which concentrate zooplankton, and concentration is probably enhanced by the behavior of the organisms themselves (Napp and Hunt 2001; Baier and Napp 2003; Baumgartner et al. 2013). The apparent shift in Bering Sea right whale occurrences from deep waters in the mid-twentieth century to the mid-shelf region in the late 1900s was attributed to changes in the availability of optimal zooplankton patches, possibly relating to climatic forcing (variability in oceanic conditions caused by changes in atmospheric patterns). Sightings in the Bering Sea are clustered in relatively shallow water (waters with a bottom depth of 50 m to 80 m [164 to 262 ft]). Recently, however, a tagged individual moved between the middle and outer portions of the continental shelf in the Bering Sea, which is consistent with historical distribution patterns (Wade et al. 2006). Additionally, sightings of some other right whale individuals during the 2004 survey were made on the outer continental shelf. In other locations, North Pacific right whales have been sighted in even deeper waters, as evidenced by a sighting off California in waters with a bottom depth as deep as 1,700 m (5,577 ft). The IWC noted a surprising absence of evidence for coastal calving grounds, since right whales in the North Atlantic and in the Southern Hemisphere have calving grounds located in shallow bays, lagoons, or in waters over the continental shelf (DoN 2006).

The location of calving grounds for the eastern North Pacific population is unknown. There were no records in the last 100 years of newborn or very young calves in the eastern North Pacific until 2004 when the presence of at least two calves was documented in the eastern Bering Sea (Allen and Angliss 2013). There are no known areas used by right whales for reproduction or calving in the Action Area.

3.3.2.4.7 Diving Behavior

Very little is known about North Pacific right whale diving abilities. Dives of 5 to 15 minutes or even longer have been reported for North Atlantic right whales (Baumgartner and Mate 2003). Observations of North Atlantic right whales found that the average depth dive was strongly correlated with both the average depth of peak copepod abundance and the average depth of the

bottom mixed layer's upper surface. North Atlantic right whale feeding dives are characterized by a rapid descent from the surface to a particular depth between 262 and 574 ft (80 and 175 m), remarkable fidelity to that depth for 5 to 14 min, and then rapid ascent back to the surface (Baumgartner and Mate 2003). Longer surface intervals have been observed for reproductively active females and their calves.

3.3.2.4.8 Acoustics

North Pacific right whale calls are classified into five categories: (1) up, (2) down-up, (3) down, (4) constant, and (5) unclassified. The "up" call is the predominant type and is typically a signal sweeping from about 90 to 150 Hz in 0.7 second (MacDonald and Moore 2002). Right whales commonly produce calls in a series of 10 to 15 calls lasting 5 to 10 min, followed by silence lasting an hour or more; some individuals did not call for periods of at least 4 hours (MacDonald and Moore 2002).

While no measured data on hearing ability are available for North Pacific right whales, Ketten (1997) hypothesized that mysticetes have acute infrasonic hearing. Houser et al. (2001) produced the first humpback whale audiogram (using a mathematical model), which was u-shaped and conformed to the typical mammalian presentation. The area of best hearing, or sensitivity, according to the model was observed between frequencies from 700 Hz to 10 kHz but the maximum range of hearing was identified between 200 Hz to 14 kHz. Au et al. (2006) noted that if the popular notion that animals generally hear the totality of the sounds they produce is applied to humpback whales, this suggests that its upper frequency limit of hearing is as high as 24 kHz. Morphometric analyses of the inner ear of North Atlantic right whales resulted in an estimated hearing frequency range of approximately 0.01 to 22 kHz, based on established marine mammal models (Parks 2003).

3.3.2.4.9 Environmental and Human Effects

Direct threats to North Pacific right whales include natural mortalities from disease, starvation, and predation by killer whales on calves, and anthropogenic threats from entanglements and ship strikes. Other factors, including habitat loss due to global climate change, pollution, and anthropogenic noise disturbance can also influence survival and reproduction of this species.

Natural mortalities in this species are poorly understood, because naturally dead right whales are rarely encountered by humans. Predation from killer whales has been observed in bowhead whale populations (George et al. 1994; Reinhart et al. 2013), and while there are no data on killer whale predation on North Pacific right whales, the similarities in life history indicate that right whale calves may also be vulnerable to killer whale predation. Other potential sources of natural mortality include disease and ice entrapment, but there are no data available on the relative significance of these threats.

Anthropogenic threats to North Pacific whales include ship strikes, entanglement in fishing gear, contaminants, and anthropogenic noise (NMFS 2013). Historically, right whales were an easy and profitable species for early (pre-modern) whalers. It has been estimated that between 26,500 and 37,000 North Pacific right whales were killed between 1839 and 1909. From 1900 to 1999, a total of 742 North Pacific right whales were killed by whaling; of those, 331 were killed in the western North Pacific and 411 in the eastern north Pacific. This includes 372 whales killed illegally by the former U.S.S.R. in the period from 1963 to 1967, primarily in the GOA and Bering Sea (Allen and Angliss 2013). While there are no current whaling activities, the population has been significantly reduced, and the Eastern North Pacific stock population

numbers fewer than 100 animals (Allen and Angliss 2013), substantially affecting the population's ability to respond to and recover from threats.

The two likely causes of anthropogenic mortalities in North Pacific right whales are entanglement in fishing gear and physical strikes by vessels (NMFS 2013). These are the same threats affecting the North Atlantic right whale, which is particularly vulnerable to both threats due to its slow speed, tendency to hang just below the water surface, and open-mouthed foraging methods (Parks et al. 2012). Both commercial fishing and vessel traffic are substantially lower in the Bering Sea and North Pacific Ocean than they are along the Eastern seaboard of the U.S., reducing the relative risk for North Pacific right whales. However, increases in vessel or fishing activity in the Bering Sea could increase the risk to this species.

Noise from anthropogenic activities can affect right whale behavior. Low frequency sounds from airguns used in seismic surveys and from vessels overlap the frequency of right whale vocalizations, and has the potential to mask inter-animal communication. North Atlantic right whales are known to modify their vocal behavior during exposure to some types of sound (Parks et al. 2007, 2011), and closely related species of baleen whales have been shown to respond to anthropogenic sounds, including sounds from seismic airguns, with changes to foraging and vocal behaviors (Croll et al. 2001; DiIorio and Clark 2010; Blackwell et al. 2013). Additionally, exposure to noise has been shown to increase stress hormone levels in North Atlantic right whales (Rolland et al. 2012). Data on responses of North Pacific whales to anthropogenic sound are not currently available, but it is probable that this species is exposed to noise from vessel traffic in the Bering Sea during fishing and shipping operations. Such exposure could have behavioral and physiological impacts on North Pacific right whales.

3.3.3 Pinnipeds

The ESA-listed pinnipeds found in the Action Area are presented in Table 3-2, along with their estimated abundance (for a given stock), MMPA regulatory status, and seasonal occurrence according to the NMFS stock assessments. Species listed as "common" indicate that they occur routinely, species listed as "rare" have sporadic sightings, and species listed as "very rare" are very few in number or are unlikely to be present in the Action Area. Detailed discussions of each species follow.

Table 3-3: Abundance, Status, and Seasonal Occurrence of ESA-Listed Pinnipeds in the Action Area

COMMON NAME (SCIENTIFIC NAME)	ABUNDANCE (CV)[1]	STOCK	ESA / MMPA STATUS	OCCURRENCE IN THE Action Area (Mar – Nov)
Bearded seal	Unknown	Beringia	T / D,S	Common
Ringed seal	Unknown	Arctic	T / D,S	Common
Steller sea lion	45,916 (CV unavailable)	Western U. S.	E / D,S	Common

MMPA = Marine Mammal Protection Act; E = endangered (under ESA); D = depleted stock (under MMPA); S = strategic stock (under MMPA); T = threatened (under ESA).

[1] CV = coefficient of variation from Angliss and Allen, 2013

3.3.3.1 Bearded Seal (*Erignathus barbatus nauticus*)

3.3.3.1.1 Regulatory Status

There are two recognized subspecies of bearded seals, one of which inhabits U.S. waters. The Pacific bearded seal subspecies is not listed under the ESA, but two Distinct Population Segments (DPS) in the Pacific (the Okhotsk and Beringia stocks) were listed as threatened in December 2012. Of these, the Beringia stock inhabits waters inside the U.S. EEZ, including the eastern Bering, Chukchi, and Beaufort seas (Allen and Angliss 2013). The bearded seal is protected under the MMPA; both ESA-listed DPS are classified as depleted and are strategic stocks.

3.3.3.1.2 Habitat Preferences

Bearded seals have a circumpolar distribution in the Arctic, generally south of 80˚N latitude, and are subarctic in some areas, such as the western North Atlantic. While they are typically strongly tied to ice, bearded seals are known to haul out on land, swim up rivers, and live in open-ocean areas for extended periods (Cleator 1996; Jefferson et al. 2008b). The bearded seal's effective range is generally restricted to areas where seasonal sea ice occurs over relatively shallow waters. Based on the best available data, Cameron et al. (2010) therefore defined the core distribution of bearded seals as those areas over waters less than 500 m deep (NMFS 2013).

The Bering and Chukchi seas are the largest area of continuous habitat for bearded seals (Burns 1981, Nelson et al. 1984). They are generally covered by sea ice in late winter and spring and ice free in late summer and fall (Burns 1967; Burns 1981; Nelson et al. 1984). During the winter months, most bearded seals appear to migrate south through the Bering Strait, though there are small numbers of individuals that reside in the Chukchi and Beaufort seas year round. In late spring, animals that spent the winter in the Bering Sea migrate northward following the edge of the sea ice.

3.3.3.1.3 Critical Habitat

Critical habitat has not been designated for this species.

3.3.3.1.4 Population Size and Trends

Due to the patchy distribution of individuals moving with ice floes, it is difficult to make accurate abundance estimates for this species (Kovacs 2009), and no estimates exist specifically for the Beringia stock. The best available global population estimate for the bearded seal is 450,000 to 500,000, approximately half of which inhabit the Bering and Chukchi Seas (Jefferson et al. 2008b). Angliss and Allen (2013) note that the only available estimate of the size of the Beringia DPS is approximately 155,000 seals, but caution that this number is not considered conservative due to the variety of survey areas and techniques.

3.3.3.1.5 Distribution

Bearded seals have a circumpolar distribution in the Arctic, generally south of 80˚N latitude, and are subarctic in some areas, such as the western North Atlantic. While they are typically strongly tied to ice, bearded seals are known to haul out on land, swim up rivers, and live in open-ocean areas for extended periods (Cleator 1996; Jefferson et al. 2008b). The bearded seal's effective range is generally restricted to areas where seasonal sea ice occurs over relatively shallow waters. Based on the best available data, Cameron et al. (2010) therefore defined the core distribution of bearded seals as those areas over waters less than 500 m deep (NMFS 2013).

The range of the Beringia DPS of the bearded seal extends from an east-west Eurasian dividing line at Novosibirskiye in the East Siberian Sea, south into the Bering Sea (Kamchatka Peninsula and 157˚E division between the Beringia and Okhotsk DPSs), and to a North American dividing line (between the Beringia DPS of the *E. b. nauticus* subspecies and the *E. b. barbatus* subspecies) at 122˚W (midpoint between the Beaufort Sea and Pelly Bay) (NMFS 2013).

The Bering and Chukchi seas are the largest area of continuous habitat for bearded seals (Burns 1981, Nelson et al. 1984). They are generally covered by sea ice in late winter and spring and ice free in late summer and fall (Burns 1967; Burns 1981; Nelson et al. 1984). During the winter months, most bearded seals appear to migrate south through the Bering Strait, though there are small numbers of individuals that reside in the Chukchi and Beaufort seas year round. In late spring, animals that spent the winter in the Bering Sea migrate northward following the edge of the sea ice.

3.3.3.1.6 Life History

The bearded seal's diet is composed largely of demersal fish and benthic invertebrate species. Dominant prey items vary among seasons and regions. In the Bering and Chukchi Seas, bearded seals consume capelin, Arctic and saffron cod, long-snouted pricklebacks, sculpins, flatfishes, several species of snailfish, and eelpouts. Invertebrates preyed on are crabs, clams, snails, amphipods, shrimps, marine worms, and octopuses. The adult diet appears to differ somewhat from that of juveniles (Jefferson et al. 2008b; Kovacs 2009). Known predators of bearded seals include polar bears, killer whales, and Greenland sharks (Kovacs 2009).

Most of the Beringia population of bearded seals winter in the Bering Sea and move north through the Bering Strait from late April through June. During summer, these animals are found along the ice edge in the Chukchi Sea (Burns 1967, Burns 1981). The overall summer distribution is quite broad, with seals rarely hauled out on land, and some seals may not follow the ice northward but remain in open-water areas of the Bering and Chukchi Seas (Burns 1981, Nelson 1981, Smith and Hammill 1981). An unknown proportion of the population moves southward from the Chukchi Sea in late fall and winter, and Burns (1967) noted a movement of bearded seals away from shore during that season as well.

Bearded seals are solitary throughout most of the year except during the breeding season. Males become sexually mature at 6 – 7 years, and females at 5 – 6 years. During the breeding season (April – July), males adopt one of two mating strategies, either defending a territory or roaming. Males of both types produce individually-specific acoustic displays, which may function to attract females or mediate interactions with rival males (van Parijs et al. 2001, 2003). Pups are born between March and May, and are weaned within 2 – 4 weeks (Lydersen and Kovacs 1999).

3.3.3.1.7 Diving Behavior

The diving behavior of adult bearded seals is closely related to their benthic foraging habits and in the few studies conducted so far, dive depths have largely reflected local bathymetry (Gjertz et al. 2000, Krafft et al. 2000). Studies using depth recording devices have until recently focused on lactating mothers and their pups. These studies showed that mothers in the Svalbard Archipelago make relatively shallow dives, generally less than 100 m in depth, and for short periods, generally less than 10 minutes in duration. Nursing mothers dived deeper on average than their pups, but by 6 weeks of age most pups had exceeded the maximum dive depth of lactating females (448 – 480 m versus 168 – 472 m) (Gjertz et al. 2000). Adult females spent most of their

dive time (47 – 92 pecent) performing U-shaped dives, believed to represent bottom feeding (Krafft et al. 2000); U-shaped dives are also common in nursing pups (Lydersen et al. 1994b).

3.3.3.1.8 Acoustics

Bearded seals are a highly vocal species, particularly during the breeding season, when males produce individually-distinctive calls known as trills (van Parijs et al. 2001; 2003). Trills show geographic variation, and calls produced by a single male are stable over periods of years (Risch et al. 2007).

Underwater audiograms for ice seals suggest that they have very little hearing sensitivity below 1 kHz; but hear underwater sounds at frequencies up to 60 kHz; and make calls between 90 Hz and 16 kHz (Richardson et al.1995). According to Southall et al. (2007), bearded seals (as with other pinnipeds) have an estimated auditory bandwidth of 75 Hz to 75 kHz in water, and 75 Hz to 30 kHz in air.

3.3.3.1.9 Environmental and Human Effects

Threats to bearded seals include natural sources of mortality, such as disease and predation, and anthropogenic effects, including subsistence hunting, interactions with fisheries, and global climate change. Bearded seals are subject to a number of diseases and parasites which can cause mortality. Since July 2011, over 100 sick or dead seals have been reported in Alaska. The cause of the Arctic seal disease remains unknown, and is under investigation (NMFS 2013). Cameron et al. (2010) noted that abiotic and biotic changes to bearded seal habitat could lead to exposure to new pathogens or new levels of virulence, but the potential threats to ringed seals were considered low.

Polar bears are the primary predator of bearded seals. Other predators include brown bears, killer whales, sharks, and walruses (Cameron et al. 2010; NMFS 2013). While there are few available studies of the interactions between bearded seals and their predators, predation is likely to be a significant source of mortality for this species.

Anthropogenic threats to bearded seals include subsistence hunting, interactions with commercial fisheries, and global climate change. Bearded seals are an important subsistence resource for Native communities along the coasts of the northern Bering, Chukchi, and Beaufort Seas. The estimated harvest peaked from 1990 to 1998 at mean levels of 6,788 bearded seals per year (Cameron et al. 2010). The most recent harvest estimates (from 2003) cover only villages in the North Slope Borough and suggest that a minimum of 1,545 bearded seals are taken from just the eastern Chukchi and western Beaufort Seas (Bacon et al. 2009).

Commercial fisheries may impact bearded seals through direct interactions (i.e., incidental take or bycatch) and indirectly through competition for prey resources and other impacts on prey populations (NMFS 2013). Estimates of bearded seal bycatch could only be found for commercial fisheries that operate in Alaska waters. Between 2007 and 2009, there were incidental serious injuries and mortalities of bearded seals in the Bering Sea/Aleutian Islands pollock trawl and the Bering Sea/ Aleutian Islands flatfish trawl. The estimated minimum mortality rate incidental to commercial fisheries is 2.70 animals per year. Cameron et al. (2010) noted that commercial fisheries target a number of known bearded seal prey species, such as walleye pollock (*Theragra chalcogramma*) and cod, and may therefore indirectly affect bearded seals through increased competition for prey. Bottom trawl fisheries have the potential to destroy or modify habitat for benthic prey species.

3.3.3.2 Ringed Seal (*Pusa hispida*)

3.3.3.2.1 Regulatory Status

There are five recognized subspecies of ringed seals. Of these, only the Arctic subspecies (*Pusa hispida hispida*) is under U.S. jurisdiction, found in waters of the Bering, Chukchi, and Beaufort Seas. The Arctic subspecies of ringed seals was listed as threatened under the ESA in 2012 (77 FR 76706) and is listed as depleted and a strategic stock under the MMPA.

3.3.3.2.2 Habitat Preferences

Ringed seals have a circumpolar distribution throughout the Arctic basin, Hudson Bay and straights, and the Bering, Okhotsk, and Baltic Seas. The distribution of ringed seals is strongly correlated with pack and land-fast ice (Born et al. 2002; Jefferson et al. 2008b) in areas over virtually any water depth (Reeves 1998a).

Habitat preferences appear to be associated with available prey and the suitability of ice habitat for essential behaviors, including breeding, birthing, and molting. During the winter, movements appear to be limited, and seals remain relatively close to breathing holes created after freeze-up (Kelly et al. 2010). Throughout most of its range, the Arctic subspecies does not come ashore and uses sea ice as a substrate for resting, pupping, and molting (Kelly et al. 2010). After breakup and during the open-water period, Arctic ringed seals range long distances to forage near the ice edge and in productive areas (Kelly et al. 2010). In fall, members of this population migrate from the Beaufort and Chukchi Seas westward into Russian waters, with some individuals moving south into the Bering Sea (Harwood et al. 2012).

3.3.3.2.3 Critical Habitat

Critical habitat has not been designated for this species.

3.3.3.2.4 Population Size and Trends

As of the latest stock assessment report, there was not enough available data for NMFS to estimate the size or population trends for the Arctic stock of ringed seals. However, Kelly et al. (2010) note that a reasonable estimate is approximately 1 million seals in the Beaufort and Chukchi seas, with a minimum of 300,000 individuals in the Alaska portions of these areas.

3.3.3.2.5 Distribution

Ringed seals have a circumpolar distribution, with five subspecies identified throughout the Arctic basin, Hudson Bay and straights, and the Bering, Okhotsk, and Baltic Seas. The genetic structure of the Arctic subspecies remains unclear (Kelly et al. 2010), but individuals from the Arctic subspecies inhabit waters of the Bering, Chukchi, and Beaufort Seas throughout the year (Allen and Angliss 2013). Harwood et al. (2012) showed that some members of this subspecies cross jurisdictional boundaries into Canadian and Russian waters at different times of the year.

3.3.3.2.6 Life History

Ringed seals are strongly associated with ice throughout the year; ice serves as a platform for resting, breeding, and basking/molting (Allen and Angliss 2013). During seasons with high ice cover (late fall – early summer), both males and females create and maintain breathing holes within subnivean lairs above the ice, used for resting and protection from predators and extreme weather conditions (Kelly et al. 2010). Females give birth in the lairs during late winter and early spring, and nurse their pups for 5 – 9 weeks (Kelly et al. 2010). Pups are capable of swimming

and may spend up to 50 percent of their time during the nursing period in the water. The rest of their time is spent in the mother's lair for protection from polar bears, their primary predator (Lydersen and Hammill 1993b).

Satellite tracking indicates that during the foraging period, ringed seals breeding in shorefast ice either forage within 100 km of their shorefast breeding habitat or they make extensive movements of hundreds or thousands of km to forage in highly productive areas and along the pack ice edge (Freitas et al. 2008 in Kelly et al. 2010b). Movements during the foraging period by ringed seals that breed in the pack ice are unknown.

During the winter subnivean period, ringed seals excavate lairs in the snow above breathing holes where the snow depth is sufficient. These lairs are occupied for resting, pupping, and nursing young in annual shorefast and pack ice. Movements during the subnivean period are typically limited, especially when ice cover is extensive. During the (late) spring basking period, ringed seals haul out on the surface of the ice for their annual molt.

Despite regional and seasonal variations in the diet of Arctic ringed seals, fishes of the cod family tend to dominate the diet from late autumn through early spring in many areas (Kovacs 2007). Arctic cod (*Boreogadus saida*) is often reported to be the most important prey species for ringed seals, especially during the ice-covered periods of the year (Lowry et al. 1980, Smith 1987, Holst et al. 2001, Labansen et al. 2007). Quakenbush et al. (2011a) reported evidence that in general, the diet of Alaska ringed seals sampled consisted of cod, amphipods, and shrimp. They found that fish were consumed more frequently in the 2000s than during the 1960s and 1970s, and identified the five dominant species or taxa of fishes in the diet during the 2000s as: Arctic cod, saffron cod, sculpin, rainbow smelt, and walleye pollock. Invertebrate prey were predominantly mysids, amphipods, and shrimp, with shrimp most dominant.

3.3.3.2.7 Diving Behavior

Ringed seals spend a significant amount of time (greater than or equal to 80 percent) in the water during non-molt seasons (molting occurs in May – June). Tagging studies have indicated that adult ringed seals may dive to depths of 500m; the longest recorded dive duration for this species is 39 minutes (Kelly et al. 2010). Dive duration is correlated with body size; larger animals perform longer and deeper dives than smaller animals (Kelly et al. 2010; Harwood et al. 2012). Most dives are shorter (10 minutes or less), and depths may be limited by the bathymetric conditions in the foraging area (Kelly et al. 2010).

3.3.3.2.8 Acoustics

Ringed seals produce a variety of vocalizations, including clicks, squeaks, yelps, and growls (Stirling 1973, Richardson et al. 1995). Peak energy of all calls appears to be below 5 kHz, with relatively low source levels (Richardson et al. 1995). Stirling (1973) detected no calls associated solely with the breeding season, but it appears that the relative frequency of call types and the overall number of calls increased at the onset of the reproductive season and decreased at the end (Richardson et al. 1995).

Unlike most pinnipeds, hearing has been directly studied in ringed seals. Underwater audiograms are essentially flat between 1 kHz (lower limit of testing) to 40 kHz, becoming less sensitive at higher frequencies. The functional high frequency limit is around 60 kHz (Richardson et al. 1995). More recent estimates of pinniped hearing come from Southall et al. (2007), which estimates the functional range of phocid hearing from 75 Hz to 75 kHz.

3.3.3.2.9 Environmental and Human Effects

Threats to ringed seals include natural and anthropogenic sources of mortality. Natural threats include disease and predation; anthropogenic mortalities are caused by subsistence hunting, interactions with fisheries, and global climate change.

Polar bears are the main predator of ringed seals, but other predators include Arctic and red foxes, walruses, wolves, wolverines, killer whales, and ravens (NMFS 2013). The threat currently posed to ringed seals by predation is moderate, but predation risk is expected to increase as snow and sea ice conditions change with a warming climate (75 FR 77476). Disease, a second source of natural mortality is also present in this population. Since July 2011, more than 60 dead and 75 diseased seals, mostly ringed seals, have been reported in Alaska. The underlying cause of the disease remains unknown, and is under investigation (NMFS 2013).

Subsistence hunting of ringed seals is important to many Alaska native villages, and contributes to annual mortality in this stock. The best estimate of ringed seal harvest in Alaska is 9,567 animals per year (Allen and Angliss, 2013). Kelly et al. (2010) noted that this level of harvest appears sustainable.

Ringed seals interact directly with a number of fisheries, but serious injuries and mortalities have only been reported in the Bering Sea/Aleutian Islands pollock and groundfish trawl fisheries. Based on data from 2007 to 2009, there have been an average of 1.75 (CV = 0.01) mortalities of ringed seals incidental to commercial fishing operations (Allen and Angliss 2013). Indirect interactions with fisheries include competition for prey species. Kelly et al. (2010) described such interactions with fisheries targeting walleye pollock, Pacific cod, herring, and capelin. Bottom trawl fisheries have the potential to destroy or modify habitat for benthic prey species.

3.3.3.3 Steller Sea Lion (*Eumetopias jubatus*)

3.3.3.3.1 Regulatory Status

In 1997, NMFS reclassified Steller sea lions into two distinct subpopulations, based on genetics and population trends (Loughlin 1997, Angliss and Outlaw 2005). The Western U.S. stock was designated as endangered and includes animals west of Cape Suckling, Alaska (144˚W; NMFS 1997c). The Eastern U.S. stock includes animals east of Cape Suckling that extend into southeastern Alaska and Canada (NMFS 1997c, Loughlin 2002, Angliss and Outlaw 2005), and was designated "recovered" and removed from the Endangered Species List effective 4 December 2013 (78 FR 66140). The Steller sea lion is designated as depleted under the MMPA. A final revised species recovery plan addresses the Western U.S. stock (NMFS 2008).

3.3.3.3.2 Habitat Preferences

Steller sea lions are opportunistic predators, feeding primarily on fishes (including walleye pollock, cod, mackerel, and herring), invertebrates, and cephalopods (octopus and squid), with diet varying geographically and seasonally (Merrick et al. 1997, Loughlin 2002, DoN 2006). For the GOA, foraging habitat is primarily shallow, nearshore and continental shelf waters 8 to 24 km (4.3 to 13 nm) offshore with a secondary occurrence inshore of the 1,000 m isobath, and a rare occurrence seaward of the 1,000 m isobath.

Steller sea lions tend to make shallow dives of less than 250 m (820 ft) but are capable of deeper dives (NMFS 2008). Female foraging trips during winter tend to be longer (130 km) and dives are deeper (frequently greater than 250 m). Summer foraging dives, on the other hand, tend to be

closer to shore (about 16 km) and shallower (100-250 m) (Merrick and Loughlin 1997; Loughlin 1997). Adult females stay with their pups for a few days after birth before beginning a regular routine of alternating foraging trips at sea with nursing their pups on land.

3.3.3.3.3 Critical Habitat

In 1993, NMFS published a final rule to designate critical habitat for Steller sea lions (NMFS 2008). The areas designated as critical habitat were based on land use patterns, the extent of foraging trips, and the availability of prey items with particular importance given to the haul out areas where animals rest, pup, nurse, mate, and molt. Two kinds of marine habitat were designated as critical: "aquatic zones" around rookeries and haulouts and three special aquatic feeding areas in Alaska. The special aquatic foraging areas were chosen, based on 1) at-sea observations indicating that sea lions commonly used these areas for foraging, 2) records of animals killed incidentally in fisheries in the 1980s, 3) knowledge of sea lion prey and their life histories and distributions, and 4) foraging studies" (NMFS 2008). For the Western U.S. stock, Critical Habitat for aquatic zones located (west of 144˚W longitude) extend 20 nm (37 km) seaward in state and federally managed waters. None of the aquatic foraging areas are located within the Action Area. Designated critical habitat within the Action Area is shown in Figure 3-1.

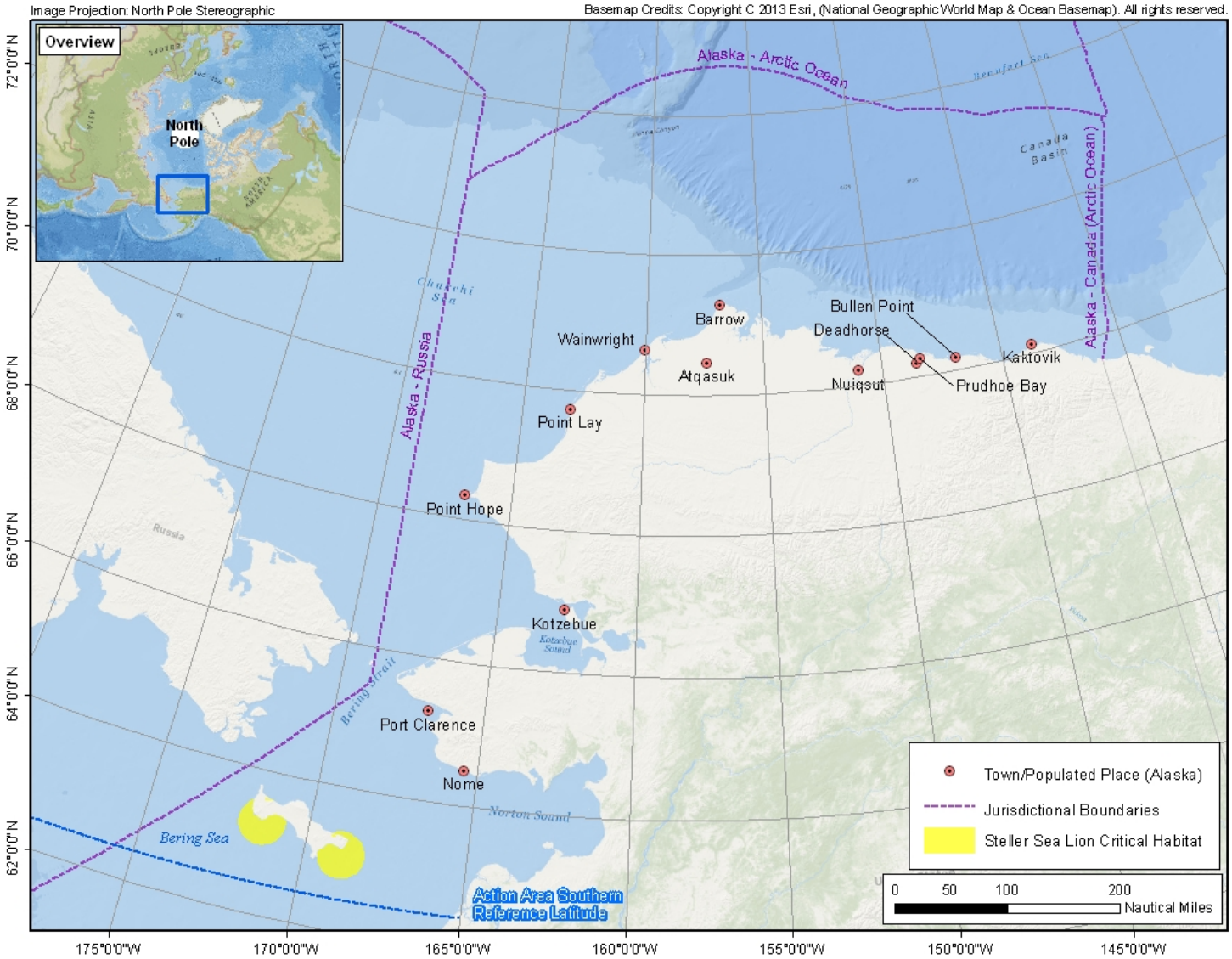

Figure 3-1: Western Steller sea lion Distinct Population Segment Critical Habitat in the Action Area

3.3.3.3.4 Population Size and Trends

The minimum abundance estimate for Western U.S. stock Steller sea lions is 38,988 individuals, and the Eastern stock is estimated at 45,095 to 55,832 (Allen and Angliss 2013). The Western U.S. stock inhabits areas including the GOA, Aleutian Islands, and Bering Sea, and is the only stock that may occur in the Action Area (DoN 2006, NMFS 2008), with about 70 percent of the population living in Alaskan waters. Between 2000 and 2004, the Western U.S. stock increased at a rate of approximately 3 percent per year (Fritz and Stinchcomb 2005). The Eastern U.S. stock has increased at an annual rate of approximately 3 percent since at least the late 1970s (Pitcher et al. 2007) and may be a candidate for removal from the list of threatened and endangered species (NMFS 2008). Despite incomplete surveys conducted in 2006 and 2007, the available data indicate that the Western Steller sea lion population (non-pups) was stable since 2004 (when the last complete assessment was done). The revised Steller Sea Lion Recovery Plan (NMFS 2008) contains recovery criteria to change the listing of the Western U.S. stock from endangered to threatened ("down-listing") and to remove it from the list of species requiring ESA protection (delist).

3.3.3.3.5 Distribution

Steller sea lions do not migrate, but they often disperse widely outside of the breeding season (Loughlin 2002). Steller sea lions are gregarious animals that often travel or haul out in large groups of up to 45 individuals (Keple 2002). At sea, groups usually consist of females and subadult males; adult males are usually solitary while at sea (Loughlin 2002). An area of high occurrence extends from the shore to the 273-fathom (500-m) depth. For the GOA, foraging habitat is primarily shallow, nearshore, and continental shelf waters 4.3 to 13 nm (8 to 24 km) offshore with a secondary occurrence inshore of the 3,280 ft (1,000 m) isobath, and a rare occurrence seaward of the 3,280 ft (1,000 m) isobath. Steller sea lions have been sighted foraging in the middle of the GOA (DoN 2006).

In the Bering Sea, the northernmost major rookery is on Walrus Island in the Pribilof Island group. The northernmost major haulout (defined as a site where more than 200 animals have been counted) is on Hall Island off the northwestern tip of St. Matthew Island (NMFS 2013). Their distribution also extends northward from the western end of the Aleutian chain to sites along the eastern shore of the Kamchatka Peninsula. Their distribution is probably centered in the GOA and Aleutian Islands (NMFS 1992).

3.3.3.3.6 Life History

Foraging habitat is primarily shallow, nearshore and continental shelf waters, and some Steller sea lions feed in freshwater rivers (Reeves et al. 1992, Robson 2002). They also are known to feed in deep waters past the continental shelf break (DoN 2006). Haulout and rookery sites are located on isolated islands, rocky shorelines, and jetties. Steller sea lions are opportunistic predators, feeding primarily on fish and cephalopods, and their diet varies geographically and seasonally (Merrick et al. 1997). They feed near land or in relatively shallow water (Pitcher and Calkins 1981).

Steller sea lions form large rookeries generally from late May to early July, beginning during late spring when adult males arrive and establish territories. Large males aggressively defend territories while non-breeding males remain at peripheral sites or haulouts. Females arrive soon after and give birth to pups. Females reach sexual maturity at 4 to 5 years of age (Pitcher and

Calkins 1981). Natural mortality in Steller sea lions is thought to result primarily from killer whale predation, diseases and parasites, and habitat loss (National Marine Fisheries Service 2008). The carrying capacity of the North Pacific for Steller sea lions also likely fluctuates in response to changes in the environment.

Most births occur from mid-May through mid-July at rookeries outside the boundaries of the MAA, and breeding takes place shortly thereafter (Pitcher and Calkins 1981). Rookeries of the Eastern stock occur along the coasts of Oregon and California (NMFS 2008). There are no known areas used by Steller sea lions for reproduction or calving in the Action Area.

3.3.3.3.7 Diving Behavior

Diving and foraging activity varies by sex, age, and season. During the breeding season, females with pups feed mostly at night, while territorial males eat little or no food (Loughlin 2002). In the winter, females make long trips of around 81 mi (130 km) and dive deeply to locate prey (Merrick and Loughlin 1997, Loughlin 2002). In the summer, trip length is about 11 mi (17 km) and dives are shallower (Loughlin 2002). Females usually go to sea to feed and return to nurse their pups in 24- to 48-hour cycles (NRC 2003). Steller sea lions tend to make shallow dives of less than 820 ft (250 m) but are capable of deeper dives (NMFS 2003).

3.3.3.3.8 Acoustics

On land, territorial male Steller sea lions usually produce low frequency roars (Schusterman et al. 1970, Loughlin et al. 1987). The calls of females range from 30 Hz to 3 kHz, with peak frequencies from 150 Hz to 1 kHz; typical duration is 1.0 to 1.5 second (Campbell et al. 2002). Pups produce bleating sounds. Underwater sounds are similar to those produced on land (Loughlin et al. 1987).

When the underwater hearing sensitivity of two Steller sea lions was tested, the hearing threshold of the male was significantly different from than that of the female. The range of best hearing for the male was from 1 to 16 kHz, with maximum sensitivity (77 dB re 1 µPa @ 1 m) at 1 kHz. The range of best hearing for the female was from 16 kHz to above 25 kHz, with maximum sensitivity (73 dB re 1 µPa @ 1 m) at 25 kHz. However, because of the small number of animals tested, the findings could not be attributed to individual differences in sensitivity or sexual dimorphism (Kastelein et al. 2005).

3.3.3.3.9 Environmental and Human Effects

Historically, the Eastern stock of Steller sea lions was subjected to substantial mortality by humans, primarily due to commercial exploitation and both sanctioned and unsanctioned predator control (NMFS 2008). Commercial exploitation occurred primarily in the 1800s and early 1900s while unsanctioned predator control probably persisted into the 1970s in some locations. State sanctioned commercial harvest of Steller sea lions ended in 1972 with the advent of the MMPA. Although not well documented, there is little doubt that numbers of Steller sea lions were greatly reduced in many locations by these activities (NMFS 2008). Commercial hunting and predator control activities have been discontinued and no longer affect this stock. In contrast the Eastern stock, for which no threats to continued recovery were identified, the Western stock is experiencing potential human-related threats from competition with fisheries (potentially high), incidental take by fisheries (low), and toxic substances (medium). Although several factors affecting the Western stock also affect the Eastern stock (e.g., environmental variability, killer whale predation, toxic substances, disturbance, shooting), these threats do not

appear to be at a level sufficient to keep the Eastern stock from continuing to recover, given the long term sustained growth of the population as a whole (NMFS 2008).

3.3.4 Essential Fish Habitat

In 1996, the Magnuson-Stevens Fishery Conservation and Management Act (MSA) was reauthorized and amended by the Sustainable Fisheries Act (Public Law 104-267). The reauthorized MSA mandated numerous changes to the existing legislation designed to prevent overfishing, rebuild depleted fish stocks, minimize bycatch, enhance research, improve monitoring, and protect fish habitat. One of the most significant mandates in the MSA that came out of the reauthorization was the Essential Fish Habitat (EFH) provision, which provides the means to conserve fish habitat.

The EFH mandate requires that the regional Fishery Management Councils, through federal fishery management plans, describe and identify EFH for each federally managed species; minimize, to the extent practicable, adverse effects on such habitat caused by fishing; and identify other actions to encourage the conservation and enhancement of such habitats. Congress defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 United States Code [USC] Section [§] 1802(10)). The term “fish” is defined in the MSA as “finfish, mollusks, crustaceans, and all other forms of marine animals and plant life other than marine mammals and birds” (16 USC § 1802(12)). The regulations for implementing EFH provide the following definitions: "waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities (50 Code of Federal Regulations [CFR] § 600.10). Habitats used at any time during a species’ life cycle (i.e., during at least one of its lifestages) must be accounted for when describing and identifying EFH (NMFS 2002).

Authority to implement the MSA is given to the Secretary of Commerce and has been delegated to National Marine Fisheries Service. The MSA requires that EFH be identified and described for each federally managed species. The MSA also requires federal agencies to consult with NMFS on activities that may adversely affect EFH or when NMFS independently learns of a federal activity that may adversely affect EFH. The MSA’s implementing regulations define an adverse effect as “any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions” (50 CFR 600.810).

In addition to EFH designations, areas called Habitat Areas of Particular Concern (HAPCs) are also designated by the regional fishery management councils. Designated HAPC are discrete subsets of EFH that provide extremely important ecological functions or are especially vulnerable to degradation (50 CFR 600.805-600.815). Regional fishery management councils may designate a specific habitat area as a HAPC based on one or more of the following reasons: (1) importance of the ecological function provided by the habitat; (2) the extent to which the habitat is sensitive to human-induced environmental degradation; (3) whether, and to what

extent, development activities are, or will be, stressing the habitat type; and (4) rarity of the habitat type (NMFS 2002). Categorization of an area as a HAPC does not confer additional protection or restriction to the designated area.

The North Pacific Fishery Management Council (NPFMC) is responsible for designating EFH and HAPC for all federally managed species occurring in the estuarine and marine waters off the coast of Alaska. The NPFMC designated EFH for these species within the fishery management plans for each of the six primary fisheries that they manage: Bering Sea and Aleutian Islands (BSAI) groundfish fishery (NPFMC 2013a), GOA groundfish fishery (NPFMC 2013b), BSAI king and tanner crab fishery (NPFMC 2011), salmon fishery (NPFMC 2012), scallop fishery off Alaska (NPFMC 2006), and the Arctic fishery (NPFMC 2009). Of these fisheries, only four (BSAI groundfish, BSAI king and tanner crabs, salmon, and Arctic) contain species for which EFH and HAPC have been designated within the Action Area.

3.3.4.1 Bering Sea and Aleutian Islands Groundfish

Five species managed by the NPFMC as part of the BSAI groundfish fishery have EFH designated within the Action Area: walleye pollock, Pacific cod, yellowfin sole, flathead sole, and Alaska plaice (NPFMC 2013a). Following is a description of the EFH designated within the Action Area for each of the five species. No areas have been designated as HAPC for BSAI groundfish within the Action Area.

3.3.4.1.1 Walleye Pollock

Of its various life stages, EFH has only been designated for late juvenile and adult walleye pollock within the Action Area. The EFH for these two life stages occurs immediately south of St. Lawrence Island and in a small area in the Bering Sea just to the west of Pastol Bay and the mouth of the Yukon River (Figure 3-2). The EFH designations for the two life stages are as follows (NPFMC 2013a):

Late Juveniles: EFH for late juvenile walleye pollock is the general distribution area for this life stage, located in the lower and middle portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI, as depicted in Figure 3-2. Substrate preferences, if they exist, are unknown.

Adults: EFH for adult walleye pollock is the general distribution area for this life stage, located in the lower and middle portion of the water column along the entire shelf (~10 to 200 m) and slope (200 to 1,000 m) throughout the BSAI, as depicted in Figure 3-2. Substrate preferences, if they exist, are unknown.

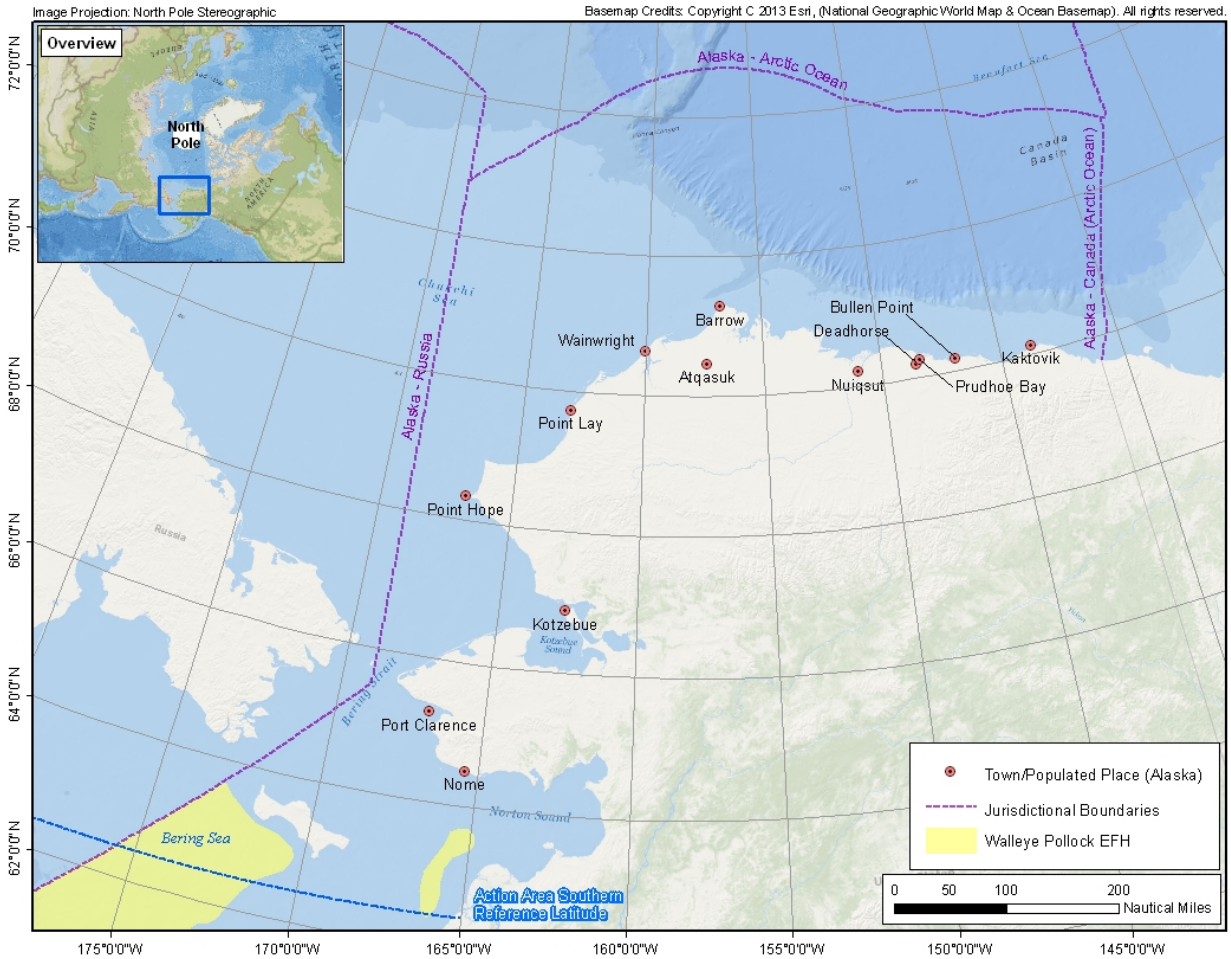

Figure 3-2: Essential Fish Habitat designated for walleye pollock in the Action Area

3.3.4.1.2 Pacific Cod

The NPFMC has designated EFH for Pacific cod within the Action Area for only two of its life stages, late juvenile and adult. The designation for both life stages in the Action Area extends in a finger north through the Bering Sea midway between St. Lawrence Island and the mainland (Figure 3-3). The EFH designations for the two life stages are as follows (NPFMC 2013a):

Late Juveniles: EFH for late juvenile Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, and muddy sand, as depicted in Figure 3-3.

Adults: EFH for adult Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, muddy sand, and gravel, as depicted in Figure 3-3.

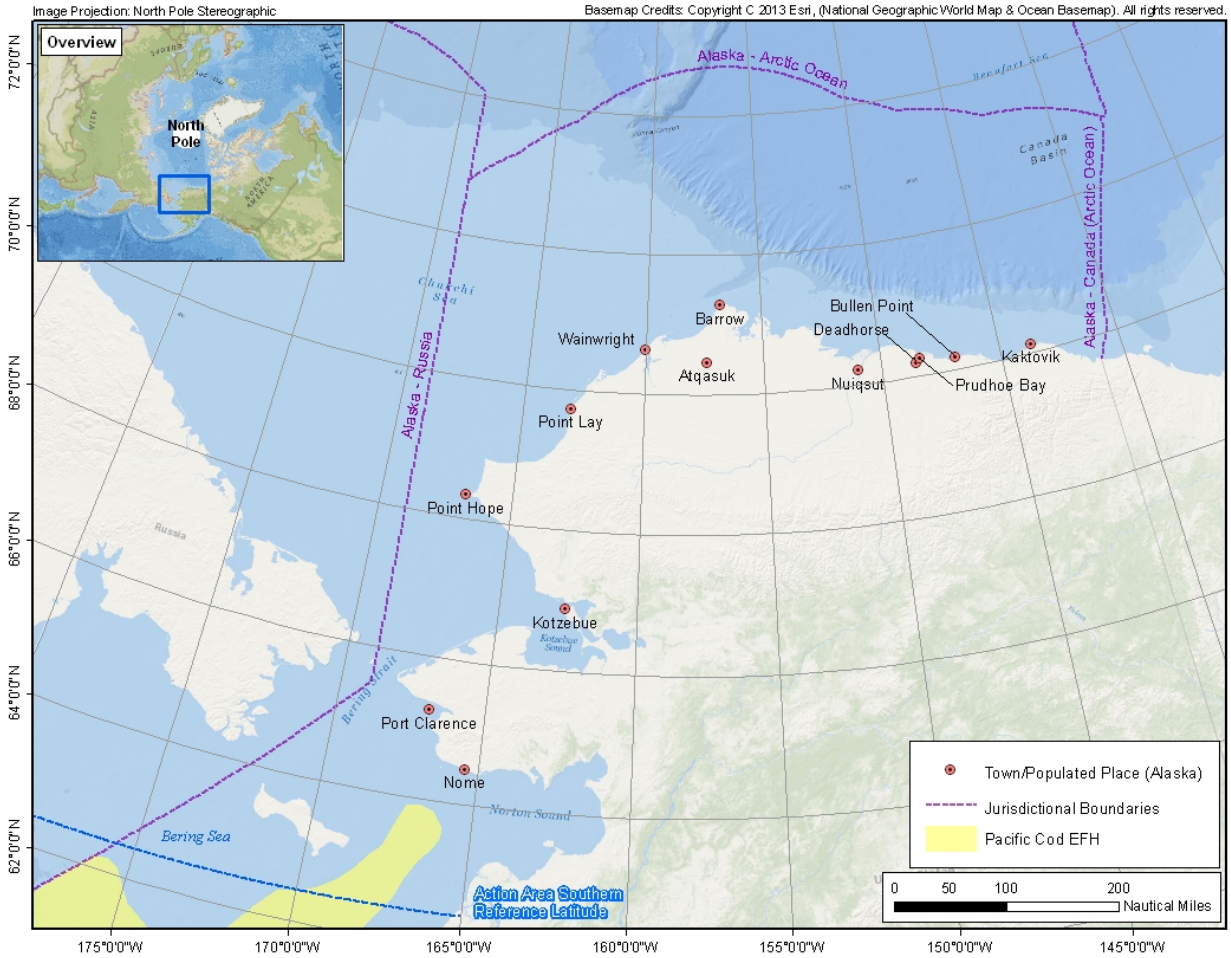

Figure 3-3: Essential Fish Habitat for Pacific Cod in the Action Area

3.3.4.1.3 Yellowfin Sole

The NPFMC has designated EFH for two life stages of yellowfin sole, late juvenile and adult, within the Action Area. The designated EFH for both life stages occurs immediately to the south and east of the eastern end of St. Lawrence Island (Figure 3-4). The EFH designations for the two life stages are as follows (NPFMC 2013a):

Late Juveniles: EFH for late juvenile yellowfin sole is the general distribution area for this life stage, located in the lower portion of the water column within nearshore bays and along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting mainly of sand, as depicted in Figure 3-4.

Adults: EFH for adult yellowfin sole is the general distribution area for this life stage, located in the lower portion of the water column within nearshore bays and along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m)

shelf throughout the BSAI wherever there are soft substrates consisting mainly of sand, as depicted in Figure 3-4.

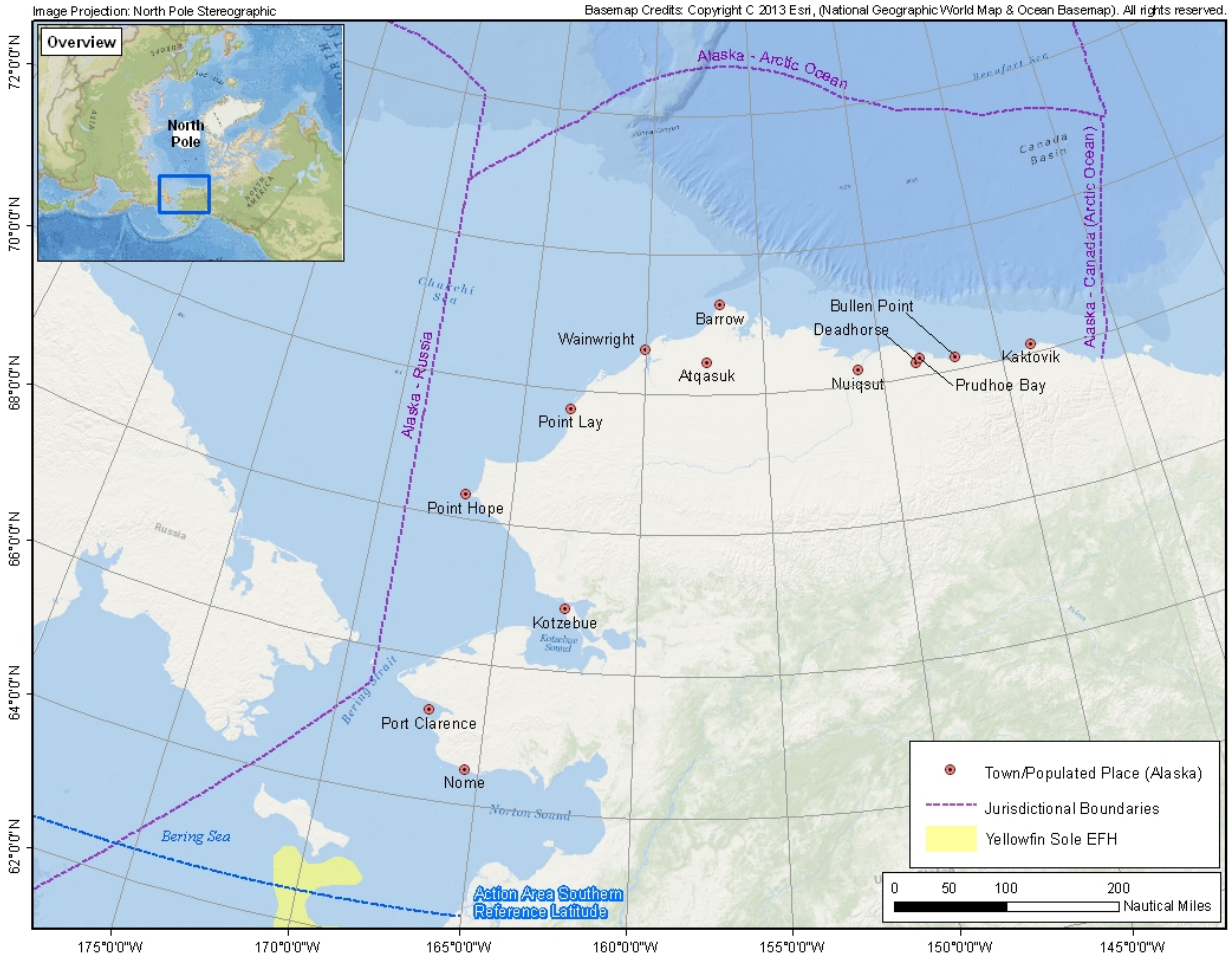

Figure 3-4: Essential Fish Habitat for Yellowfin Sole in the Action Area

3.3.4.1.4 Flathead Sole

Essential Fish Habitat has been designated within the Action Area for only the larval stage of flathead sole. The designation encompasses a very small area immediately to the east of St. Lawrence Island (Figure 3-5). The EFH designation for larval flathead sole is as follows (NPFMC 2013a):

Larvae: EFH for larval flathead sole is the general distribution area for this life stage, located in pelagic waters along the entire shelf (0 to 200 m) and slope (200 to 3,000 m) throughout the BSAI, as depicted in Figure 3-5.

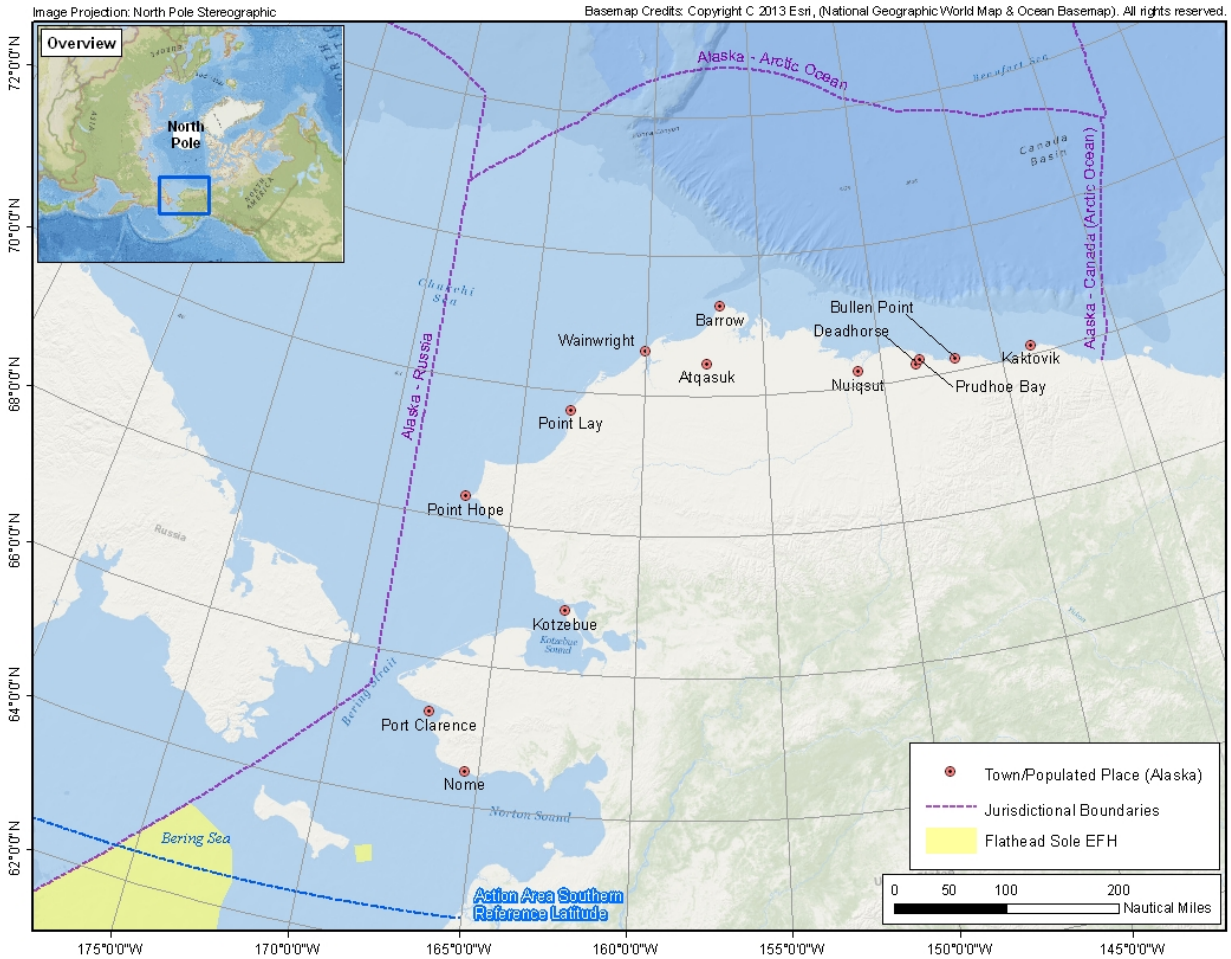

Figure 3-5: Essential Fish Habitat for Flathead Sole in the Action Area

3.3.4.1.5 Alaska Plaice

Late juveniles and adults are the only two life stages of Alaska plaice that have designated EFH within the Action Area. The area designated as EFH for this species within the Action Area runs along the southeast and eastern edge of St. Lawrence Island and extends in a finger north along the Bering Sea to the southern shore of Seward Peninsula (Figure 3-6). The EFH designations for the two life stages found in the Action Area are as follows (NPFMC 2013a):

Late Juveniles: EFH for late juvenile Alaska plaice is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are softer substrates consisting of sand and mud, as depicted in Figure 3-6.

Adults: EFH for adult Alaska plaice is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are softer substrates consisting of sand and mud, as depicted in Figure 3-6.

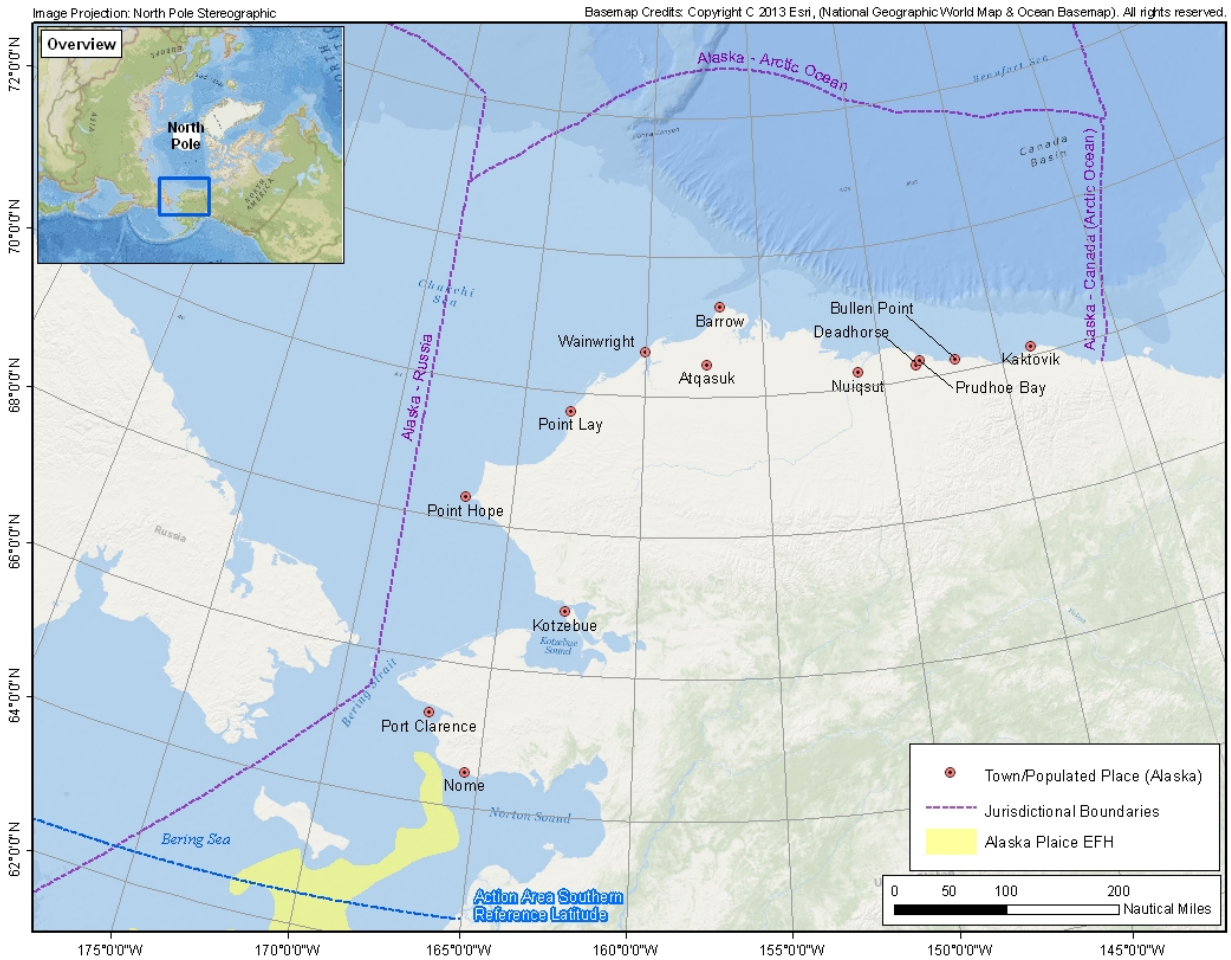

Figure 3-6: Essential Fish Habitat for Alaska Plaice in the Action Area

3.3.4.2 Bering Sea and Aleutian Islands King and Tanner Crabs

Only a single species managed by the NPFMC through the BSAI King and Tanner Crab Fishery Management Plan, the red king crab, has EFH designated within the Action Area. Following is a description of the EFH designated within the Action Area for this species. No areas have been designated as HAPC for BSAI king and tanner crabs within the Action Area.

3.3.4.2.1 Red King Crab

The NPFMC has designated EFH for late juvenile and adult red king crabs within the Action Area. The designations run along the southern edge of the Seward Peninsula and extend south into the Bering Sea (Figure 3-7). The EFH designations for the two life stages found in the Action Area are as follows (NPFMC 2011):

Late Juveniles: EFH for late juvenile red king crab is the general distribution area for this life stage, located in bottom habitats along the inner (0 to 50 m), middle (50 to 100

m), and outer shelf (100 to 200 m) throughout the BSAI wherever there are substrates consisting of rock, cobble, and gravel and biogenic structures such as boltenia, bryozoans, ascidians, and shell hash, as depicted in Figure 3-7.

Adults: EFH for adult red king crab is the general distribution area for this life stage, located in bottom habitats along the nearshore (spawning aggregations) and the inner (0 to 50 m), middle (50 to 100 m), and outer shelf (100 to 200 m) throughout the BSAI wherever there are substrates consisting of sand, mud, cobble, and gravel, as depicted in Figure 3-7.

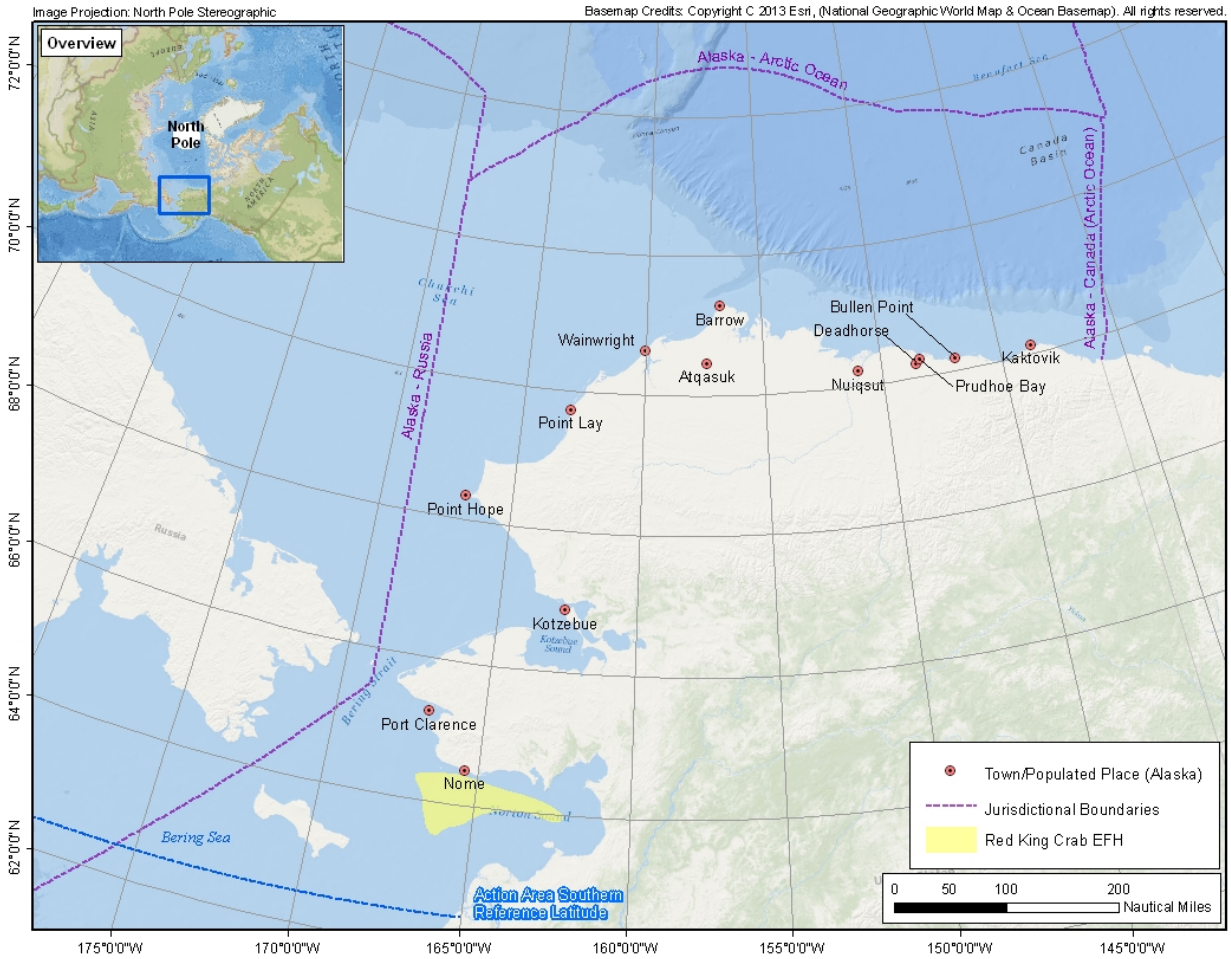

Figure 3-7: Essential Fish Habitat for Red King Crab in the Action Area

3.3.4.3 Salmon Fisheries in the Exclusive Economic Zone

As a result of their complex life history, involving periods spent in freshwater, estuarine, and marine environments, the EFH designations developed by the NPFMC for salmon are equally complex. All five species of salmon managed under the Fishery Management Plan for the Salmon Fisheries in the EEZ off Alaska (NPFMC 2012) have EFH designated within freshwater, estuarine, and marine environments within the Action Area (Figure 3-8). Following is a

description of the EFH designated within the Action Area for each of the five species. No areas have been designated as HAPC for salmon within the Action Area.

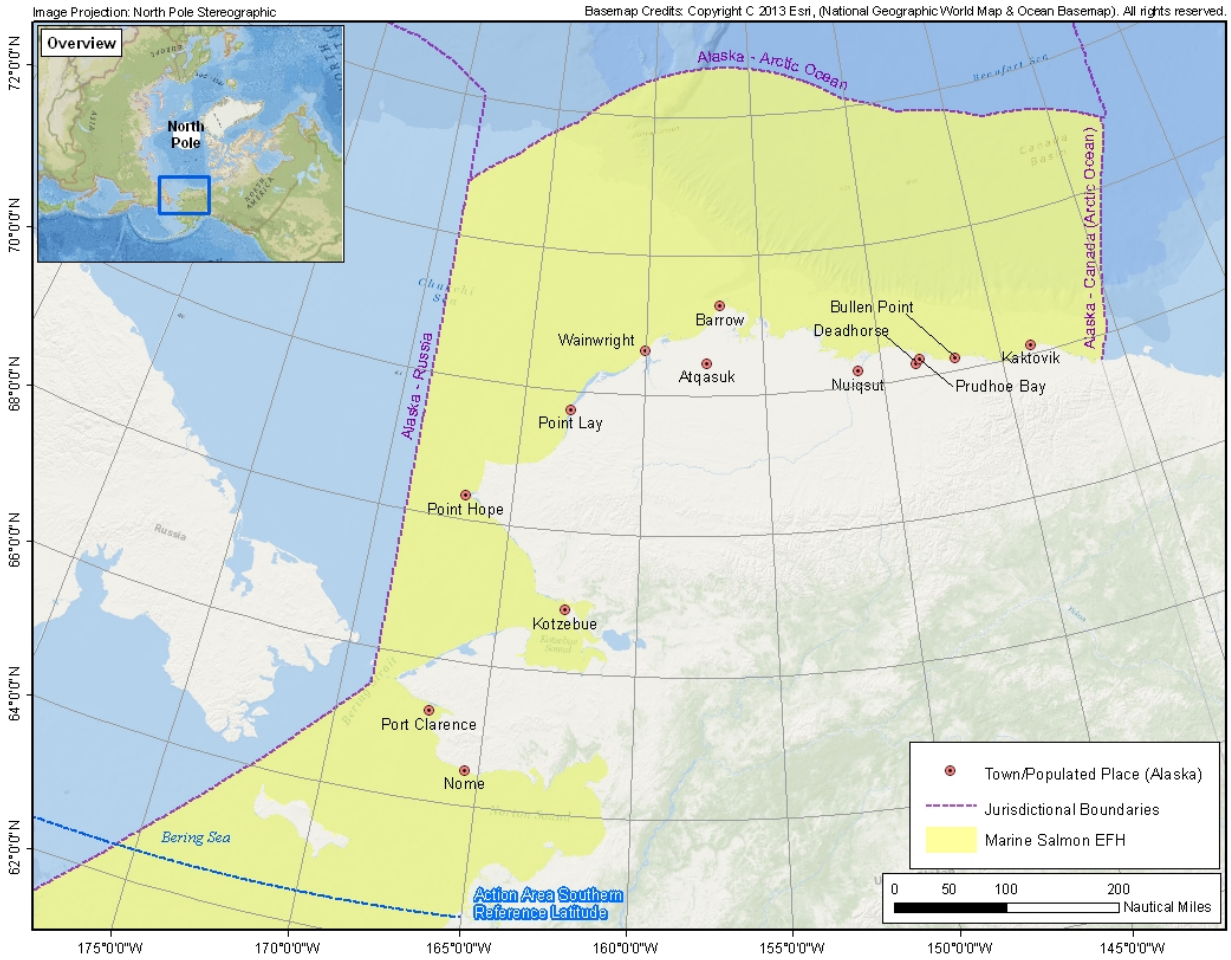

Figure 3-8: Essential Fish Habitat for all Salmon species in the Action Area

3.3.4.3.1 Pink Salmon

All life stages of pink salmon are found within the Action Area. The EFH designations for pink salmon are as follows (NPFMC 2012):

Freshwater Eggs: EFH for pink salmon eggs is the general distribution area for this life stage, located in gravel substrates in those waters identified in Alaska Department of Fish and Game's (ADF&G) Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (ADF&G 1998).

Freshwater Larvae and Juveniles: EFH for larval and juvenile pink salmon is the general distribution area for this life stage, located in those waters identified in ADF&G's Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (ADF&G 1998) and contiguous rearing areas within the boundaries of ordinary high water during the spring, generally

migrate in darkness in the upper water column. Fry leave streams in within 15 days and the duration of migration from a stream towards sea may last two months.

Estuarine Juveniles: Estuarine EFH for juvenile pink salmon is the general distribution area for this life stage, located in estuarine areas, as identified by the salinity transition zone (ecotone) and the mean higher tide line, within nearshore waters and generally present from late April through June.

Marine Juveniles: Marine EFH for juvenile pink salmon is the general distribution area for this life stage, located in all marine waters off the coast of Alaska from the mean higher tide line to the 200 nm (370 km) limit of the U.S. EEZ, including the GOA, Eastern Bering Sea, Chukchi Sea, and Arctic Ocean, as depicted in Figure 3-8.

Marine Immature and Maturing Adults: EFH for immature and maturing adult pink salmon is the general distribution area for this life stage, located in marine waters off the coast of Alaska to depths of 200 m and range from the mean higher tide line to the 200 nm (370 km) limit of the U.S. EEZ, including the GOA, Eastern Bering Sea, Chukchi Sea, and Arctic Ocean, as depicted in Figure 3-8. Mature adult pink salmon frequently spawn in intertidal areas and are known to associate with smaller coastal streams.

Freshwater Adults: EFH for pink salmon is the general distribution area for this life stage, located in freshwaters identified in ADF&G's Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (ADF&G 1998) and wherever there are spawning substrates consisting of medium to course gravel containing less than 15 percent fine sediment (less than 2-mm diameter), 15 to 50 centimeters in depth from June through September.

3.3.4.3.2 Chum Salmon

All life stages of chum salmon are found within the Action Area. The EFH designations for chum salmon are as follows (NPFMC 2012):

Freshwater Eggs: EFH for chum salmon eggs is the general distribution area for this life stage, located in gravel substrates in those waters identified in ADF&G's Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (ADF&G 1998).

Freshwater Larvae and Juveniles: EFH for larval and juvenile chum salmon is the general distribution area for this life stage, located in those waters identified in ADF&G's Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (ADF&G 1998) and contiguous rearing areas within the boundaries of ordinary high water and contiguous rearing areas within the boundaries of ordinary high water during the spring, generally migrate in darkness in the upper water column. Fry leave streams in within 15 days and the duration of migration from a stream towards sea may last two months.

Estuarine Juveniles: Estuarine EFH for juvenile chum salmon is the general distribution area for this life stage, located in estuarine areas, as identified by the salinity transition zone (ecotone) and the mean higher tide line, within nearshore waters from late April through June.

Marine Juveniles: Marine EFH for juvenile chum salmon is the general distribution area for this life stage, located in all marine waters off the coast of Alaska to approximately 50 m in depth from the mean higher tide line to the 200 nm (370 km) limit of the EEZ, including the GOA, Eastern Bering Sea, Chukchi Sea, and Arctic Ocean, as depicted in Figure 3-8.

Marine Immature and Maturing Adults: EFH for immature and maturing adult chum salmon is the general distribution area for this life stage, located in marine waters off the coast of Alaska to depths of 200 m and ranging from the mean higher tide line to the 200 nm (370 km) limit of the EEZ, including the GOA, Eastern Bering Sea, Chukchi Sea, and Arctic Ocean, as depicted in Figure 3-8.

Freshwater Adults: EFH for chum salmon is the general distribution area for this life stage, located in freshwaters identified in ADF&G's Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (ADF&G 1998) and wherever there are spawning substrates consisting of medium to course gravel containing less than 15 percent fine sediment (less than 2 millimeters [mm] diameter) and finer substrates can be used in upwelling areas of streams and sloughs from June through January.

3.3.4.3.3 Sockeye Salmon

All life stages of sockeye salmon are found within the Action Area. The EFH designations for sockeye salmon are as follows (NPFMC 2012):

Freshwater Eggs: EFH for sockeye salmon eggs is the general distribution area for this life stage, located in gravel substrates in those waters identified in ADF&G's Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (ADF&G 1998).

Freshwater Larvae and Juveniles: EFH for larval and juvenile sockeye salmon is the general distribution area for this life stage, located in those waters identified in ADF&G's Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (ADF&G 1998) and contiguous rearing areas within the boundaries of ordinary high water. Juvenile sockeye salmon require year-round rearing habitat. Fry generally migrate downstream to a lake or, in systems lacking a freshwater lake, to estuarine and riverine rearing areas for up to 2 years. Fry out migration occurs from approximately April to November and smolts generally migrate during the spring and summer.

Estuarine Juveniles: Estuarine EFH for juvenile sockeye salmon is the general distribution area for this life stage, located in estuarine areas, as identified by the salinity transition zone (ecotone) and the mean higher tide line, within nearshore waters. Under-yearling, yearling, and older smolts occupy estuaries from March through early August.

Marine Juveniles: Marine EFH for juvenile sockeye salmon is the general distribution area for this life stage, located in all marine waters off the coast of Alaska to depths of 50 m and range from the mean higher tide line to the 200 nm (370 km) limit of the U.S. EEZ, including the GOA, Eastern Bering Sea, Chukchi Sea, and Arctic Ocean from midsummer until December of their first year at sea, as depicted in Figure 3-8.

Marine Immature and Maturing Adults: EFH for immature and maturing adult sockeye salmon is the general distribution area for this life stage, located in marine waters off the coast of Alaska to depths of 200 m and range from the mean higher tide line to the 200 nm (370 km) limit of the U.S. EEZ, including the GOA, Eastern Bering Sea, Chukchi Sea, and Arctic Ocean, as depicted in Figure 3-8.

Freshwater Adults: EFH for sockeye salmon is the general distribution area for this life stage, located in freshwaters identified in ADF&G's Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (ADF&G 1998) and wherever there are spawning substrates consisting of medium to course gravel containing less than 15 percent fine sediment (less than 2-mm diameter) and finer substrates can be used in upwelling areas of streams and sloughs from June through September. Sockeye often spawn in lake substrates, as well as in streams.

3.3.4.3.4 Chinook Salmon

All life stages of Chinook salmon are found within the Action Area. The EFH designations for Chinook salmon are as follows (NPFMC 2012):

Freshwater Eggs: EFH for Chinook salmon eggs is the general distribution for this life stage, located in gravel substrates in those waters identified in ADF&G's Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (ADF&G 1998).

Freshwater Larvae and Juveniles: EFH for larval and juvenile Chinook salmon is the general distribution area for this life stage, located in those waters identified in ADF&G's Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (ADF&G 1998) and contiguous rearing areas within the boundaries of ordinary high water. Juvenile Chinook salmon out-migrate from freshwater areas in April toward the sea and may spend up to a year in a major tributaries or rivers, such as the Kenai, Yukon, Taku, and Copper Rivers.

Estuarine Juveniles: Estuarine EFH for juvenile Chinook salmon is the general distribution area for this life stage, located in estuarine areas, as identified by the salinity transition zone (ecotone) and the mean higher tide line, within nearshore waters. Chinook salmon smolts and post-smolt juveniles may be present in these estuarine habitats from April through September.

Marine Juveniles: Marine EFH for juvenile Chinook salmon is the general distribution area for this life stage, located in all marine waters off the coast of Alaska from the

mean higher tide line to the 200 nm (370 km) limit of the EEZ, including the GOA, Eastern Bering Sea, Chukchi Sea, and Arctic Ocean (Figure 3-8). Juvenile marine Chinook salmon are at this life stage from April until annulus formation in January or February during their first winter at sea.

Marine Immature and Maturing Adults: EFH for immature and maturing adult Chinook salmon is the general distribution area for this life stage, located in marine waters off the coast of Alaska and ranging from the mean higher tide line to the 200 nm (370 km) limit of the U.S. EEZ, including the GOA, Eastern Bering Sea, Chukchi Sea, and Arctic Ocean (Figure 3-8).

Freshwater Adults: EFH for adult Chinook salmon is the general distribution area for this life stage, located in fresh waters identified in ADF&G's Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (ADF&G 1998) wherever there are spawning substrates consisting of gravels from April through September.

3.3.4.3.5 Coho Salmon

All life stages of coho salmon are found within the Action Area. The EFH designations for coho salmon are as follows (NPFMC 2012):

Freshwater Eggs: EFH for coho salmon eggs is the general distribution area for this life stage, located in gravel substrates in those waters identified in ADF&G's Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (ADF&G 1998).

Freshwater Larvae and Juveniles: EFH for larval and juvenile coho salmon is the general distribution area for this life stage, located in those waters identified in ADF&G's Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (ADF&G 1998) and contiguous rearing areas within the boundaries of ordinary high water. Fry generally migrate to a lake, slough, or estuary and rear in these areas for up to 2 years.

Estuarine Juveniles: Estuarine EFH for juvenile coho salmon is the general distribution area for this life stage, located in estuarine areas, as identified by the salinity transition zone (ecotone) and the mean higher tide line, within nearshore waters. Juvenile coho salmon require year-round rearing habitat and also migration habitat from April to November to provide access to and from the estuary.

Marine Juveniles: Marine EFH for juvenile coho salmon is the general distribution area for this life stage, located in all marine waters off the coast of Alaska from the mean higher tide line to the 200 nm (370 km) limit of the U.S. EEZ, including the GOA, Eastern Bering Sea, Chukchi Sea, and Arctic Ocean, as depicted in Figure 3-8.

Marine Immature and Maturing Adults: EFH for immature and maturing adult coho salmon is the general distribution area for this life stage, located in marine waters off the coast of Alaska to 200 m in depth and range from the mean higher tide line

to the 200 nm (370 km) limit of the U.S. EEZ, including the GOA, Eastern Bering Sea, Chukchi Sea, and Arctic Ocean, as depicted in Figure 3-8.

Freshwater Adults: EFH for coho salmon is the general distribution area for this life stage, located in freshwaters as identified in ADF&G's Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes (ADF&G 1998) and wherever there are spawning substrates consisting mainly of gravel containing less than 15 percent fine sediment (less than 2-mm diameter) from July to December.

3.3.4.4 Arctic Management Area

Three species, Arctic cod, Saffron cod, and snow crab, are managed by the NPFMC under the Fishery Management Plan for Fish Resources of the Arctic Management Area (NPFMC 2009). All three of these species have EFH designated within the Action Area. Following is a description of the EFH designated for each of the three species. No areas have been designated as HAPC for species belonging to any of the Arctic fisheries within the Action Area.

3.3.4.4.1 Arctic Cod

The NPFMC has designated EFH within the Action Area for two life stages of Arctic cod, late juvenile and adult. The designation extends from the western most tip of the Seward Peninsula north into the Chukchi Sea, Beaufort Sea, and the Arctic Ocean within the boundary of the U.S. EEZ (Figure 3-11). The EFH designations for the two life stages are as follows (NPFMC 2009):

Late Juveniles: EFH for late juvenile Arctic cod is the general distribution areas for this life stage located in pelagic and epipelagic waters from the nearshore to offshore areas along the entire shelf (0 to 200 m) and upper slope (200 to 500 m) throughout Arctic waters and often associated with ice floes which may occur in deeper waters (Figure 3-9).

Adults: EFH for adult Arctic cod is the general distribution area for this life stage located in pelagic and epipelagic waters from the nearshore to offshore areas along the entire shelf (0 to 200 m) and upper slope (200 to 500 m) throughout Arctic waters and often associated with ice floes which may occur in deeper waters (Figure 3-9).

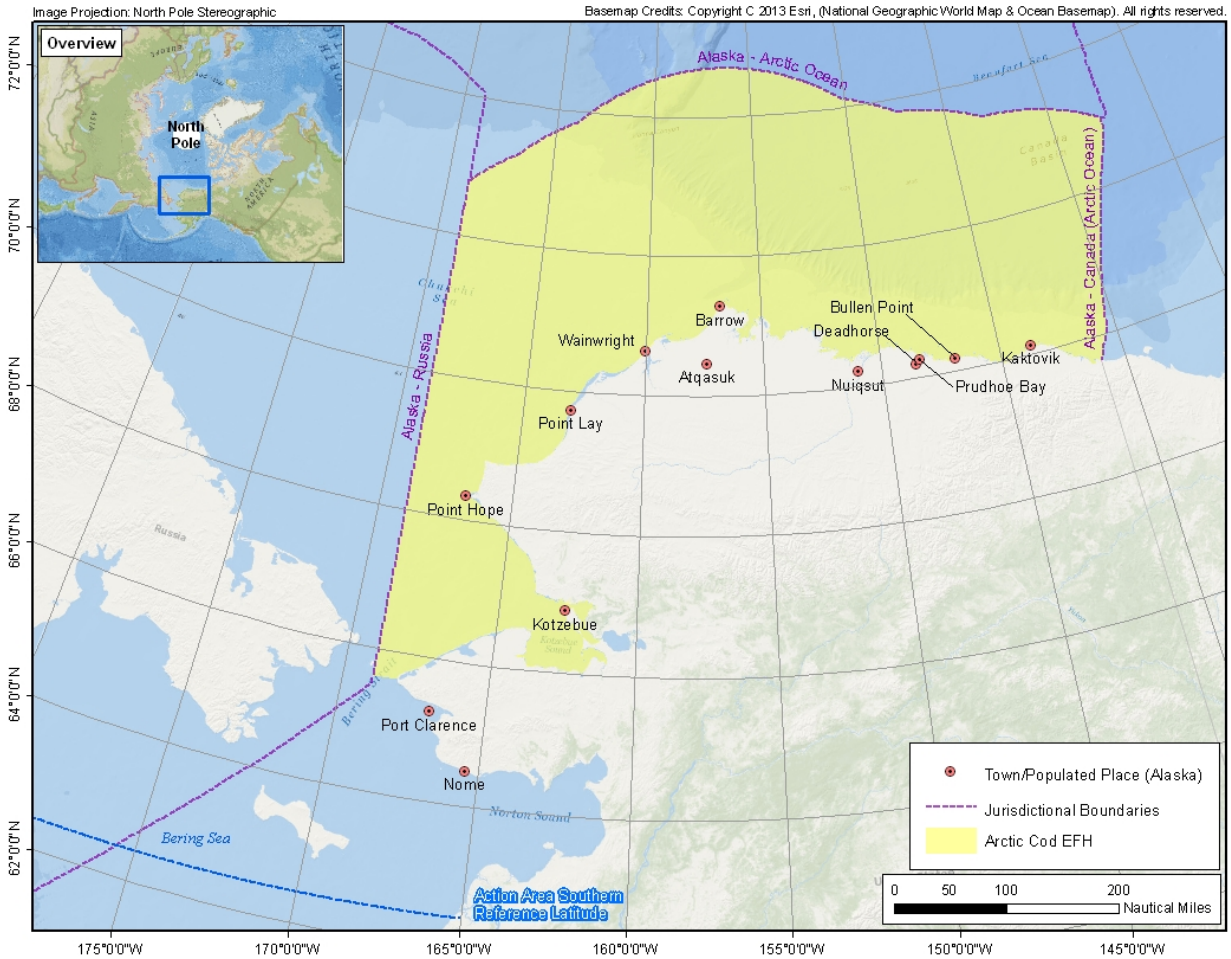

Figure 3-9: Essential Fish Habitat for Arctic Cod in the Action Area

3.3.4.4.2 Saffron Cod

The late juvenile and adult life stages of Saffron cod have EFH designated within the Action Area. The designation extends from the western most tip of the Seward Peninsula north into the southern Chukchi Sea and in a thin band along the coastline of northwest Alaska (Figure 3-12). The EFH designations for Saffron cod are as follows (NPFMC 2009):

Late Juveniles: EFH for late juvenile Saffron cod is the general distribution area for this life stage, located in pelagic and epipelagic waters along the coastline, within nearshore bays, and under ice along the inner (0 to 50 m) shelf throughout Arctic waters and wherever there are substrates consisting of sand and gravel (Figure 3-10).

Adults: EFH for adult Saffron cod is the general distribution area for this life stage, located in pelagic and epipelagic waters along the coastline, within nearshore bays, and under ice along the inner (0 to 50 m) shelf throughout Arctic waters and wherever there are substrates consisting of sand and gravel (Figure 3-10).

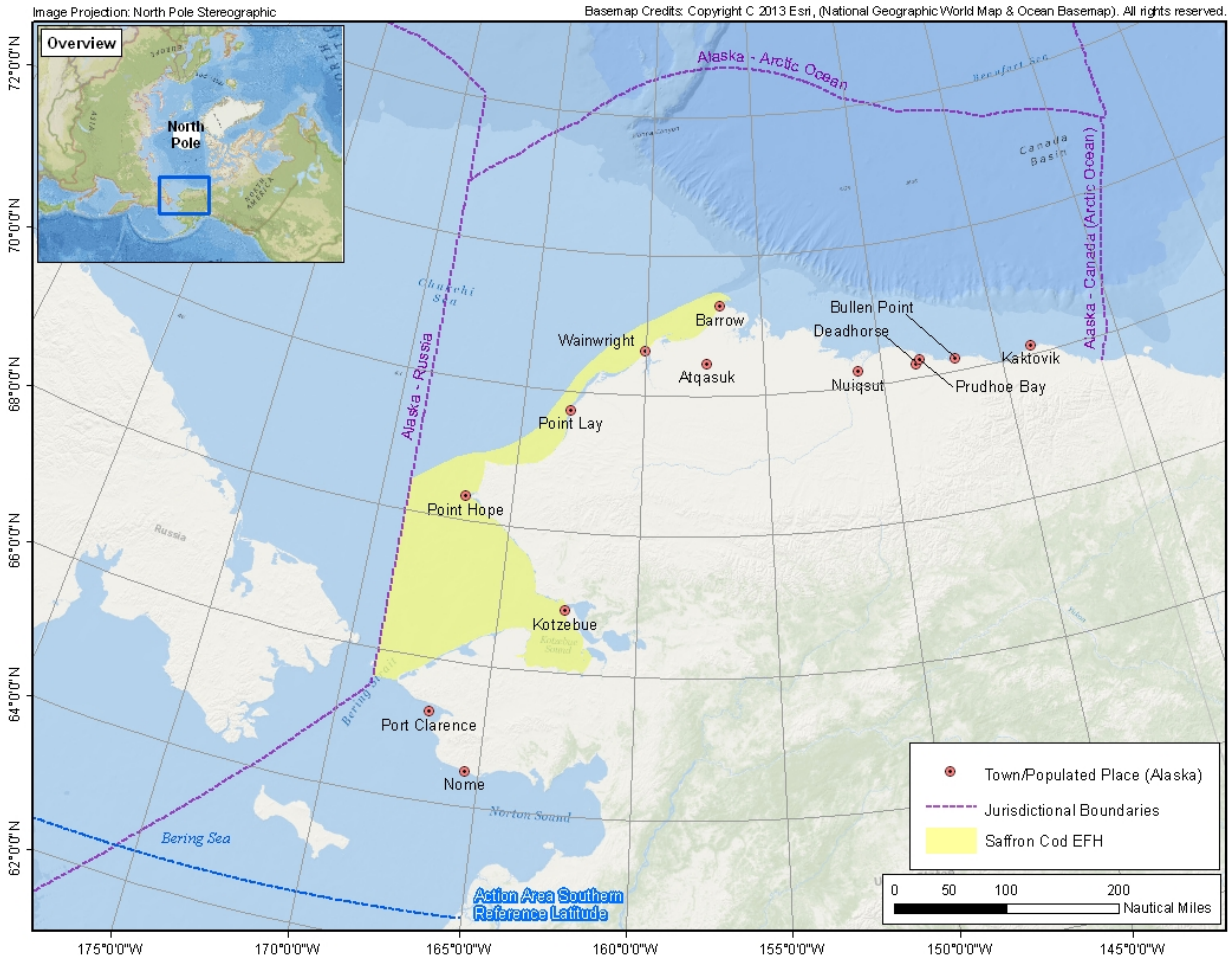

Figure 3-10: Essential Fish Habitat for Saffron Cod in the Action Area

3.3.4.4.3 Snow Crab

Essential Fish Habitat has been designated for three life stages of snow crab - eggs, late juvenile, and adult - within the Action Area. The designations are restricted to the waters of the southern Chukchi Sea within the boundaries of the U.S. EEZ (Figure 3-11). The EFH designations for snow crab are as follows (NPFMC 2009):

Eggs: Essential fish habitat of snow crab eggs is inferred from the general distribution of egg-bearing female crab (see Adults; Figure 3-11).

Late Juveniles: EFH for late juvenile snow crab is the general distribution area for this life stage, located in bottom habitats along the inner (0 to 50 m) and middle (50 to 100 m) shelf in Arctic waters south of Cape Lisburne, wherever there are substrates consisting mainly of mud (Figure 3-11).

Adults: EFH for adult snow crab is the general distribution area for this life stage, located in bottom habitats along the inner (0 to 50 m) and middle (50 to 100 m) shelf in Arctic waters south of Cape Lisburne, wherever there are substrates consisting mainly of mud (Figure 3-11).

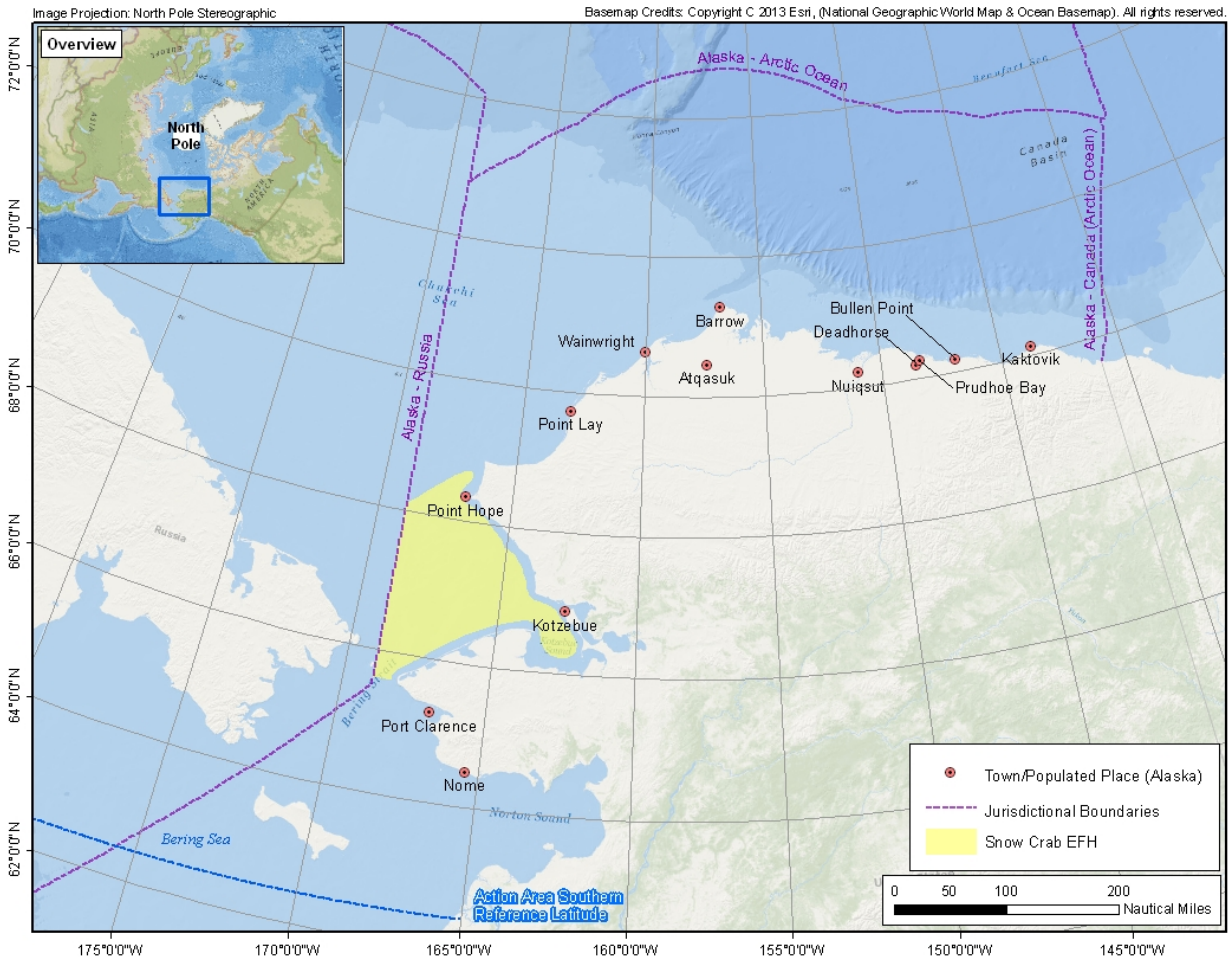

Figure 3-11: Essential Fish Habitat for Snow Crab in the Action Area

3.4 ENDANGERED SPECIES ACT-LISTED SPECIES UNDER UNITED STATES FISH AND WILDLIFE SERVICE JURISDICTION

3.4.1 Critical Habitat in the Action Area

Critical habitat has been designated for three of the seven species within United States Fish and Wildlife Service (USFWS) jurisdiction. For Steller's eider, there is no overlap between designated critical habitat and the Action Area. Within the Action Area, critical habitat exists for polar bears and spectacled eiders and is described in sections 3.4.2.2.7 and 3.4.3.3.3, respectively.

3.4.2 Marine Mammals

3.4.2.1 Pacific Walrus (*Odobenus rosmarus divergens*)

3.4.2.1.1 Regulatory Status

There are three recognized subspecies of walrus, only one of which occurs in the Action Area. The Pacific walrus is protected under the MMPA, and is warranted but precluded from a "threatened" listing under the ESA (78 FR 23284). The walrus is managed by the USFWS under the Department of the Interior.

3.4.2.1.2 Habitat Preferences

Walruses occur in shallow, continental shelf areas and are seldom found in deep waters. Walruses haul out on ice floes and sandy beaches or rocky shores, along remote stretches of mainland coastlines or islands (Jefferson et al. 2008b; Kastelein 2009).

Although walruses are capable of diving to depths of more than 250 m (820 ft) (Born et al. 2005), they usually forage in waters of 80 m (262 ft) or less (Fay and Burns 1988; Born et al. 2003; Kovacs and Lydersen 2008), presumably because of higher productivity of their benthic foods in shallow waters (Fay and Burns 1988; Carey 1991; Jay et al. 2001; Grebmeier et al. 2006 a,b). Walruses make foraging trips from land or ice haulouts that range from a few hours up to several days (Jay et al. 2001; Born et al. 2003; Ray et al. 2006; Udevitz et al. 2009). Walruses tend to make more frequent but shorter, both in duration and distance, trips when they are using sea-ice as a foraging platform compared to terrestrial haulouts (Udevitz et al. 2009). Satellite telemetry data indicates that walruses spend, on average, 46 hours in the water between resting bouts on ice (Udevitz et al. 2009). Male walruses appear to have greater endurance than females, with foraging excursions from land haulouts that can last up to 142 hours (about 6 days) (Jay et al. 2001).

3.4.2.1.3 Critical Habitat

Critical habitat has not been designated for Pacific walrus.

3.4.2.1.4 Population Size and Trends

The size of the Pacific walrus population has never been known with certainty. Based on large sustained harvests in the 18th and 19th centuries, Fay (1957) speculated that the pre-exploitation population was about 200,000 animals. Since that time, population size is believed to have fluctuated in response to varying levels of human exploitation (Garlich-Miller et al. 2011). In 2006, U.S. and Russian researchers surveyed walruses in the pack-ice of the Bering Sea using thermal imaging systems to detect walruses hauled out on sea-ice and satellite transmitters to account for walruses in the water (Speckman et al. 2010). The number of walruses within the

surveyed area was estimated at 129,000 with 95 percent confidence limits of 55,000 to 507,000 individuals.

3.4.2.1.5 Distribution

Three modern subspecies of walruses are generally recognized (Wozencraft 2005; ITIS 2010): the Atlantic walrus (*O. r. rosmarus*) ranges from the central Canadian Arctic eastward to the Kara Sea (Reeves 1978); the Pacific walrus (*O. r. divergens*) which ranges across the Bering and Chukchi Seas (Fay 1982) and the Laptev walrus (*O. r. laptevi*) which is represented by a small, geographically isolated population of walruses in the Laptev Sea (Heptner et al. 1976;Andersen et al. 1998; Rice 1998; Wozencraft 2005; Jefferson et al. 2008).

Pacific walruses range across vast offshore areas of the shallow continental shelf waters of the northern Bering Sea and southern Chukchi Sea, relying principally on broken pack-ice habitat to access offshore feeding areas (Fay 1982). Pacific walruses spend the winter in the Bering Sea, and migrate northwards as the ice retreats during the spring and summer months, where they feed in the offshore areas of the continental shelf in the Chukchi Sea (Garlich-Miller et al. 2011).

3.4.2.1.6 Life History

Walruses are primarily benthic feeders, with a large proportion of their prey consisting of mollusks (Andersen et al. 2009; Kastelein and Wiepkema 1989; Stewart et al. 2003). They use their tusks to plow through the bottom sediments and dig up prey, most of which they find in the upper few centimeters of sediment or on or just above the bottom. Walrus diet also consists of snails, soft-shell crabs, amphipods, shrimp, sea cucumbers, tunicates, and slow-moving fish. Some prey on seals, small whales, and seabirds and may occasionally scavenge marine mammal carcasses. Walruses are known to consume between 88 and 176 pounds (lb.) (40 and 80 kg) of food per day (Jefferson et al. 2008b; Kastelein and Wiepkema 1989).

Walruses are preyed on by killer whales and polar bears (Jefferson et al. 2008).

Mating occurs primarily in January and February in broken pack-ice habitat in the Bering Sea. Breeding bulls follow herds of females and compete for access to groups of females hauled out onto sea-ice. Males perform visual and acoustical displays in the water. Sub-dominant males remain on the periphery of these aggregations and apparently do not display. Intruders into display areas are met with threat displays and physical attacks. Individual females leave the resting herd to join a male in the water where copulation occurs (Fay et al. 1984b; Sjare and Stirling 1996; NAMMCO 2004).

3.4.2.1.7 Diving Behavior

Although walruses are capable of diving to depths of more than 250 m (820 ft) (Born et al. 2005), they usually forage in waters of 80 m (262 ft) or less (Fay and Burns 1988; Born et al. 2003; Kovacs and Lydersen 2008), presumably because of higher productivity of their benthic foods in shallow waters (Fay and Burns 1988; Carey 1991; Jay et al. 2001; Grebmeier et al. 2006 a,b). Walruses make foraging trips from land or ice haulouts that range from a few hours up to several days (Jay et al. 2001; Born et al. 2003; Ray et al. 2006; Udevitz et al. 2009). Walruses tend to make more frequent but shorter, both in duration and distance, trips when they are using sea-ice as a foraging platform compared to terrestrial haulouts (Udevitz et al. 2009). Satellite telemetry data indicates that walruses spend, on average, 46 hours in the water between resting bouts on ice (Udevitz et al. 2009). Male walruses appear to have greater endurance than females,

with foraging excursions from land haulouts that can last up to 142 hours (about 6 days) (Jay et al. 2001).

3.4.2.1.8 Acoustics

Walrus are highly vocal both in air and underwater. During the breeding season, adult males produce extensive acoustic displays to attract females and ward off rival males. These underwater vocalizations include knocks, bells, whistles, and gongs, among other sounds (Tyack and Miller 2002). All age and sex classes of walrus produce in-air vocalizations, which can serve to mediate interactions between adults and to facilitate mother-calf reunions (Miller 1985).

Unlike many species of marine mammals, walrus hearing has been measured directly. Underwater, the range of best sensitivity occurs between 1 and 12 kHz (Kastelein et al. 2002). Airborne hearing has not been directly measured for this species, but Southall et al. (2007) suggest that most pinnipeds have a function in-air hearing range of 75 Hz – 30 kHz.

3.4.2.1.9 Environmental and Human Effects

Threats to Pacific walrus include natural mortality sources such as predation and disease, and anthropogenic threats including hunting, interactions with fisheries, and global climate change. A 2011 status review by Garlich-Miller et al. determined that while Pacific walruses are vulnerable to disease and predation by polar bears (*Ursus maritimus*) and killer whales (*Orcinus orca*), these natural sources of mortality are not a significant threat at this time.

Anthropogenic threats to Pacific walrus include harvesting in U.S. and Russian waters. Over the past fifty years the Pacific walrus population has sustained annual harvest removals ranging from 3,200 to 16,000/year. Over the past decade, harvest removals in the U.S. and Russia have averaged approximately 5,000/year. Recent harvest levels are significantly lower than historic highs and likely within a sustainable range (Garlich-Miller et al. 2011).

Pacific walrus prey on shellfish and other benthic organisms, none of which are currently targeted by commercial fisheries, reducing the likelihood of direct interaction between walrus and fishing gear. Indirect interaction with ground-trawling fisheries may affect walrus prey through habitat modification and destruction, but this issue is currently a minimal impact to walrus survival (Garlich-Miller et al. 2011).

3.4.2.2 Polar Bear (*Ursus maritimus*)

3.4.2.2.1 Regulatory Status

In May 2008**,** the polar bear was listed as a threatened species under the ESA due to loss of sea ice habitat caused by climate change; it is also protected under the MMPA. The polar bear is managed by the USFWS under the Department of the Interior.

3.4.2.2.2 Habitat Preferences

Polar bears prefer to inhabit areas of pack ice throughout the Arctic. Typically, they are found on the edge of the ice flow and in areas of moving ice. Much of their habitat depends on sea ice, and they generally do not spend large amounts of time on land, unless the ice has melted and they are in areas without ice access (Amstrup and DeMaster 1988). Monnett and Gleason (2006) present aerial survey results that indicate polar bears are observed on land at a much higher rate than in the water (3.8 percent of observations in water in years 1987–2003 and 19.9 percent in 2004) (Monnett and Gleason 2006). Observations of free-swimming polar bears from 1987 to 2003

showed that they can occur at a distance of 3 to 47 mi (4.8 to 75.6 km) from land and 14 to 217 mi (22.5 to 349.2 km) from pack ice (Monnett and Gleason 2006).

3.4.2.2.3 Critical Habitat

The Service designated polar bear critical habitat on November 24, 2010 (75 FR 76086), but on January 10, 2013, the U.S. District Court for the District of Alaska issued an order vacating the Final Rule designating critical habitat for the polar bear. Therefore, at this time, there is no critical habitat designated for the polar bear.

3.4.2.2.4 Population Size and Trends

There are two populations of polar bear that occur in the Action Area: the Chukchi Sea and Southern Beaufort Sea stocks (Schliebe et al. 2006). The two populations overlap in Alaskan waters, with the Chukchi Sea population ranging from Eastern Russia to near Icy Cape, Alaska, and including the Bering Sea to the south. The Southern Beaufort Sea population ranges from Icy Cape in the west across the U.S.-Canadian border to Pearce Point, Northwest Territory, Canada (Schliebe et al. 2006). There is no population estimate available for the Chukchi Sea population at this time, but a recent analysis of body condition and reproduction in this population indicates that bears from this population have better body condition and higher reproductive success than bears in the Southern Beaufort Sea population (Rode et al. 2013). The Southern Beaufort Sea population is exhibiting signs of poor body condition, fasting, and unusual behaviors, which may be connected to more reduced-ice days than seen in the Chukchi Sea population (Rode et al. 2013). The most recent population estimate for this population is from 2006, models indicated there were 1,526 individuals (95 percent Confidence interval: 1,211 – 1,841) (Regehr et al. 2006).

3.4.2.2.5 Distribution

Polar bears have a circumpolar distribution, and are found throughout the Arctic. They are most abundant near shore in shallow-water areas and in other areas where currents and ocean upwellings increase productivity and serve to keep the ice cover from becoming too solidified in winter (Stirling and Smith 1975, Stirling et al. 1981, Amstrup and DeMaster1988, Stirling 1990, Stirling and Øritsland 1995, Stirling and Lunn 1997, Amstrup et al. 2000b).There are 19 recognized populations, of which two occur in U.S. waters. The Chukchi Sea and Southern Beaufort Sea populations overlap in Alaskan waters, with the Chukchi Sea population ranging from Eastern Russia to near Icy Cape, Alaska, and including the Bering Sea to the south. The Southern Beaufort Sea population ranges from Icy Cape in the west across the U.S.-Canadian border to Pearce Point, Northwest Territory, Canada (Schliebe et al. 2006).

The distribution of polar bears in most areas varies with the seasonal extent of sea-ice cover and availability of prey. In Alaska in the winter, sea-ice may extend 400 km south of the Bering Strait, and polar bears will extend their range to the southernmost proximity of the ice (Ray 1971). Sea-ice disappears from the Bering Sea and is greatly reduced in the Chukchi Sea in the summer, and polar bears occupying these areas may migrate as much as 1000 km to stay with the pack ice (Garner et al. 1990, 1994a). Throughout the polar basin, during the summer polar bears generally concentrate along the edge or into the adjacent persistent pack ice. Significant northerly and southerly movements appear to be dependent on seasonal melting and refreezing of ice (Amstrup et al. 2000b).

3.4.2.2.6 Life History

Polar bears obtain most of their prey from the sea but rarely hunt directly in the water (Amstrup 2003; Jefferson et al. 2008b), and have no natural predators though cannibalism has been documented among some populations (Rode et al. 2013). They feed mainly on ringed seals and bearded seals. Although seals are their primary source of prey, they are known to hunt larger animals, such as walruses and even small beluga whales and narwhals (Rugh and Shelden 1993; Stirling 2009). Similar to other bear species, polar bears will feed on human refuse, and when trapped on land for long periods are known to feed on small amounts of terrestrial vegetation (Amstrup 2003). They sometimes feed on Arctic cod as well. Polar bears in Hudson Bay and southeastern Baffin Island fast for many months while ice is melting during the summer, returning to the ice when it re-forms in the autumn. If bears have regular access to sea ice throughout the year, they generally do not fast. Polar bears hunt individually, by waiting near a hole in the ice used by seals for breathing and then attack when the seal surfaces to breathe. They have a well-developed sense of smell, which they use to do much of their hunting (Amstrup 2003). In at least some areas, the diets of polar bears have shifted from species associated with ice (ringed and bearded seals) to species less associated with ice (harbor and harp seals) (McKinney et al. 2009).

Reproduction in polar bears varies across populations, with age at sexual maturity and denning habits dependent on environmental characteristics (Schliebe et al. 2006). In the Chukchi Sea and Southern Beaufort Sea populations, bears become sexually mature at around 6 years for males and 5 – 6 years for females (Rosing-Asvid et al. 2002). Breeding generally occurs between March and June, but may happen as late as July. Female polar bears exhibit delayed implantation, and gestation begins in the fall. Birth occurs during the winter, while females are in hibernation in dens either on land (usual) or in the pack ice (sometimes observed in the Chukchi and Southern Beaufort populations). Cubs stay with their mothers for 2 – 3 years.

3.4.2.2.7 Environmental and Human Effects

Polar bears have no natural predators, but may be susceptible to disease. However, a recent status review did not identify any significant threat from disease or parasites (Schliebe et al. 2006). Commercial hunting is not a threat to polar bears in the U.S., due to restrictions under the MMPA. However, because both populations that reside in the U.S. cross international borders, hunting by Russia and Canada will cause some mortality in these populations. Subsistence hunting does occur in Alaska, and is regulated in cooperation with Native corporations. The most recent available harvest levels are 32 bears in 2004 – 2005 from the Chukchi Sea population and 46 bears in 2004 – 2005 from the Southern Beaufort Sea population (27 in Alaska, 19 in Canada) (Schliebe et al. 2006).

The primary threat to this species is climate change and associated sea ice loss. Changes in sea ice patterns thought to be caused by climate change are reducing the size, growth, reproduction, and survival of polar bears in affected areas and is significantly shrinking their available habitat (Amstrup 2003; Durner et al. 2009). Schliebe et al. (2006) note that decreases in sea ice habitat may increase the amount of time polar bears spend in open water, which may decrease survival rates for cubs and young bears without the endurance of adults. Additionally, changes to ice and snow cover regimes may decrease available denning habitat for females during the winter months when cubs are born. Polar bear prey will also be affected by reductions in sea ice. The primary prey species (ringed seals) uses subnivian lairs for pupping; polar bears hunt by scenting

dens and digging out infant seals. Reductions in sea ice could therefore reduce available prey for bears (Schliebe et al. 2006).

3.4.3 Birds

Of the bird species that occur in the Action Area, one is listed as endangered, two are listed as threatened and two are candidate species. Section 3.4.3 summarizes the biology and ecology of these species that are then relevant to the effects analysis in this BE. Summaries of the global status and trends for these species are presented to provide a foundation for the analysis.

3.4.3.1 Short-tailed Albatross (*Phoebastria albatrus*)

3.4.3.1.1 Regulatory Status

The short-tailed albatross is the largest of the three north Pacific albatrosses (Harrison 1984), and was listed as endangered throughout its range under the ESA in 2000 (USFWS 2000). They are considered vulnerable by the International Union for Conservation of Nature Red List of Threatened Species and are protected by the Convention on International Trade in Endangered Species of Flora and Fauna. Within Alaska waters, short-tailed albatrosses must compete with approximately 50 million shearwaters and two other albatross species foraging in the area (USWFS 2008b).

3.4.3.1.2 Habitat Preferences

Very little is known of marine habitat requirements of the short-tailed albatross. However, foraging occurs over offshore waters (Department of the Navy 2006) and when diving for food, their diving ability varies from 15 ft to 40 ft (4.6 to 12.2 m) in depth. These birds are pelagic wanderers, traveling thousands of miles at sea during the non-breeding season (Department of the Navy 2006). However, most of their travel is concentrated along the continental shelf edge upwelling zones where they forage on squid, fish, shrimp and other crustaceans, and the eggs of flying fish (USFWS 2008b). The majority of short-tailed albatross sightings in Piatt's (2006) database (which covered the North Pacific from 1940 to 2004) were located on the continental shelf edge of Alaska. In the eastern and northern GOA, the offshore shelf-break and slope domain is influenced by the Alaska Current, a broad and sluggish counter-clockwise flow with weak horizontal and vertical gradients (Reed and Schumacher 1986). Short-tailed albatross abundance is greatly diminished along the east GOA coast and south to Southeast Alaska. To the west of the Kenai Peninsula, the Alaska Current is transformed into the Alaska Stream, a narrow and swift flow that creates strong vertical and horizontal gradients. The stream continues westward along the south side of the Alaska Peninsula and Aleutian Islands. Short-tailed albatross abundance was highest along this Aleutian shelf-edge, particularly south of Unalaska and Umnak islands.

3.4.3.1.3 Critical Habitat

Critical habitat has not been designated for the short-tailed albatross.

3.4.3.1.4 Population Size and Trends

During the late 1800s, the world population of short-tailed albatrosses was severely reduced by aggressive hunting for their plumage, resulting in the death of an estimated five million birds (Roberson 2000). Short-tailed albatrosses nest on isolated, windswept, offshore islands that have

restricted human access. The population has been rebounding in recent years because Pacific rookeries have been protected from human use (USFWS 2000). The population is currently estimated to be about 2,572 birds and is increasing (USFWS 2008b).

3.4.3.1.5 Distribution

Historically, millions of short-tailed albatrosses bred in the western North Pacific on several islands south of the main islands of Japan. There are presently only two documented breeding colonies located on Torishima Island and Minami-kojima Island south of the main islands of Japan (USFWS 2001). The at-sea distribution of short-tailed albatrosses includes the entire north Pacific north of about 20˚N although they tend to concentrate along the Aleutians in the Bering Sea (Piatt et al. 2006). For the Action Area, nearly 90 percent of the sightings occur within a 26 nm (50 km) band centered over the Aleutian shelf where it is likely they find prey brought to the surface in zones of upwelling (Department of the Navy 2006, Piatt et al. 2006). This is the approximate western quarter of the Action Area. Sightings of short-tailed albatrosses have the potential to increase in frequency as the species continues recovering.

3.4.3.1.6 Life History

Short-tailed albatrosses can live more than 40 years. They may begin breeding at age seven or eight, but do not attain full adult plumage until age 12 (Harrison 1990, USFWS 2001). Nesting begins in October, with the hatching of the single egg in late December and January. Fledging occurs in late April to early June, and the colony is totally deserted by mid-July (Roberson 2000). Non-breeders and failed breeders disperse from the colony months sooner. While many non-breeders return to the colonies each year, the presence of immature birds far from the colony (e.g., U.S. Pacific Coast) during the breeding season suggests that some immature birds may spend years at sea before returning to the colony.

3.4.3.1.7 Environmental and Human Effects

Severe storms, loss of nesting habitat to volcanic eruptions, and competition with black-footed albatrosses for nesting habitat are among the most important natural threats to short-tailed albatrosses. In the 1930s, nesting habitat on Torishima Island was damaged by volcanic eruptions, leaving fewer than 50 birds. The last eruption on Torishima Island in August 2002 occurred outside the breeding season and no short-tailed albatrosses were present (NMFS 2002a).

During the late 1800s and early 1900s, the world population of short-tailed albatrosses was nearly wiped out for the birds' plumage. Feather hunters clubbed to death an estimated five million short-tailed albatrosses at the Torishima Island colony alone. By 1932, when the Japanese government declared this island a bird refuge, the short-tailed albatross had been extirpated from most nesting locations throughout its range (USFWS 2000). After an extensive investigation of the historical breeding sites, the species was declared extinct (Austin 1949).

Despite this finding, breeding was again reported at Torishima Island in 1950, presumably by birds that were wandering juveniles during the final years of harvesting (Tickell 2000). This colony has grown steadily at a rate of 6.5 to 8 percent over the past 20 years. A second colony established itself at a former breeding site at Minami-kojima in 1971 and has recently been growing at an annual rate of 11 percent (USFWS 2008b).

Human-induced threats include hooking and drowning on commercial long-line gear, entanglement in derelict fishing gear, ingestion of plastic debris, contamination from oil spills, and potential predation by introduced mammals on breeding islands (USFWS 2001). Seabird population trends are largely determined by forage fish availability. Plastics, which may be mistaken for food items or may have food such as flying-fish eggs or invertebrates attached, are commonly ingested and contribute to chick mortality (BirdLife International [BLI] 2001, Suryan et al. 2006). Invasive species at colonies, including cats, rats, and plants (which can alter available nesting habitat), also can be a significant source of induced mortality (USFWS 2008b).

3.4.3.2 Spectacled Eider (*Somateria fischeri*)

3.4.3.2.1 Regulatory Status

The spectacled eider was listed under the ESA as threatened in 1992 (USFWS 2010a). They are considered a species of least concern by the International Union for Conservation of Nature Red List of Threatened Species (IUCN 2013) due to the extremely large range. The spectacled eider has three distinct populations: the Russian, Yukon Delta, and the North Slope (USFWS 2009a). The Russian population is large enough to meet delisting criteria as a Distinct Population Segments (DPS), the Yukon-Delta population is increasing and should meet delisting levels as a DPS from 2014 to 2019 if trends continue, and the North Slope population, though stable, is below recovery levels as a DPS required for delisting (USFWS 2009a). Because the ESA listing of the spectacled eider occurred prior to the policy on DPS, the entire species population must meet recovery goals to qualify for delisting (USFWS 2009a).

3.4.3.2.2 Habitat Preferences

Spectacled eiders are sea ducks and spend the majority of their non-breeding lives (November to March/April) in a coastal or shallow waters of the marine environment. These habitats include open seas (generally water depths of less than 80 m), polynyas (areas of open water at predictable, recurrent locations in sea ice covered regions), or open leads (more ephemeral breaks in the sea ice, often along coastlines) (Petersen et al. 2000). Shallower waters are preferred due feeding method of diving for benthic invertebrates, primarily clams and some crustaceans (Petersen et al. 1998, Lovvorn et al. 2003, del Hoyo et al. 1992).

Breeding begins in May or June in single pairs or loose groups after the spectacled eider moves to small lakes, pools, bogs and streams of the wet coastal tundra (Petersen et al. 2000, Bart and Earnst 2005, and del Hoyo et al. 1992). The Yukon Delta population nesting is restricted to the vegetated intertidal zone (areas dominated by low wet-sedge and grass marshes with numerous small shallow water bodies). The North Slope population nesting is typically located on large shallow thaw lakes usually with convoluted shorelines or small islands with emergent vegetation (Larned and Balogh 1997).

Nests are located near these small lakes, pools, bogs and streams, usually within 3 m of the water, where females and fledglings feed on a varied diet of insects, crustaceans, and vegetation (Petersen et al. 2000). Male spectacled eiders return to the marine habitats once egg incubation begins (Petersen et al. 1999).

3.4.3.2.3 Critical Habitat

Critical Habitat for the spectacled eider was designated in February 2001 by the USFWS. This critical habitat encompasses approximately 39,000 mi^2 of coastal and shallow water habitat in Alaska (USFWS 2001). Figure (3-12) shows spectacled eider critical habitat. The spectacled eider critical habitat is divided into four units. These units were designated due to their Primary Constituent Elements (PCE) that are important to the conservation of spectacled eiders (USFWS 2001). PCE's are the physical and biological features that are essential to the conservation of the species and that may require special management considerations and protections (USFWS 2001). These units are described below.

Unit 1 (Central and Southern Yukon-Kuskokwim Delta): Unit 1 (includes Unit 2) contains approximately 690,164 acres (USFWS 2001). This unit includes "all portions of the vegetated intertidal zone, and all open water inclusions within that zone. The intertidal zone includes all lands inundated by seawater often enough to affect plant growth, habit, or community composition. Plant communities within this zone include, but are not limited to: low wet sedge tundra; grass marsh; dwarf shrub/graminoid (consisting of grasses and sedges) meadow; high and intermediate graminoid meadow; mixed high graminoid meadow/dwarf shrub uplands" (USFWS 2001). This unit is used by spectacled eiders primarily for nesting and brood-rearing (USFWS 2001).

Units 3 (Norton Sound) and 4 (Ledyard Bay): Units 3 and 4 contain approximately 2,615,853 and 3,449,585 acres each, respectively (USFWS 2001). These units "include all marine waters greater than 5 m (16.4 ft) and less than or equal to 25 m (82.0 ft) in depth at mean lower low water (MLLW), along with associated marine aquatic flora and fauna in the water column, and the underlying marine benthic community" (USFWS 2001). These units are used by spectacled eiders primarily for molting and foraging (USFWS 2001).

Unit 5 (Waters South of St. Lawrence Island): Unit 5 contains approximately 18,199,283 acres (USFWS 2001). This unit "includes all marine waters less than or equal to 75 m (246.1 ft) in depth at MLLW, along with associated marine aquatic flora and fauna in the water column, and the underlying marine benthic community"(USFWS 2001). This unit is used by spectacled eiders primarily as wintering habitat (USFWS 2001).

3.4.3.2.4 Population Size and Trends

The worldwide population of spectacled eiders is estimated to be approximately 330,000-390,000 individuals (WI 2006). This includes the Russian, Yukon Delta, and North Slope populations. Survey work in the 1990s has estimated 333,000 individual wintering spectacled eiders in the pack ice of the Bering Sea south of Saint Lawrence Island (Petersen et al. 1999). An additional estimate placed the wintering population at 374,792 birds (USFWS 2001) and this maybe an indicator of the worldwide population. The most recent data suggest that the Yukon Delta breeding population to be about 3,500 to 4,000 pairs and the North Slope breeding population estimated to be 3,837 to 5,651 pairs (USFWS 2001). From the 1970s through the 1990s it is estimated that the Yukon Delta population declined by 96 percent, from 48,000 pairs to fewer than 2,500 pairs estimated in 1992 (USFWS 2001).

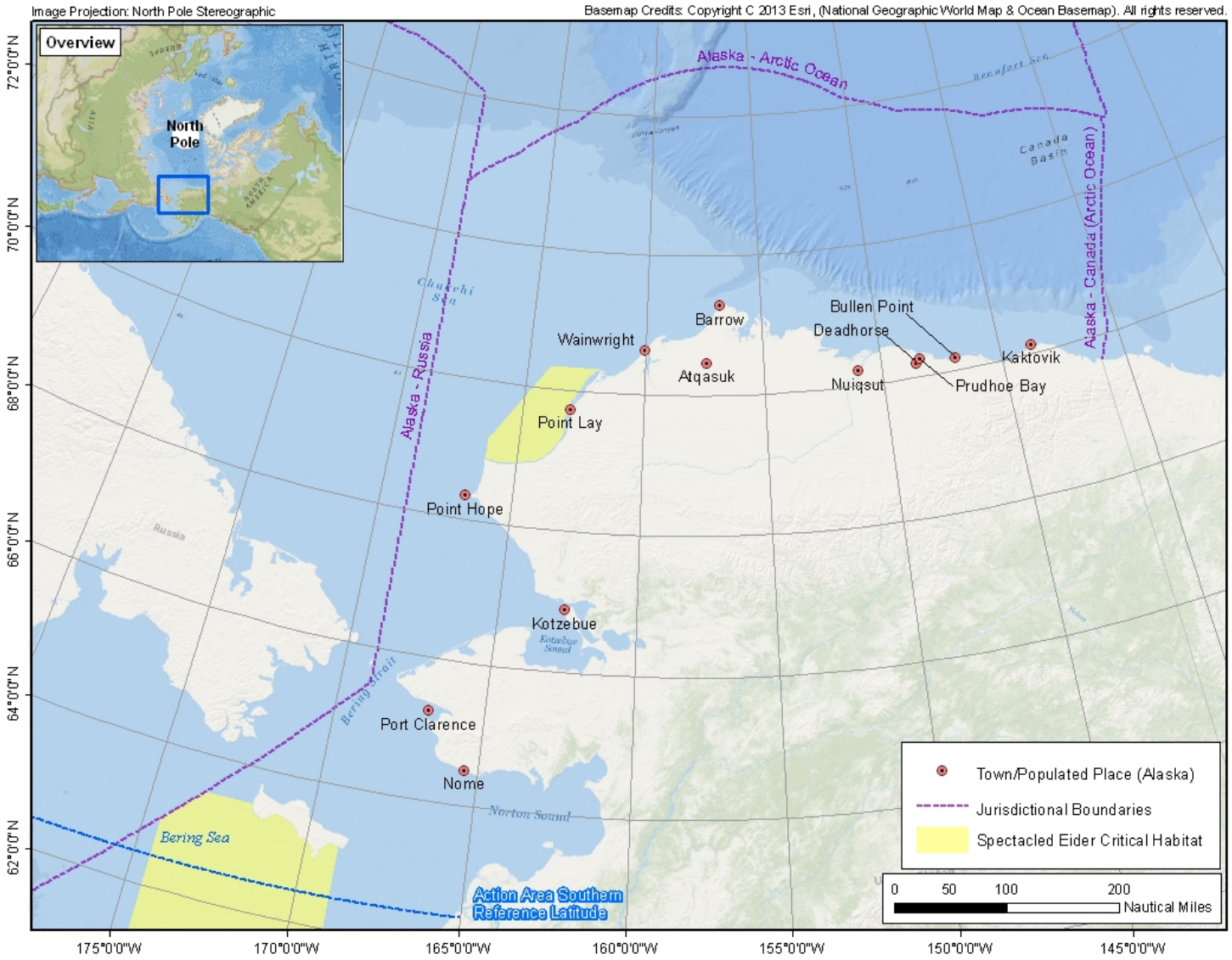

Figure 3-12: Spectacled Eider Critical Habitat in the Action Area

3.4.3.2.5 Distribution

Historically, spectacled eider populations in the United States (Yukon Delta and North Slope) had a nesting distribution from the Nushagak Peninsula in southwestern Alaska, north to Barrow and east nearly to the Canadian border. The majority of the Yukon Delta population breeds 15 km of the coast from Kigigak Island north to Kokechik Bay (USFWS 2001). Smaller numbers nest south of Kigigak Island to Kwigillingok and north of Kokechik Bay to the mouth of Uwik Slough. The North Slope population breeds north of 70˚ latitude between Icy Cape and the Shaviovik River with the majority occurring between Cape Simpson and the Sagavanirktok River (USFWS 2001).

The two U.S. populations congregate in large flocks to molt in Norton Sound and Ledyard Bay during the summer months. The primary molting area for the Russian population is Mechigmenskiy Bay and off the coast of the Indigirka and Kolyma River Deltas (Petersen et al. 1998). The winter populations collect in large numbers in the openings in the pack ice between St. Lawrence and St. Matthew Islands in the central Bering Sea (USFWS 2001). Spectacled eiders from all three known breeding populations use this wintering area (USFWS 2001); no other wintering areas are currently known.

3.4.3.2.6 Life History

The spectacled eider has a lifespan of approximately 15 years and does not become sexually mature until 2 to 3 years of age. Once at breeding age, in the spring (March/April) adult spectacled eiders move to small lakes, pools, bogs and streams of the wet coastal tundra or intertidal zones to pair bond and mate (Petersen et al. 2000, Bart and Earnst 2005, del Hoyo et al. 1992). Nesting generally begins in May to June with incubation lasting approximately 22 days (Warnock and Troy 1992 and USFWS 2010a). Clutch size varies but is generally around four to five eggs. Males leave breeding grounds once incubation begins (Petersen et al. 1998). Hatch dates are generally late June to early July (Fischer et al. and USFWS 2010a). Hatchlings move from the nest to freshwater habitats located near the nest and remain there until fledging occurs after approximately 30 additional days (Petersen et al. 1998). Once fledged, young eiders move to the marine environment (Petersen et al. 1998). Adult birds go through a yearly molt that typically occurs in late summer to early fall with each bird losing the ability to fly for a few weeks.

3.4.3.2.7 Environmental and Human Effects

Weather and predator related mortality appear to be the greatest natural threat to the spectacled eider. Severe weather events are likely a risk to individual birds, particularly young birds and those in the flightless molt stage. Birds in the marine environment would be vulnerable to a variety of marine predators while resting on the water. The greatest natural mortality occurs during nesting with the adult female, eggs, and hatchlings all be vulnerable to predation by many predators including gulls (*Larus* spp.), jaegers (*Stercorarius* spp.), and red (*Vulpes vulpes*) and arctic (*Alopex lagopus*) foxes (USFWS 2010a). In the Yukon Delta population, Arctic foxes are a primary predator of spectacled eider nests, causing near complete nest failure in some years (USFWS 2010a). Researchers have correlated control of foxes with increased nest success in spectacled eiders (Lake 2008). Gull predation on spectacled eiders appears to be variable within the Yukon Delta (USFWS 2010a) but other researchers have observed gull predation on the lower Kashunuk River and recommended gull removal to increase nest success (Grand and Flint 1997). Though unsubstantiated, there is some evidence that human habitation near spectacled

eider nesting areas may increase predation (Eberhardt et al. 1983) due to the increased populations of predators such as foxes, gulls and ravens (USFWS 2010a).

Habitat destruction from anthropogenic activities is not known to be a threat to the Yukon Delta spectacled eider population at listing or in the foreseeable future (USFWS 2010a). Oil and gas development in the Arctic Coastal Plain altered a small area of nesting habitat increasing the potential of negative effects from spill contamination, off-road vehicle use, wetland loss and indirect effects of human presence (USFWS 2010a). Habitat destruction and modification of the nesting habitat has been low and it not currently considered a significant threat to populations of spectacled eiders (USFWS 2010a).

Climate change may be a current and long term threat to spectacled eider populations. Arctic surface air temperatures have increased at a rate that is higher than the global average and are current predicted to continue to increase (IPCC 2007) and the waters of the Arctic Ocean have warmed and are expected to continue to increase (Overland 2009). The indirect effect of the warmer climate may include an altered marine food web due to increased ocean acidification, an increase in vehicle traffic (spills, disturbance and collisions) due to the reduction in summer sea ice, and the potential loss of nesting habitat by coastal erosion (Mars and Houseknecht 2007, USFWS 2010a, Walsh et al. 2005).

Lead shot used for hunting was banned in the United States (excluding Alaska and Hawaii) in 1991 (USFWS 2010a). Alaska passed regulations in 2006 and 2007 prohibiting the use of lead shot on the Arctic Coastal Plain for upland game bird hunting and on the Yukon Delta for all bird and small game hunting (USFWS 2010a). The regulation has decreased mortality rates from lead poisoning for waterfowl in the lower 48 states but in Alaska, permafrost may keep lead shot available to waterfowl for many years after regulations become effective (USFWS 2010a). A research study of nesting female spectacled eiders in the Yukon Delta found higher lead contamination exposure rates than in other populations (Flint et al. 1997). Though still considered a threat to spectacled eiders, regulations have significantly reduced use of lead shot in the nesting areas of spectacled eiders and this should decrease the impacts to eiders in the future **(**USFWS 2010a**)** as the lead in the environment becomes less available**.**

Commercial fishing is not considered a threat to populations of spectacled eiders. Additionally, all hunting of spectacled eiders in the United States is prohibited; hunting of this species in Russia remains an unknown.

Scientific studies of spectacled eiders and other studies in population areas may affect individual birds. One study found a negative impact of biological surveys of spectacled eiders nesting areas in the Yukon Delta (Bowman and Stehn 2003). Climate change research is increasing scientific research across the North Slope (USFWS 2010a). Research funded or permitted by Federal agencies requires USFWS Section 7 consultations. The USFWS intends on increasing researcher awareness through outreach and other management devices such as conservation plans (USFWS 2010a). These research activities are not considered a population level threat to the spectacled eider (USFWS 2010a).

Spectacled eiders live the majority of their lives in the marine environment, which exposes them to anthropogenic activities in and around the water. The development of oil and gas resources in the Arctic is a threat to spectacled eiders through direct collision with oil and gas structures and marine vessels, and the potential of oil and toxic substance spills (USFWS 2010a). The oil industry is active in spectacled eider habitats in Alaska including development in the Colville

River Delta and exploration activities in the eastern Chukchi Sea. Associated air and boat traffic could disturb or displace foraging or nesting spectacled eiders with the duration, noise level, and time of year affecting the severity of the threat (USFWS 2010a). The low level and high speed (approximately 45 mph) flight behavior of spectacled eiders combined with potential visibility limiting weather related events such as storms and fog makes eiders potentially vulnerable to collisions with vessels and structures in the water (Day et al 2005).

Oil and toxic spills are a low but potential threat to the populations of spectacled eiders. Spills of oil, refined petroleum products, or other toxic substances from offshore oil and gas development can occur as a result of well blowouts, operational 24 discharges, pipeline failures, tanker or other vessel leaks, and numerous other potential accidental discharges (AMAP 2007). Spills of these products can cause direct mortality of individual eiders or indirectly affect eiders by degrading habitats or their food web (USFWS 2010a).

Due to the low level of activities in the Arctic Ocean, the current threat collision and disturbance by activities associated with oil and gas development and exploration is low but has the potential to increase in the future with expanded operations as new areas open due to easier accessibility from the result of climate change (USFWS 2010a). However, the threat of oil and toxic spills though low, is unmitigated by a lack of sufficient spill response plans therefore, oil and toxic spills remain a threat to spectacled eiders (USFWS 2010a).

3.4.3.3 Steller's Eider (*Polysticta stelleri*)

3.4.3.3.1 Regulatory Status

The Steller's eider was listed under the ESA as threatened in 1997 (USFWS 2001a). They are considered vulnerable by the International Union for Conservation of Nature Red List of Threatened Species (IUCN 2013) due to rapid population decrease in key Alaska populations. Three breeding populations of Steller's eiders are known, two in Arctic Russia (Russia Atlantic and Russia Pacific populations) and one in Alaska called the Alaska population (USFWS 2001a). The following discussion is focused on the Alaska population.

3.4.3.3.2 Habitat Preferences

Steller's eiders are sea ducks and spend the majority of their non-breeding lives (September to April/May) in the coastal waters of the marine environment. These preferred habitats are near shore, low-lying rocky coasts, bays, and river mouths generally with water depths of less than 10 m (del Hoyo et al. 1992, Madge and Burn 1988 iucn and USFWS 2001a). Shallower waters are preferred due to their feeding method of diving for benthic invertebrates, primarily clams and some crustaceans (del Hoyo et al. 1992).

The Steller's eider breeds in flat coastal plains typically several kilometers from the coastline (Kear 2005). Nest sites may be in grassy areas with hummocks (Johnsgard 1978) or in moss-lichen tundra within a few meters of ponds of various shapes and sizes (Kear 2005). Nests are built on small hummocks or in depressions between hummocks (Kear 2005). During nesting forage is done in nearby fresh, saline or brackish waters, and tidal flats (Johnsgard 1978).

3.4.3.3.3 Critical Habitat

Critical habitat was designated for the Steller's eider in 2001, and encompasses approximately 1.8 million acres that are 65 percent federal land and waters, 25 percent state waters, and 10 percent tribal lands (CBD 2013). No critical habitat has been designated within the Action Area; the closest parcel is 50 nm (93 km) south of the action aarea boundary.

3.4.3.3.4 Population Size and Trends

The population size of Steller's eiders is difficult to determine due to the wide geographic distribution that includes Arctic Russia. Breeding Steller's eiders are also difficult to estimate because of their dispersed rather than colonial nesting habits. Population levels appear to have decreased in Alaska with eiders extirpated from their historical western range in Alaska (Kertell 1991). In known habitats, it has been observed that the frequency of presence and breeding has declined in recent decades (USFWS 2001a).

Steller's eiders located in the North Slope have been estimated through extrapolated data from 2-3 percent of surveyed range to cover their entire known range which equates to an estimated breeding population of 2,543 in 1999 (USFWS 2001a). Additional population estimates include 90,000 to 95,000 individuals in Alaska (IUCN 2013). By 2011, this population had declined with the estimate at 74,369 individuals (Larned 2012).

3.4.3.3.5 Distribution

Three breeding populations of Steller's eiders are known, two in Arctic Russia (Russia Atlantic and Russia Pacific populations) and one in Alaska called the Alaska population (USFWS 2001a). The majority of Steller's eider breed in Arctic Russia (Nygard et al. 1995). The Russian Atlantic population breeds west of the Khatanga River and winters in the Barents and Baltic seas (USFWS 2001a). The Russian Pacific population breeds east of the Khatanga River mouth and winters in the southern Bering Sea and northern Pacific Ocean (USFWS 2001a).

In Alaska, Steller's eiders are known to breed on the western Arctic Coastal Plain in northern Alaska (on the western North Slope and the northern half of the National Petroleum Reserve), approximately Point Lay east to Prudhoe Bay, and in extremely low numbers on the Yukon Delta (USFWS 2001a). Post breeding, eiders move back to marine water to molt with the majority known to occupy one of four areas on the Alaska coastline, Izembek Lagoon (Metzner 1993 and USFWS 2001a), Nelson Lagoon, Herendeen Bay, and Port Moller (USFWS 2001aSmall numbers of eiders use molt sites along the western Alaska coast, around islands in the Bering Sea, along the coast of Bristol Bay, and in smaller lagoons along the Alaska Peninsula (USFWS 2001a). Overwintering Steller's eiders are known to utilize the southern and southwest coastline of Alaska staying in shallow, nearshore marine waters (USFWS 2001a).

3.4.3.3.6 Life History

The smallest of the eiders, the Steller's eider has a life span of 16 to 21 years (ADFG 2013a). Steller's eiders reach breeding age at 2 to 3 years of age with the breeding cycle beginning in the late winter to early spring with pair bonding. As many as 50,000 Steller's eiders may congregate during pair bonding (Kear 2005). Pair bonding consists of several males (three to seven) performing courtship displays for females and aggressive displays for rival males (ADFG 2013a). Migration to breeding grounds takes place from March through May with arrival at the nesting grounds occurring in June (Kear 2005). Migration flights occur in long lines of single

birds only a few feet above the water or ground. Migration routes of Steller's eiders generally follow open leads in the ice and coastlines (ADFG 2013a).

The Alaskan population of Steller's eider's nesting grounds is located in the northern Arctic coastal plain with many of the sites located near Barrow, Alaska (ADFG 2013a and USFWS 2002). Nesting is done with individual nests rather than in colonies of birds (ADFG 2013a) though small colonies of sixty plus nests have been observed (Kear 2005). Nests are typically located on a peninsula or island on a tundra lake or pond near the coast and are made of grasses lined down feathers (ADFG 2013a). Males depart the nesting grounds once brooding commences, gathering in large flocks off the coast (ADFG 2013a and Johnsgard 1978). Five to ten eggs are the typical brood size with hatching taking approximately 25 to 28 days (ADFG 2013a). Soon after hatching, broods are moved from the nest site to the coast (Johnsgard 2005) where fledging occurs after 5 to 7 weeks post hatching. Moulting generally occurs in late summer or as late as mid-fall (November) (Johnsgard 1978) with birds migrating up to 3,000 km to moulting sites (Johnsgard 1978 and Kear 2005). At the moulting grounds, large flocks of up to 50,000 eiders gather with the flightless period lasting around 3 weeks (Kear 2005 and USFWS 2001a). After moulting, the majority of the world's population of Steller's eiders migrates to wintering grounds in the Alaskan peninsula or the Aleutian Islands (ADFG 2013a). This migration pathway maybe as far as 4,800 km from their nesting grounds in northern coastal plain of Alaska (ADFG 2013a).

3.4.3.3.7 Environmental and Human Effects

Natural mortality of Steller's eiders can be caused by a variety of sources, including predation and disease. Ground nesting waterfowl are susceptible to nest predation and predation may be a contributing factor to the decline of the Steller's eider population in Alaska. It has been suggested that an overall decline in overall prey availability has increased predator pressure on the Steller's eider population on the Yukon Delta (USFWS 2001a).

The nesting population near Barrow has had some nest success observations including that only 15 to 18 percent of eggs survived to hatching in the years 1991 to 2000 with predation suspected as the main cause (Quakenbush et al. 1995 and Obritschkewitsch et al. 2001). Steller's eiders are a poorly studied species so predation data is insufficient to identify the primary predators but species such as Arctic foxes, red foxes, mink (*Mustela vison*), pomarine jaegers (*Stercorarius pomarinus*), parasitic jaegers (*S. parasiticus*), snowy owls (*Nyctea scandiaca*), common ravens, mew gulls (*Larus canus*), and glaucous gulls (*Larus hyperboreus*) are all likely predators of the eider (USFWS 2002).

Other stressors may include disease with Steller's eiders and other sea ducks in Alaska having significant exposure rates to a virus in the family Adenoviridae (Hollmen and Franson 2002) though the effects are unknown and not quantified.

Anthropogenic threats to the Steller's eider including harvesting, habitat destruction, contamination, and climate change. Habitat loss and modification does not appear to be a significant factor in the decline of the Steller's eider because only a very small amount of the habitat has been altered by human activities; other waterfowl species continue to occur in large numbers, and Steller's eiders regularly nest near Barrow, Alaska around gas pipelines, roads, airports, and other forms of human disturbance and habitat modification (USFWS 2001a).

Sport hunting for Steller's eiders was made illegal by state and federal regulation in 1991. Though illegal, some accidental and illegal hunting of the species occurs but this is likely in

insignificant numbers (USFWS 2002). Prior to 1994, subsistence hunting of Steller's eider was legal during parts of the year but in 1994, the USFWS prohibited all hunting of eiders (USFWS 2002).

Lead shot used for hunting was banned in the United States (excluding Alaska and Hawaii) in 1991 (USFWS 2010a). Alaska passed regulations in 2006 and 2007 prohibiting the use of lead shot on the Arctic Coastal Plain for upland game bird hunting and on the Yukon Delta for all bird and small game hunting (USFWS 2010a). The regulation has decreased mortality rates from lead poisoning for waterfowl in the lower 48 states but in Alaska, permafrost may keep lead shot available to waterfowl for many years after regulations become effective (USFWS 2010a). One study indicated lead exposure for Steller's eider in the nesting grounds near Barrow, Alaska with all eight hens sampled for lead showing lead exposure with seven of the eight indicating that the lead poisoning threshold had been exceeded (USFWS 2002). An additional observation found that an individual Steller's eider mortality had high levels of lead that might indicate poisoning (Trust et al. 1997). The same conclusion may be reached with Steller's eiders that was reached with spectacled eiders that even though lead is still considered a threat, regulations have significantly reduced use of lead shot in the nesting areas of Steller's eiders and this threat should decrease in the future (USFWS 2010a) as the lead in the environment becomes less available.

Climate change may be a current and long term threat to Steller's eider populations. Arctic surface air temperatures have increased at a rate that is higher than the global average and are current predicted to continue to increase (IPCC 2007) and the waters of the Arctic Ocean have warmed and are expected to continue to increase (Overland 2009). As with the spectacled eider, the indirect effect of the warmer climate on the Steller's eider population is likely similar and may include an altered marine food web due to increased ocean acidification, an increase in vehicle traffic (spills, disturbance and collisions) due to the reduction in summer sea ice, and the potential loss of nesting habitat by coastal erosion (Mars and Houseknecht 2007, USFWS 2010a andWalsh et al. 2005).

No information is available that suggests that the decline of Steller's eiders is due to overutilization (USFWS 2002). Additionally, commercial fisheries are not considered a threat to the Steller's eider population (USFWS 2002). The effects of scientific research are unknown. Unlike spectacled eiders, which tend to nest in colonies, Steller's eiders are generally solitary nesters. It is reasonable to presume that they are less vulnerable to potential negative effects of scientific research since researchers are unlikely to disturb large numbers of nesting birds during a site visit due to the lower nesting density of the Steller's eider. Like the spectacled eider, research funded or permitted by Federal agencies requires USFWS ESA Section 7 consultations.

3.4.3.4 Yellow Billed Loon (*Gavia adamsii*)

3.4.3.4.1 Regulatory Status

The yellow-billed loon is listed as a candidate species throughout its range under the ESA. Listing justification includes small population size, restricted breeding grounds, and vulnerability to human impact. In 2009, the USFWS concluded that listing as threatened or endangered is "warranted but precluded" effectively delaying listing due to higher priority cases (ADFG 2013b). They are near threatened by the International Union for Conservation of Nature Red List of Threatened Species (IUCN 2013).

3.4.3.4.2 Habitat Preferences

The yellow-billed loon is primarily a marine species that spends the majority of its non-breeding life in the coastal environment. One study indicated that migrating and wintering loons stayed within 20 mi of the shore (USFWS 2009b). These offshore habitats include fjords with muddy substrates, inlets, sheltered coastal waters while generally avoiding ice covered waters (IUCN 2013, del Hoyo et al. 1992).

Breeding habitats are primarily freshwater pools, lakes or rivers but may include low-lying Arctic coasts and estuaries IUCN 2013, del Hoyo et al. 1992). The preferred breeding habitats for the yellow-billed loons are freshwater lakes with the following characteristics.

- Do not freeze to the bottom in the winter
- Are at least 33 acres or larger
- Are connected to a stream during some portion of the year to supply fish
- Have highly convoluted, vegetated and low-lying shorelines
- Clear water
- Consistent water levels (USFWS 2009b)
- Sandy or stony lake bottom substrate (IUCN 2013).

3.4.3.4.3 Critical Habitat

Critical Habitat has not been designated for this species.

3.4.3.4.4 Population Size and Trends

The worldwide population is estimated to be 16,000-32,000 individuals and the Alaska portion of this is approximately 3,000 to 4,000 individuals (IUCN 2013). The yellow-billed loon has a wide distribution and a solitary life style that makes it difficult to estimate the population. The global population is considered stable (ADFG 2013b) but the Alaska population may be showing a slight decline of approximately 1 percent a year (USFWS 2009b). This conclusion is based on aerial survey data from the Alaska Coastal Plain and a statistical model that extrapolated this data to cover the Alaska population (USFWS 2009b).

3.4.3.4.5 Distribution

The yellow-billed loons are a wide ranging species with low densities. Breeding range in Alaska includes the Arctic Coastal Plain, northwestern Alaska, and St. Lawrence Island; in Canada it ranges east of the Mackenzie Delta and west of Hudson Bay; and in Russia the distribution includes the area from the Chukotka Peninsula in the east and on the western Taymyr Peninsula in the west (USFWS 2009b)

The winter range is large and includes coastal waters Alaska, Canada, continental United States, Japan, Russia, Norway and maybe even Great Britain. In North America it includes southern Alaska and British Columbia from the Aleutian Islands to Puget Sound; in Asia it includes the Sea of Okhotsk near Japan south to the Yellow Sea between China and North and South Korea; in Europe it includes the Barents Sea around to the coast of the Kola Peninsula of Russia; and may also include the coastal waters of Great Britain (USFWS 2009b).

3.4.3.4.6 Life History

The lifespan of the yellow-billed loon is unknown (ADFG 2013b). Breeding age is reached at 3 years of age but breeding territories are not typically acquired until 4 years of age (USFWS

2009b). Migration to freshwater breeding site takes place in May with nesting occurring in late May and June.

Nest sites are typically located within 3 ft of a freshwater lake on an island, hummock, peninsula or low-lying shoreline (USFWS 2009b). Loons mate for life and their mud, peat and vegetation lined nests maybe used for more than 1 year (USFWS 2009b). Generally, two eggs are laid that hatch in 27 or 28 days (USFWS 2009b). Both parents are involved in the brooding and rearing of the young. Fledging is rather slow with flight capabilities thought to be reached at eight to eleven week (USFWS 2009b).

Loons migrate from their summer breeding grounds in mid-August to September. The migration takes them along the northern coasts heading from the arctic tundra to the over wintering areas to the south and east arriving by mid-November. Migration is generally as individuals or pairs but they have been observed in small flock (ADFG 2013b).

Yellow-billed loons feed by diving in their freshwater and marine water environments. Freshwater prey includes small fish, aquatic plants, insects, mollusks, and frogs (ADFG 2013b). Marine species include fish such as sculpins (*Leptocottus armatus*, *Myoxocephalus* sp.), Pacific tomcod (*Microgadus proximus*), and rock cod (*Sebastodes* sp.), and invertebrates such as amphipods (*Orchomonella* sp., *Anonyx nirgax*), isopods (*Idothea* sp.), shrimps (*Pandalus danae*, *Spirontocaris ochotensis*), hermit crabs (*Pagarus* sp.), and marine worms (*Nereis* sp.) (USFWS 2009b).

Loons prefer to dive rather than fly when disturbed since flight requires a long run across the water to become airborne. Loons cannot take flight from the land. Yellow-billed loons are strong fliers able to reach speeds of 60 mi per hour (ADFG 2013b).

3.4.3.4.7 Environmental and Human Effects

The majority of predation of the yellow-billed loon is during the nesting season. Known predators include glaucous gull (*Larus hyperboreus*), parasitic jaeger (*Stercorarius parasiticus*), and arctic fox (*Alopex lagopus*); pomarine jaeger (*Stercorarius pomarinus*), common raven (*Corvus corax*), snowy owl (*Nyctea scandiaca*), red fox (Vulpes fulva), and grizzly bear (*Ursus arctos horribilis*) also predate nests (USFWS 2009b).

Data on the harvest of the yellow-billed loon is incomplete with issues of range coverage, misidentification, and sampling methodologies considered to compromise the information. Using this limited data, USFWS still estimates that the annual harvest is in the hundreds of birds. USFWS considers this level of harvest as significant and is considered a threat to the species (USFWS 2009b).

Climate change may be a current and long term threat to yellow-billed loon populations. Arctic surface air temperatures have increased at a rate that is higher than the global average and are currently predicted to continue to increase (IPCC 2007) and the waters of the Arctic Ocean have warmed and are expected to continue to increase (Overland 2009). The biggest concern for the yellow-billed loon is the effect of climate change on the perma-frost of the arctic tundra and the subsequent potential threat to breeding habitats and the effects on their prey communities especially in the freshwater lakes used for breeding (USFWS 2009b).

Yellow-billed loons are marine birds that spend the majority of their lives in marine waters within 20 mi of the coastline. Due to this habitat requirement, the potential exists and has been observed for negative impacts by commercial and subsistence fisheries through mortality caused

by entanglement or accidental drowning but are not considered a significant threat to the species (USFWS 2009b).

The yellow-billed loon breeds over a wide spread area of the arctic tundra as individual pairs. Oil and gas development has the potential of disturbance to the yellow-billed loon through aircraft noise, vehicle, and heavy equipment noise (USFWS 2009b). It has been observed that human disturbance can cause nesting yellow-billed loons to abandoned nests (USFWS 2009b).

Approximately 75 percent of the nesting range in Alaska and ninety percent of the nesting range in the Arctic Coastal Plain fall within the 23.5 million National Petroleum Reserve-Alaska (NPR-A). This entire area is designated for oil and gas leasing and development (USFWS 2009b). Within the NPR-A, disturbance and habitat degradation that may affect the nesting habitats of yellow-billed loons is mitigated by required operating procedures that are included in the oil and gas leases that specify that if yellow-billed loons are observed that design and locations of facilities must minimize disturbance and place at least a 1-mi buffer around nest sites and a 500-m buffer around the remainder of the lake shoreline on which the nest is located (USDOI–BLM 2004a, USDOI–BLM 2008b, USFWS 2009b). Other potential disturbances to the habitat may occur while the breeding lakes are unoccupied in the winter with the practice of using water from lakes for drilling and the construction of ice roads and pads (USFWS 2009b).

Yellow-billed loons live the majority of the lives in the marine environment which exposes them to activities in and around the water. Oil and gas development has the potential of disturbing the yellow-billed loons through vessel and aircraft traffic, collisions with vessels and structures, and the potential of oil and toxic spills.

Noise associated with vessel and aircraft traffic could disturb or displace loons from a particular habitat with unknown cost to foraging success and energy. Vessel traffic and offshore structure pose a potential collision risk especially in poor weather conditions since the flight speed of the yellow-billed loon is approximately 60 mph and is typically at a low level.

Oil and toxic spills are a low but potential threat to the populations of yellow-billed loons. Like eiders, toxic spills can cause direct mortality of individual eiders or indirectly effect eiders by degrading habitats or their food web. The wide range of the yellow-billed loon combined the tendency of this species to not congregate in large groups reduces the threat of toxic spills to the species with the highest potential for negative impacts occurring during migration when modest concentration of this species may occur (USFWS 2009b).

4 EFFECTS OF THE ACTION

4.1 FACTORS USED TO ASSESS THE SIGNIFICANCE OF EFFECTS

This Biological Evaluation (BE) analyzes potential effects to listed threatened and endangered species in the context of the Endangered Species Act (ESA) within the Arctic Operations and Training Action Area under the Proposed Action. For purposes of ESA compliance, the actions were analyzed to make the United States Coast Guard (Coast Guard) determination of effect on listed species (i.e., no effect or may affect). The following definitions used in making the determination of effect under Section 7 of the ESA are based on the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) *Endangered Species Consultation Handbook* (USFWS and NMFS 1998).

- "No effect" is the appropriate conclusion when a listed species will not be affected, either because the species will not be present or because the project does not have any elements with the potential to affect the species. "No effect" does not include a small effect or an effect that is unlikely to occur.
- If effects are insignificant (in size) or discountable (extremely unlikely) or beneficial to the species, a "may affect, but not likely to adversely affect" determination is appropriate. Insignificant effects relate to the magnitude or extent of the effect (i.e., they must be small and would not rise to the level of a take of a species). Discountable effects are those extremely unlikely to occur.
- A "may affect, and is likely to adversely affect" determination is based on responses to disturbances that are not beneficial, insignificant or discountable, meaning that negative consequences may happen as a result to the species responses to disturbance with the action. The negative consequences may be manifested as harassment or harm as defined by USFWS. A "may affect and is likely to adversely affect" determination requires initiation of formal consultation with the USFWS.

Provisions of the ESA also require a determination of whether proposed Federal actions may affect critical habitat for listed threatened or endangered species. Within the Action Area, critical habitat has been designated for Steller sea lions, polar bears, and spectacled eiders. Effects to critical habitat are addressed in section 4.3.

4.2 ACTIVITIES ASSOCIATED WITH THE PROPOSED ACTION

Some of the operations and training exercises proposed as part of the Proposed Action do not have the potential to impact ESA-listed species or their critical habitat because they will be conducted in an office setting and have no field component; therefore, they have been excluded from further analysis in this BE. These are:

- Training Exercises
  - Mass Rescue Operation (MRO) table top exercise;
  - Spill of National Significance table top exercise; and
- Tribal and Government Engagement.

All other Proposed Actions outlined in Section 2 (Description of the Action and Action Area) were analyzed in the sections below to determine the potential effects of those activities on ESA-listed species and Essential Fish Habitat under USFWS or NMFS jurisdiction.

4.2.1 Shore Operations

Shore operations, including forward operating locations (FOLs) and Inspections and Safety Ashore involve activites that occur on shore and in ports, including installation of a temporary 49 ft fanlite antenna, berthing of personnel, inspections of vessels in port and education courses for local communities.

4.2.1.1 Forward Operating Locations

FOLs involve stationing of personnel and equipment in existing population centers to enable routine patrols and timely respose to search and rescue (SAR) missions (see Figure 2-4). Increases in population would be minor and seasonal, occurring from March – November of each year. FOLs would not involve construction or development of currently undeveloped areas. Installation of a temporary 49 ft fanlite antenna has previously been analyzed in consultation with USFWS; in accordance withthis consultation, the guide-wires for the antenna will be equipped with bird diverters to avoid impacts on listed bird species (USFWS 2014). FOLs occur exclusively on shore and have no potential to impact species that spend their lives entirely in the marine environment.

4.2.1.1.1 National Marine Fisheries Service Jurisdictional Species

Cetaceans (bowhead, fin, humpback, and North Pacific right whales) and Essential Fish Habitat are not present at FOLs because they occur exclusively in the marine environment.

Pinnipeds spend part of their lives on sea ice or on shore, leading to the potential for interactions with FOLs. Of the three ESA-listed pinnipeds under NMFS jurisdiction, two are highly unlikely to interact with existing or new FOLs. Bearded and ringed seals do not typically haul out on shore in the Action Area, preferring instead to rest on and den in sea ice. The potential for interactions with FOLs are therefore so low as to be discountable.

Steller sea lions haul out onshore, and may occur in the vicinity of two of the listed FOLs (Nome and Port Clarence). There are no major haul-outs in or near either location (Allen and Angliss 2013), and documented occurrences of Steller sea lions in these locations are rare. Sea lions are taken by subsistence hunters in and around the Bering Sea, including near the two FOLs mentioned above. Individuals are likely sensitized to human presence, and are unlikely to approach humans and developed areas. There are minimal impacts of FOLs on undeveloped areas near existing population centers and a low likelihood of Steller sea lion presence in and around Nome and Port Clarence.

Conclusions:

- FOLs will have no effect on the bowhead whale, fin whale, humpback whale, and North Pacific right whales.
- FOLs may affect, but are not likely to adversely affect the bearded seal, ringed seal, and Steller sea lion.

4.2.1.1.2 United States Fish and Wildlife Service Jursidictional Species

Marine Mammals

Pacific walrus and polar bears both spend time on shore. While walruses prefer to haul out on sea ice, significant concentrations of walrus are known to occur on land, particularly in years of low ice density. Seasonal increases in human population at the FOLs listed in Section 2.4.1.1 (Forward Operating Locations) may result in increases in foot and vehicle traffic in and around the population centers. If walrus haul out on shore near a FOL, this could result in potential behavioral disturbance to the animals. Behavioral disturbances to walruses on shore have previously resulted in flight responses, where animals stampeded into the water. These stampedes have resulted in death and abandonment of calves. However, Coast Guard best management practices (BMPs) restrict approaches to walrus haulouts and dictate minimum approach distances in order to reduce the potential for behavioral disturbance. The overall increase in human population at any one FOL will be low. Combined with the Coast Guard BMPs, there will be minimal potential for disturbance to walruses hauled out on shore.

Polar bears are more likely than any other marine mammal species to be found in and around the proposed FOLs, with the potential for indirect and direct interactions with humans. Polar bears are active year round, and may be attracted to human population centers by availability of food sources, particularly in times of food scarcity in the natural environment (Schliebe et al. 2006). Pregnant female polar bears enter dens in November, emerging in April or May with nursing cubs. Bears that enter human population centers are at risk for impacts, including behavioral disturbance, injury, and mortality due to hazing and defense of life and property (DLP) actions. Most bear interactions involve modifications to human behavior (i.e. moving inside when a bear is sighted) or hazing (behavioral disturbance) to bears (Schliebe et al. 2006); these behavioral changes are not expected to significantly impact bears over the long term. Coast Guard FOLs are proposed only in locations with exisiting human populations and construction, and would therefore not impact previously undisturbed polar bear habitat or foraging areas. A minor increase in town waste production would occur. All such wastes would be disposed of in accordance with community and Coast Guard standards in order to avoid attracting bears to existing community waste dumps. Increases in human population due to Coast Guard activities would be minor and seasonal (approximately 20 – 30 persons, May – November, except as needed to suit operational requirements). Because of the seasonal nature of Coast Guard presence at FOLs, there will be no impact to denning female polar bears in the Action Area. The Coast Guard BMPs and Polar Bear Interaction Plan (in development; includes specific requirements for personnel training, avoidance and encounter procedures, hazing, waste management, monitoring requirements, etc.) include provisions for avoiding the need to haze or otherwise directly interact with bears in the Action Area. Coast Guard will coordinate with local and tribal organizations with respect to communication about polar bear presence and behavior in and around FOLs.

Birds

Proposed FOLs will occur in and around exisiting population centers, and will have minimal impact on seabird species since the majority of their time is spent offshore. During nesting season (generally from May to September), the four ESA-listed bird species come ashore and nest in a variety of preferred habitats; only the short-tailed albatross nests outside of the Action Area. Steller's eider breeding habitats are generally in flat coastal plain typically several kilometers from the coastline (Kear 2005) in grassy areas with hummocks (Johnsgard 1978) or in

moss-lichen tundra within a few meters of ponds of various shapes and sizes (Kear 2005). Spectacled eiders nest near small lakes, pools, bogs and streams of the wet coastal tundra (Petersen et al. 2000, Bart and Earnst 2005, del Hoyo et al. 1992). In the Yukon Delta population of spectacled eiders, nesting is restricted to the vegetated intertidal zone (areas dominated by low wet-sedge and grass marshes with numerous small shallow water bodies). The yellow-billed loon nests near freshwater pools, lakes or rivers, or low-lying Arctic coasts and estuaries (del Hoya et al 1992). The construction of joint use modular facilities in Barrow and other locations would occur at locations with an existing level of manmade disturbance and would not be located within the breeding habitat of any of the four ESA-listed bird species.

Conclusions:

- FOLs may affect, but are not likely to adversely affect Pacific walrus and polar bears.
- FOLs will have no effect on the short-tailed albatross, Steller's eider, spectacled eider, and yellow-billed loon.

4.2.1.2 Inspections and Safety Ashore

Inspections and safety activities take place in ports such Barrow and Nome and other locations indicated in Figure 2-4. Coast Guard conducts inspections of vessels in major ports in Alaska to ensure cargos are as claimed, safety standards are intact, and construction or maintenance plans meet established standards. Activities would take place on or next to vessels in port. Depending on vessel size and port facilities, access to the vessels will be via docks or small boats. Duration and frequency of the activities will depend on vessel traffic and operational needs and will occur throughout the year as needed.

4.2.1.2.1 National Marine Fisheries Service Jurisdictional Species

Cetaceans occasionally occur within ports and harbors, leading to the potential for interaction with small boats used to access vessels being inspected. However, the four listed cetacean species are large whales with preferred open ocean habitat. These species are highly unlikely to enter confined areas such as ports and harbors under normal circumstances, and will likely be sighted very quickly if they do enter these areas. Given the rarity of most of the listed cetaceans and their normal distributions in deeper, open ocean waters, the potential for interaction with small boats conducting vessel inspections is so low as to be discountable.

Pinnipeds spend part of their lives on sea ice or on shore, with some species spending significant amounts of time in nearshore waters or hauling out in areas near anthropogenic activity (Richardson et al. 1995), leading to the potential for interactions with Inspections and other Saftey Ashore activities. Of the three ESA-listed pinnipeds under NMFS jurisdiction, two are highly unlikely to be impacted by marine or shore-based components of this activity. Bearded and ringed seals do not typically haul out on shore in the Action Area, preferring instead to rest on and den in sea ice, located well offshore of the ports and harbors where inspections take place. The potential for interactions with safety and inspection activities are therefore so low as to be discountable.

Steller sea lions do haul out onshore, and may occur in the vicinity of two of the potential ports (Nome and Port Clarence). There are no major haul-outs in or near either location (Allen and Angliss 2013), and documented occurrences of Steller sea lions in these locations are rare. Sea lions are taken by subsistence hunters in and around the Bering Sea, including near the two ports

mentioned above. Individuals are likely sensitized to human presence, and are unlikely to approach humans and developed areas. Interactions ashore are therefore highly unlikely. Interactions with small boats conducting inspections may occur, and would have the potential for physical strikes or behavioral disturbance. Sentitization to human presence, as mentioned above, is likely to reduce the risk of physical strike and injury as animals are expected to avoid small boats. Behavioral reactions to boat presence or noise are expected to be short-term and temporary (Richardson et al. 1995).

Conclusions:

- Inspections and Safety Ashore activities may affect, but are not likely to adversely affect bowhead, fin, humpback, and North Pacific right whales, bearded seals, ringed seals, and Steller sea lions.

4.2.1.2.2 United States Fish and Wildlife Service Jursidictional Species

Marine Mammals

Pacific walrus and polar bears both spend time in nearshore waters and resting ashore. While walruses prefer to haul out on sea ice, significant concentrations of walrus are known to occur on land, particularly in years of low ice density. Land-based haulouts are not typically found in and around human population centers, where Inspections and Safety Ashore activities are proposed. In the water, there is the potential for walrus interactions with small boats conducting inspections; however, Richardson et al. (1995) noted that walrus in the water are typically not disturbed by nearby vessels, and Garlich-Miller et al. (2011) found that shipping and boating activities are not a serious threat to walruses in Alaska. If disturbed in the marine environment, behavioral reactions could include moving away from the small boat, hauling out, or leaving the area. These reactions are expected to be short-term and temporary.

Polar bears occur onshore and in the marine environment, and have the potential to interact with shore-based and marine safety inspection activities. If a polar bear is spotted in or near a human population center, persons are advised to go inside and avoid the bear, drastically reducing the potential for negative interactions during shore-based activities. If a bear is encountered by a small boat conducting an inspection of a ship moored in a port, potential impacts include physical strike and behavioral disturbance. While it is rare to encounter a swimming bear, these animals may be able to detect engine noise from small boats, potentially causing a behavioral reaction. Such reactions could include avoidance of the vessel or diving, and are expected to be minor and short-term. Coast Guard vessels do not approach polar bears in the water, reducing the potential for behavioral reactions.

Birds

The level of impact to the four ESA-listed bird species will depend on the duration, frequency, and timing of the inspections and safety activities and the presence of the birds at the port locations. Two of the listed bird species are unlikely to occur in coastal ports where safety inspections and activities occur. While little is known about the marine distribution of short tailed albatrosses, they are primarily an offshore species and it is unlikely that their nearshore distribution overlaps with the area of activities. Albatross nesting habitat is not located in or near these coastal ports. Similarly, spectacled eiders spend the majority of their lives in marine waters

or nesting in coastal lands near small lakes, pools, bogs and streams. Their preferred habitats include open seas (generally water depths of less than 80 meters), polynyas (areas of open water at predictable, recurrent locations in sea ice covered regions), or open leads (more ephemeral breaks in the sea ice, often along coastlines) (Petersen et al. 2000). They are not commonly found in coastal port areas, and their nesting habitat is not located in or near these coastal ports.

The Steller's eider and yellow-billed loon spend the majority of their lives in marine waters or nesting in coastal lands. Steller's eiders' preferred marine habitats are near shore, low-lying rocky coasts, bays, and river mouths generally with water depths of less than 10 meters (del Hoyo et al. 1992, Madge and Burn 1988, IUCN 2013, USFWS 2001a), while yellow-billed loons prefer fjords with muddy substrates, inlets, sheltered coastal waters while generally avoiding ice covered waters (Byrkjedal et al. 2000, Snow and Perrins 1998, del Hoyo et al. 1992 IUCN 2013). Yellow-billed loons' nesting habitats are typically located inland within 3 ft of a freshwater lake on an island, hummock, peninsula or low-lying shoreline. The marine distributions of these species are likely to overlap with the location of some inspections and safety activities, and these activities may therefore impact the Steller's eider and yellow-billed loon in their marine habitats. The most likely impact would be one or more birds temporarily alerting, diving or flying in response to an approaching small boat in transit to or near the vessel location. But, due to the short duration, and low frequency of the maintenance activities these impacts would be considered minor and discountable. Nesting habitat would not be located in or near these coastal ports.

Conclusions:

- Inspections and Safety Ashore activities therefore may affect, but are not likely to adversely affect Pacific walrus and polar bears.
- Inspections and Safety Ashore activities would have no effect on the short-tailed albatross, spectacled eider, Steller's eider and yellow-billed loon.

4.2.2 Air Operations and Training

Various types of aircraft are used in Coast Guard operations throughout the Action Area, and will include flights at a variety of altitudes by fixed-wing aircraft (HC-130H) and helicopters (MH-60T and MH-65D), and unmanned aerial vehicles (UAVs). Fixed-wing aircraft are used for long-range search, surveillance, and support, and would likely be based outside of the Arctic and deployed as necessary in the Action Area. Helicopters are used for short- and medium-range rescue, recovery, surveillance, and support tasks. UAVs are generally used for short-term surviellence during operations including icebreaking. Flight altitudes and patterns will depend on the activity in which the aircraft is engaged.

Risks to listed species from air operations and training include behavioral disturbance and physical strikes. Both fixed-wing aircraft and helicopters generate noise, which has the potential to disturb animals on land (including birds and some species of marine mammals), and may transmit into the water. ESA-listed species could be exposed to noise in air or near the surface of the water.

During air operations and training, ESA-listed species could be exposed to aircraft presence and noise, which have been shown to cause behavioral disturbances in many species. Responses to

aircraft noise are difficult to distinguish from responses to aircraft presence, particularly for species exposed in air. Aircraft noise may also be detected underwater, but is unlikely to reach levels that may disturb marine mammals, particularly if the aircraft is above 500 ft. Among marine mammals, both cetaceans and pinnipeds have shown responses to aircraft overflights, with responses often varying based on aircraft type, altitude, and flight patterns (Richardson et al. 1995; Patenaude et al. 2002). In general, the strongest reactions are observed in response to low-altitude (≤ 305 m) aircraft and to aircraft involved in circular (rather than linear) flight patterns. Polar bears often run away from aircraft passing at low altitudes (less than 200 m), though they do not appear to abandon dens after approaches by aircraft (Richardson et al. 1995). In some species, including bowhead whales, overflights by helicopters may be more likely to provoke a behavioral response than overflights from fixed-wing aircraft (Patenaude et al. 2002).

Behavioral reactions to aircraft presence and noise may also depend on the behavioral or social context of an individual; this appears to be particularly relevant for bowhead whales (Richardson et al. 1995, Patenaude et al. 2002). Animals resting or transiting through shallow water are more likely to react to overflights than whales engaged in social, mating, or foraging behaviors (Richardson et al. 1995). Female bowhead whales with calves may be more likely to respond than other animals; Patenaude et al. (2002) reported a mother-calf bowhead pair exposed to multiple close (50 – 150 m lateral distance), low altitude (15 – 30 m) overflights. The adult whale dove during every exposure and the calf dove once. This type of behavioral reaction has the potential to cause separations of mothers and calves; however, based on the short duration of expected overflights and observed tolerance of whales to repeated overflights, a permanent separation of mothers and calves due to overflights is considered extremely unlikely.

Among pinnipeds, walrus appear especially sensitive to aircraft overflights, and may respond at a distance of more than 1 kilometer (km). Reactions to overflights have included stampedes resulting in the deaths of calves at haulout sites; between 12 and 38 percent of walrus exposed to a low-altitude pass of a fixed-wing aircraft showed responses, including abandonment of pack ice or diving by animals already in the water (Richardson et al. 1995). If disturbed at haulouts, bearded and ringed seals may dive into the water (Burns and Harbo 1972; Burns and Frost 1979; Alliston 1981). Harbor seals disturbed from haulouts by aircraft sometimes move to a new haulout location (Johnson 1977); there is no such data for Arctic species, but disturbance is likely to be short-term and temporary, and is not likely to increase risk of predation for Arctic pinnipeds.

Effects of air operations and training on avian species could include physical strikes and behavioral disturbances. Bird strikes pose a safety risk to the aircraft and crew and well as wildlife, and are avoided when at all possible. Additionally, the Coast Guard follows BMPs to avoid interactions with birds (Section 2.4.7.2). Behavioral disturbance to the four ESA-listed bird species will depend on the duration, frequency, timing, and the presence of the birds at the location of the flight activities. These activities take place in a variety of locations above the land and marine water. Access to the patrol and flight areas would include helicopters and fixed-wing aircraft and are performed above 500 foot (ft) altitude, weather permitting. These operations have variable duration and frequency that is determined based on each event requirement. These activities are generally scheduled but can occur at all times of the year in response to operation requirements. The four listed bird species spend the majority of their lives in marine waters or nesting in coastal lands. Due to the wide geographic range covered by air operations and training exercises and the presence of listed birds in the marine and land habitats within the Action Area,

it is likely that their distribution does overlap with the location of some air operations and training activities. The most likely potential impact of air operations and training would be one or more birds temporarily alerting, diving or flying in response to an approaching aircraft.

Coast Guard aircraft follow the BMPs discussed in Section 2.4.7.2, except as needed for SAR and law enforcement missions. These include altitude restrictions for aircraft to avoid significant impacts on listed species. In particular, restrictions include minimum altitudes (1,500 ft; 457 meters [m]) in the vicinity of polar bears, minimum 2,000 ft (610 m) for fixed wing aircraft and 3,000 ft (914 m) for helicopters in the vicinity of walrus, and minimum 500 ft. (153 m) when flying over molting spectacled eider flocks. When aircraft are operated at altitudes below these minimums because of weather conditions, the operator must avoid areas of known walrus and polar bear concentrations and will take precautions to avoid flying directly over or within 0.5 mile (mi) (805 m) to one mile (1610 m) of these areas. District 17 aviation personnel also comply with the 3000-ft altitude restriction over Steller sea lion rookeries unless lower altitudes are needed for law enforcement or SAR operations. To the extent possible, Coast Guard aircraft avoid approaching pinniped rookeries and haulouts at altitudes below 2,000 ft (USCG Air Operations Manual. COMDTINST M3710.1d). A closer approach may be required during emergencies, SAR, LE or other non-emergency missions requiring surveillance and identification of vessels.

Mitigation measures

Coast Guard aircraft follow the following BMPs except as needed for national security, SAR and law enforcement missions:

- Aircraft will, at all times, conduct their activities at the maximum distance possible from concentrations of walruses or polar bears.

- Aircraft will not operate at an altitude lower than 1,500 ft (457 m) within 0.5 mi (805 m) of polar bears observed on ice or land. Helicopters may not hover or circle above such areas or within 0.5 mi of such areas. When weather conditions do not allow a 1,500 ft flying altitude, such as during severe storms or when cloud cover is low, aircraft may be operated below the 1,500 ft altitude stipulated above. However, when aircraft are operated at altitudes below 1,500 ft because of weather conditions, the operator must avoid areas of known polar bear concentrations and will take precautions to avoid flying directly over or within 0.5 mi (805 m) of these areas.

- Fixed-wing aircraft will not operate at an altitude lower than 2,000 ft (610 m) within 0.5 mi (805 m) of walrus observed on ice or land. Helicopters will not operate at an altitude lower than 3,000 ft (914 m) within one mile (1610 m) of walrus observed on ice or land, and may not hover or circle above such areas or within one mile of such areas. When weather conditions do not allow these minimum flying altitudes, such as during severe storms or when cloud cover is low, aircraft may be operated below the 2,000 ft (610 m) altitude stipulated above. However, when aircraft are operated at altitudes below 2,000 ft (610 m) because of weather conditions, the operator must avoid areas of known walrus concentrations and will take precautions to avoid flying directly over or within one mile (1610 m) of these areas.

- Avoid the following known concentration areas for Pacific walruses along the coast to the maximum extent practicable during training and routine flight activities:
    - Cape Lisburne (68° 52’ 53” N, 160° 11' 39” W)
    - Corwin Bluff (68° 52’ 30” N, 165° 06' 02” W)
    - Point Lay (69° 45 '39” N, 163° 03 20” W)
    - Icy Cape (70° 19’ 45” N, 161° 52' 55” W)

- Helicopters will avoid approaching flocks of spectacled eiders and other birds; aircraft will maintain an altitude of at least 500 ft above sea level when flying over molting spectacled eider flocks (late July through October, in the Chukchi Sea in Ledyard Bay).

4.2.2.1 Routine Patrols, Arctic Domain Awareness Flights, and Flight Training

Routine Patrols and Arctic Domain Awareness Flights serve to locate, identify, and document human contacts north of the Arctic Circle, and gather and verify data on coastal erosion, ice observations, and other scientific data requests. These flights may be conducted from either fixed-wing aircraft or helicopters, and are typically performed at altitudes above 500 ft (153 m), weather permitting.

Flight training is required to meet safety and training requirements for flight crews at all FOLs. Aircraft that will be included under this portion of the Proposed Action include MH-60T and MH-65D helicopters, which will be flown when weather permits. During training flights, aircraft will remain above 500 ft (153 m) and only operate below this altitude when required during exercises for SAR operations or other events requiring low altitude operation.

4.2.2.1.1 National Marine Fisheries Service Jurisdictional Species

Impacts to cetaceans and pinnipeds from Routine Patrols, Arctic Domain Awareness Flights, and Flight Training are restricted to those resulting from aircraft presence and noise. Because these flights occur at altitudes over 500 ft (153 m), the possibility of eliciting behavioral reactions is reduced (Richardson et al. 1995; Patenaude et al. 2002) and sound levels received by animals will be reduced relative to low-altitude overflights. Behavioral reactions can include changes to direction, swim speed, or diving behavior; these reactions typically abate in minutes to hours after the disturbance (Nowacek et al. 2007). Based on the low probability of repeated overflights, these behavioral reactions are expected to be discountable.

To the extent possible, Coast Guard aircraft avoid approaching pinniped rookeries and haulouts at altitudes below 2,000 ft (USCG Air Operations Manual. COMDTINST M3710.1d). Additionally, flight patterns for these operations generally will not involve circling and repeated passes over a single target, reducing the possibility that animals will respond to the aircraft’s flight pattern. Given the large area over which air operations and training will occur and the high mobility of most marine mammals in the area, it is unlikely that any individual will receive more than overflight that could induce a behavioral reaction. Due to the short duration and high altitude of overflights, any behavioral reactions induced are likely to be short-term, temporary, and discountable.

Conclusions:

- Aircraft presence and noise during Routine Patrols, Arctic Domain Awareness Flights, and Flight Training may affect, but are not likely to adversely affect bowhead, fin, humpback, and North Pacific right whales, bearded seals, ringed seals, and Steller sea lions.

4.2.2.1.2 United States Fish and Wildlife Service Jurisdictional Species

Marine Mammals

Impacts to polar bears and Pacific walrus from Routine Patrols, Arctic Domain Awareness Flights, and Flight Training are restricted to the potential effects of aircraft overflight and noise. Because these flights occur at altitudes over 500 ft (153 m), the possibility of eliciting behavioral reactions is reduced (Richardson et al. 1995; Patenaude et al. 2002) and sound levels received by animals in the water or hauled out will be lower. Flight patterns for these operations generally will not involve circling and repeated passes over a single target, reducing the possibility that animals will respond to the aircraft's flight pattern. Coast Guard aircraft will also follow the BMPs outlined above for approaches to polar bears and walrus during aircraft operations, minimizing the potential for impact from aircraft overflights.

Birds

The level of impact to the four ESA-listed bird species will depend on the duration, frequency, timing, and the presence of the birds at the location of the routine patrols, Arctic Domain awareness flights, and flight training. These activities take place in a variety of locations above the land and marine water. Access to the patrol and flight areas would include helicopters and fixed-wing aircraft and are performed above 500 ft altitude, weather permitting. These operations have variable duration and frequency that is determined based on each event requirement. Routine patrols, Arctic Domain awareness flights, and flight training may include large areas of land or the marine environment. These activities are generally scheduled but can occur at all times of the year in response to operation requirements.

The four listed bird species spend the majority of their lives in marine waters or nesting in coastal lands. Due to the wide geographic range covered by routine patrols, Arctic Domain Awareness flights, and flight training and the presence of listed birds in the marine and land habitats within the Action Area, it is likely that their distribution does overlap with the location of some air operations and training activities. The most likely potential impact of air operations and training would be one or more birds temporarily alerting, diving or flying in response to an approaching aircraft. Due to the short duration and high altitude of most overflights and the general low frequency of routine patrols, Arctic Domain Awareness flights, and flight training exercises, these impacts are unlikely to occur, and would be considered minor and discountable. Additionally, the listed species' habit of flying low near the water surface, and the low density of the population of short-tailed albatross would decrease the probability of an impact with SAR flight operations to minor and discountable.

Conclusions:

- Routine Patrols and Arctic Domain Awareness Flights may affect, but are not likely to adversely affect polar bears and Pacific walrus.

- Routine Patrols, Arctic Domain Awareness Flights, and flight training may affect, but are not likely to adversely affect short-tailed albatross, spectacled eiders, Steller's eiders, and yellow-billed loons.

4.2.2.2 Search and Rescue

SAR missions have the goal of preventing the loss of life and property. Aircraft are often sent to find vessels or persons in distress and report their location before Coast Guard surface support vessels arrive. Air searches for persons in the water must be performed at an altitude below 500 ft (153 m) to be effective. When a target is located, aircraft may deploy expendable markers and rescue equipment, including flares, dye packs, buoys, or life rafts. Rescue missions may also include recovering persons from the water via helicopter. Deployment and recovery of equipment and persons require the helicopter to hover below 500 ft (153 m). Most SAR missions occur within 50 mi of shore.

During SAR missions, Coast Guard aircraft are likely to fly in a linear path to the approximate area of the vessel in distress, descend to an effective search altitude (≤ 500ft; 153 m), and begin a search grid or circle over the contact. During transit to the search area, high altitude and linear flight paths will minimize disturbance to marine mammals. Once a search begins and/or a contact is located, low altitude flight and circling may increase the potential for behavioral reactions in nearby marine mammals. However, SAR missions are focused on human contacts and vessels, and will not involve hovering over or circling around marine species unless they are immediately adjacent to the human contact in the water, minimizing the risk of behavioral disturbance from SAR flights.

Training flights for SAR operations will not target marine mammals during low altitude search patterns and will not occur near known areas of ESA-listed species concentrations, reducing the possibility of eliciting behavioral reactions (Richardson et al. 1995; Patenaude et al. 2002).

Expended materials associated with SAR missions include flares, dye packs, self-locating buoys, and life rafts. All have expendable pieces intended to sink to the bottom; only self-locating buoys and life rafts are designed to float indefinitely. Brief discussions of these materials follow:

- **Parachutes:** Aircraft-launched flares and buoys deploy nylon parachutes of varying sizes. At water impact, the parachute assembly is expended and sinks, as all of the material is negatively buoyant. Some components are metallic and will sink rapidly. The expended material will accumulate on the ocean floor and will be covered by sediments over time, remaining on the ocean floor and reducing the potential for entanglement. If bottom currents are present, the canopy may billow (bulge) and pose an entanglement threat to marine animals with bottom-feeding habits; however, the probability of a marine mammal encountering a submerged parachute assembly and the potential for accidental entanglement in the canopy or suspension lines is considered to be unlikely.

- **Marine Markers:** Marine markers produce chemical flames and regions of surface smoke and are used to mark surface positions of points of contact. When the cartridge breaks, an area of smoke is released. The smoke dissipates in the air having little effect on the marine environment. The marker burns similar to a flare, producing a flame until all burn components have been used. While the light generated from the marker is bright enough to be seen up to 3 mi (5 km) away in ideal conditions, the resulting light would

either be reflected off the water's surface or would enter the water and attenuate in brightness over depth. The point source of the light would be focused and be less intense than if an animal were to look to the surface and encounter the direct path of the sun. The marker itself is not designed to be recovered and would eventually sink to the bottom and become encrusted and/or incorporated into the sediments.

- **Self-locating buoys:** Expendable self-locating buoys may be released either singularly or in groups during a SAR operation and are used to measure surface ocean currents. The buoys are approximately 55 inches in height by 43 inches in cross section width when deployed. They primarily consist of four nylon orthogonal drag vanes (drogues; 20 x 26 inches) supported at the top and bottom by PVC arms which extend from a cylindrical aluminum hull containing the electronic equipment (Figure 11). Small floats are attached to the end of each upper arm in order to maintain buoyancy. When deployed from aircraft, the buoy is encased in a plastic tube and attached to a parachute. Upon reaching the ocean surface, the outer casing and parachute break away from the buoy, and the spring-loaded antenna deploys.

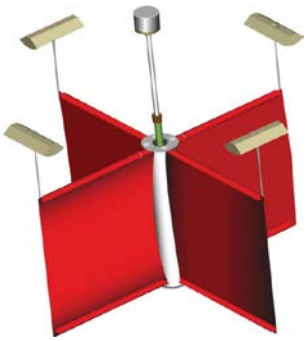

Figure 4-1: Typical design for an expendable self-locating buoy.

  The ultimate fate of self-locating buoys is unknown once they cease broadcasting a signal as they are designed to float at the ocean surface and may potentially do so for an indefinite period of time. In the arctic environment, buoys may eventually be entrained in ice or leave the area entirely carried along with the ocean current systems. The buoys would have no impact on the water through which they traveled. Should the floats become unattached from the main unit, it is conceivable that the unit would sink through the water and settle on the seafloor.

  The parachute and plastic casing used to protect the buoy during air deployments would be expended upon entry into the water. The casing would sink rapidly through the water column and come to rest on the bottom. The parachute may or may not remain attached to the casing. If it does, it would settle on the seafloor along with the casing. If not, it would travel with the currents before gradually sinking to the seafloor.

Expended materials deployed during SAR missions include casings and parachutes for buoys, flares, and rafts, which are intended to quickly sink to the bottom. These materials may present entanglement and ingestion hazards to listed species while in the water column. However, entanglement and the eventual drowning of an animal in a parachute assembly would be unlikely, since such an event would require the parachute to land directly on an animal, or the animal would have to swim into it before it sinks. Expended parachutes and marine markers are a potential ingestion hazard while they are floating or after they sink to the bottom. However, the probability of ingestion is extremely low based on the low number expended per year versus the large operational area of the Action Area.

Flares and chemical markers could pose a hazard to marine species if they are exposed to flames or toxic chemicals, but it is unlikely that individuals would be exposed because these components are consumed in their entirety during the burning process. Animals are unlikely to approach close enough to the flame to be exposed to any chemical components.

4.2.2.2.1 National Marine Fisheries Service Jurisdictional Species

During SAR air operations, 7 ESA-listed species under NMFS jurisdiction (4 cetaceans and 3 pinnipeds) could be exposed aircraft presence and noise from low-altitude flights, and expended materials from rescue equipment. Both cetaceans and pinnipeds have shown responses to aircraft overflights, with responses often varying based on aircraft type, altitude, and flight patterns (Richardson et al. 1995; Patenaude et al. 2002). In general, the strongest reactions are observed in response to low-altitude (≤ 305m) aircraft and to aircraft involved in circular (rather than linear) flight patterns. SAR missions may occur near pinniped haulout sites (e.g. if a vessel has run aground near a haulout). If disturbed at haulouts, bearded and ringed seals may dive into the water (Burns and Harbo 1972; Burns and Frost 1979; Alliston 1981). Harbor seals disturbed from haulouts by aircraft sometimes move to a new haulout location (Johnson 1977); there is no such data for Arctic species, but disturbance is likely to be short-term and temporary, and is not likely to increase risk of predation for Arctic pinnipeds. The potential for animals at any given haulout to receive even one exposure to a low-flying aircraft is exceedingly low due to the large range covered by the Action Area and low density of vessel traffic.

Responses to aircraft noise are difficult to distinguish from responses to aircraft presence, particularly for species exposed in air. Aircraft noise may also be detected underwater, but is unlikely to reach levels that may disturb marine mammals, particularly if the aircraft is above 500 ft. Exposure to fixed-wing aircraft noise would be brief as an aircraft passes overhead. Exposures would be infrequent based on the transitory and dispersed nature of the overflights; repeated exposure to individual animals over a short period of time (hours or days) is unlikely. Behavioral reactions can include changes to direction, swim speed, or diving behavior; these reactions typically abate in minutes to hours after the disturbance (Nowacek et al. 2007). Based on the low probability of repeated overflights, these behavioral reactions are expected to be discountable.

Fixed-wing and helicopter overflights can occur throughout the Action Area, but will generally be far from known haul out areas and established rookeries of Steller sea lions, minimizing potential impacts on this species. District 17 aviation personnel also comply with the 3000-ft altitude restriction over Steller sea lion rookeries unless lower altitudes are needed for SAR operations. Aircraft overflights are not expected to result in chronic stress for any listed species because it is extremely unlikely that individual animals would be repeatedly exposed to low altitude overflights.

Expended materials deployed during SAR missions include casings and parachutes for buoys, flares and chemical markers, and rafts. Entanglement and the eventual drowning of a marine mammal in a parachute assembly would be unlikely, since such an event would require the parachute to land directly on an animal, or the animal would have to swim into it before it sinks. The probability of ingestion is extremely low based on the low number of materials expended per year versus the large operational area of the Action Area.

Conclusions:

- SAR missions may affect, but are not likely to adversely affect bowhead, fin, humpback, and North Pacific right whales, bearded seals, ringed seals, and Steller sea lions.

4.2.2.2.2 United States Fish and Wildlife Service Jurisdictional Species

Protected species under the jurisdiction of the USFWS include marine mammals (polar bears and Pacific walrus) and birds. Effects of SAR air operations on these two groups will be analyzed separately.

Marine Mammals

The effects of aircraft overflights on polar bears and walrus are not well known, but there is some evidence that these species respond similarly to other species of marine mammals. Polar bears often run away from aircraft passing at low altitudes (less than 200 m), though they do not appear to abandon dens after approaches by aircraft (Richardson et al. 1995).

Walrus appear especially sensitive to aircraft overflights, and may respond at a distance of more than 1 km. Reactions to overflights have included stampedes resulting in the deaths of calves at haulout sites; Between 12 and 38 percent of walrus exposed to a low-altitude pass of a fixed-wing aircraft showed responses, including abandonment of pack ice or diving by animals already in the water (Richardson et al. 1995).

SAR missions are focused on human contacts and vessels, and will not involve hovering over or circling around marine mammals unless they are immediately adjacent to the human contact. In the unlikely event that a polar bear or walrus is close to the human contact, the animal would be expected to avoid the aircraft and potentially leave the area. Any disturbance is likely to be short-term and temporary. The potential for any single polar bear or walrus to receive even one exposure to a low-flying SAR aircraft is exceedingly low due to the large range covered by the Action Area and low density of air traffic.

Additionally, Coast Guard aircraft follow the following BMPs near polar bears and walrus, except as needed for national security, SAR, and law enforcement missions:

- Aircraft will, at all times, conduct their activities at the maximum distance possible from concentrations of walruses or polar bears.
- Aircraft will not operate at an altitude lower than 1,500 ft (457 m) within 0.5 mi (805 m) of walruses or polar bears observed on ice or land. Helicopters may not hover or circle above such areas or within 0.5 mi of such areas. When weather conditions do not allow a 1,500 ft flying altitude, such as during severe storms or when cloud cover is low, aircraft may be operated below the 1,500 ft altitude stipulated above. However, when aircraft are operated at altitudes below 1,500 ft because of weather conditions, the operator must avoid areas of known walrus and polar bear concentrations and will take precautions to avoid flying directly over or within 0.5 mi (805 m) of these areas.

Expended materials deployed during SAR missions include casings and parachutes for buoys, flares and chemical markers, and rafts. Entanglement and the eventual drowning of a marine mammal in a parachute assembly would be unlikely, since such an event would require the parachute to land directly on an animal, or the animal would have to swim into it before it sinks. The probability of ingestion is extremely low based on the low number of materials expended per year versus the large operational area of the Action Area.

Birds

The level of impact to the four ESA-listed bird species will depend on the duration, frequency, timing, and the presence of the birds at the location of the SAR air operations. These activities

take place in a variety of locations on land and in the water as required by each emergency situation. Access to the areas to be searched would include flights by helicopters and fixed-wing aircraft, and will include low-altitude flights and hovering. SAR air operations are unscheduled activities which can occur at all times of the year in response to emergency events.

The four listed bird species spend the majority of their lives in marine waters or nesting in coastal lands. Due to the variable nature of SAR air operations and the presence of listed birds in the marine and land habitats within the Action Area, it is likely that their distribution does overlap with the location of some SAR air operations. Therefore, it is likely that some SAR air operations may impact listed species in their marine and nesting habitats. Impacts to ESA-listed bird species from high altitude overflights (as aircraft transit to search area) will be similar to those described for general air operations (Section 4.2.2). Low-altitude flights and hovering associated with SAR operations and training involve additional risk of physical strikes, which may cause injury or mortality, and behavioral disturbances. Physical strikes pose a safety risk to the aircraft and crew and well as wildlife, and are avoided when at all possible. Additionally, the Coast Guard follows BMPs to avoid interactions with birds (Section 2.4.7.2). Coast Guard aircraft involved in SAR operations and training do not target or circle over marine species, reducing the likelihood of behavioral reactions to low-altitude aircraft. The most likely impact would be one or more birds temporarily alerting, diving or flying in response to an approaching aircraft. Due to the short duration of most overflights and the general low frequency of the SAR operations and training exercises, these impacts would be considered minor and discountable. Additionally, the listed species' habit of flying low near the water surface would decrease the probability of an impact with SAR flight operations to minor and discountable.

Conclusions:

- SAR missions may affect, but are not likely to adversely affect polar bears and Pacific walrus.
- SAR missions may affect, but are not likely to adversely affect short-tailed albatross, spectacled eiders, Steller's eiders, and yellow-billed loons.

4.2.3 Sea Operations and Training

Sea operations in the Action Area include SAR missions (in conjunction with air support), icebreaking, establishment and enforcement of safety zones, routine patrols, and establishment of berthing and facilities for operations and support personnel. Training activities include small boat operations, rescue exercises, and oil spill recovery exercises. All Coast Guard vessels are equipped with standard navigational technologies, including radar and navigational sonars. These devices allow ships to operate safely in the complex arctic environment, and will be used by all relevant platforms during standard operations, training, and other missions. Additionally, unmanned underwater vehicles (UUVs) used in emergency response and training operations may be equipped with sonar equipment to aid in obstacle detection.

Sea Operations and Training activities include movement and operation of vessels and associated support craft in the Action Area. Effects of aircraft were addressed previously in Section 4.2.2. Section 4.2.3 will address potential effects of vessel movements, noise, and hydroacoustic sensor equipment (sonars). Vessel movements include risks of disturbance by noise and vessel presence and physical strikes. Characteristics of active acoustic sources associated with Sea Operations and Training Activities are given in Table 4-1. It is important to note that source levels indicated

are taken within 1 m of the source. Received sound levels (the level of sound an animal perceives) are generally further from the source, and subject to transmission loss based on propagation modeling and environmental conditions.

Table 4-1: Active Acoustic Sources associated with Sea Operations and Training

Source type	Frequency range [kHz]	Source level [dB re 1μPa @ 1m]	Associated Action
Small vessel	1 – 7	175	Small boat training, routine patrols
Large vessel	0.02 – 0.30	190	All sea operations and training
Icebreaking	0.01 – 0.1	205	Icebreaking activities
Echosounder (single-beam)	3.5 -1,000	205	All sea operations and training, research and development
Echosounder (multi-beam)	180 – 500	242	Icebreaking activities, Oil Recovery Exercises, research and development
Side-scan sonar	100 – 1,600	249	Icebreaking activities, Oil Recovery Exercises, research and development

kHz: kiloHertz;

References: Richardson et al. 1995; NMFS 2012; U.S. Coast Guard 2013b; Roth et al. 2013.

The probability of vessel and protected species interactions occurring in the Action Area is dependent upon several factors including numbers, types, and speeds of vessels; the regularity, duration, and spatial extent of activities; the presence/absence and density of protected species; and protective measures implemented by the Coast Guard. The Action Area encompasses the waters of the Beaufort, Chukchi and Bering Seas within the United States (U.S.) EEZ north of latitude 62.5˚N. Consequently, the density of Coast Guard vessels within the Action Area at any given time is extremely low, reducing the potential for physical interactions with protected species. The different operations conducted by the Coast Guard necessitate the use of several different types of vessels, including cutters, icebreakers, and small boats. Speeds and movements will depend on operational requirements as outlined below.

Vessel Presence and Noise

Marine animals react to vessels in a variety of ways and seem to be generally influenced by the activity the marine mammal is engaged in when a vessel approaches (Richardson et al. 1995). Some respond negatively by retreating or engaging in antagonistic responses while other animals ignore the stimulus altogether (Watkins 1986, Terhune and Verboom 1999). The ESA-listed marine mammal species that occur in the Action Area are not generally documented to approach vessels in their vicinity. The predominant reaction is neutral or avoidance behavior, rather than attraction behavior.

Functional hearing ranges for marine mammals indicate which frequencies are likely to be detectable by different groups. Vessel noise is typically low frequency (see Table 4-1), and likely to be detectable by all listed species of marine mammals in the Action Area (Table 4-2).

Table 4-2: Functional hearing ranges for marine mammals

Functional Hearing Group	Functional hearing range	Listed species present in Action Area
Low Frequency Cetaceans	7 Hz to 22 kHz	Bowhead whale; fin whale; humpback whale; North Pacific right whale
Mid Frequency Cetaceans	150 Hz to 160 kHz	None
High Frequency Cetaceans	200 Hz to 180 kHz	None
Phocid Pinnipeds (in water)	75 Hz to 100 kHz	Bearded seal; ringed seal
Otariids and Odobenids (in water)	100 Hz – 50 kHz	Steller sea lion; Pacific walrus
Ursids (in water)	100 Hz – 50 kHz	Polar bear

Hz: Hertz; kHz: kiloHertz
References: Southall et al. 2007, Finneran and Jenkins 2012, NOAA 2013.

Marine mammal responses to vessel presence and vessel noise are relatively well studied, but can be difficult to distinguish from one another, particularly during field studies. Behavioral responses appear to depend on behavioral context in some species, and on the characteristics of the vessel's movement in some situations (Richardson et al. 1995). Specific to the species likely to be encountered in the Action Area, fin whales and humpback whales have been observed altering their swimming patterns by increasing speed, changing their heading, and changing their breathing patterns in response to an approaching vessel (Baker et al. 1983; Jahoda et al. 2003). Observations have shown that when vessels remain 328 ft (100 m) or farther from fin and humpback whales, they were largely ignored (Watkins et al. 1981). Only when vessels approached more closely did the fin whales in the study alter their behavior by increasing time at the surface and engaging in evasive maneuvers. The humpback whales did not exhibit any avoidance behavior (Watkins et al. 1981).

Bowhead whales exhibit strong avoidance reactions to ships, sometimes beginning to swim away from vessels approaching at distances of up to 4 km (Richardson et al. 1995). They also avoid vessels with outboard motors, which are used during the fall subsistence hunts of the northern coast of Alaska. Disturbance reactions in this species appear short-term and temporary, as disturbed whales return to the areas they left within hours or days (Richardson et al. 1995).

There are few data on the reactions of North Pacific right whales to ships, but North Atlantic right whales appear to have habituated to vessel noise, exhibiting no response to playbacks of vessel noise (Nowacek et al. 2004). Some studies indicate that right whales in the North Atlantic also avoid approaching ships and rapidly moving vessels (Richardson et al. 1995). Additionally, North Atlantic right whales exhibit a physiological stress response during exposure to ship noise (Rolland et al. 2012), and it is likely that this response also occurs in other species exposed to increased anthropogenic noise or activities.

Based on existing studies, it is likely that protected whale species found in the Action Area would have relatively minor behavioral reactions to vessels that maintain a reasonable distance. The distance that will provoke a response varies based on many factors including, but not limited to, vessel size, geographic location, and individual animal tolerance levels (Watkins et al. 1981,

Baker et al. 1983, Jahoda et al. 2003). Should the vessels approach close enough to invoke a reaction, animals may engage in avoidance behaviors and/or alter their breathing patterns. Reactions exhibited by the whales would be temporary in nature. They would be expected to return to their pre-disturbance activities once the vessel has left the area.

There are few available studies of the reactions of ice seals, walrus, and polar bears to vessel activity. Those studies that do exist indicate that animals hauled out on ice, reactions depend on distance to the approaching vessel, and that animals in the water are less likely to respond than those on ice or land. There is some evidence that walrus calves may be more vulnerable to predation during periods of herd disturbance (Richardson et al. 1995). Other pinnipeds appear relatively tolerant of vessel passages (Richardson et al. 1995).

Polar bears do not appear to respond to vessel passages in any consistent manner. Bears have been observed not reacting, moving away, and approaching (swimming or walking toward) vessels (Richardson et al. 1995).

Vessel Strikes

The primary hazard of Coast Guard vessel operations is collisions of vessels with wildlife. Vessel activity (including Coast Guard vessels) is not heavy anywhere in the Action Area; the highest use area is the Bering Sea, which supports active commercial fisheries and is becoming a likely passage to the Northern Shipping Route. The relatively low vessel traffic density means that the risk of a collision with marine wildlife is low. Routine Coast Guard vessel operations do not create a collision risk greater than that of operations of most other types of vessels. High-speed operation increases the risk of a collision.

Collisions with vessels can result in death of the animal(s) involved. George et al. (1994) reported that less than 1 percent of the bowhead whales harvested by Alaskan Eskimos in the Bering, Chukchi, and Beaufort Seas had evidence of collision scars. This compares to a ship strike incidence of 20 percent among right whales in the northwestern Atlantic Ocean off the U.S. and Canada (Kraus 1990). Several vessel collisions involving humpback whales have been reported in the western North Atlantic off New England and eastern Canada, probably because parts of their high-use habitat in this area overlap with major shipping routes into major northeastern U.S. and Canadian ports. Vessel collisions with juvenile gray whales have been reported off southern California (Sumich and Harvey 1986). Fin and minke whales are fast swimmers and there are few reports of vessel collisions involving these species. Overall, the frequency of vessel strikes involving whales is related to the numbers of whales and vessels operating in the same areas. The relatively small numbers of large, fast motor vessels, including Coast Guard cutters (CGCs) and patrol boats, in the Action Area precludes a high frequency of vessel strikes involving whales.

Coast Guard vessels have previously struck whales in Alaskan waters. In a summary of reported whale-vessel collisions in Alaskan waters between 1978 and 2006 published by NMFS, Glacier Bay National Park, and University of Alaska; Coast Guard vessels were involved in 3 of the 62 reported whale strikes.

In summary, bowhead, fin, humpback and North Pacific right whales are likely to be present in the Action Area, but the low density of vessel traffic and sparse available data on whale-vessel collisions indicates that collisions are unlikely overall. The risk of collision is further reduced by

Coast Guard BMPs, protocols for maintaining a lookout at all times, and maneuvering to avoid whales when possible.

The four listed bird species spend the majority of their lives in marine waters or nesting in coastal lands. The spectacled eider's preferred habitats include open seas (generally water depths of less than 80 m), polynyas (areas of open water at predictable, recurrent locations in sea ice covered regions), or open leads (more ephemeral breaks in the sea ice, often along coastlines) (Petersen et al. 2000). Steller's eiders prefer near shore, low-lying rocky coasts, bays, and river mouths generally with water depths of less than 10 m (del Hoyo et al. 1992, Madge and Burn 1988). The yellow-billed loon's preferred habitats include fjords with muddy substrates, inlets, sheltered coastal waters while generally avoiding ice covered waters (Byrkjedal, et al. 2000, Snow and Perrins 1998, del Hoyo et al. 1992).

Seabirds on the surface of the ocean may be at risk for vessel strikes, particularly during seasonal periods of molting when large numbers of some species (e.g. spectacled eiders) gather in "rafts" in marine habitats. When molting, birds are unable to fly, reducing their available avenues of escaping an approaching vessel or other disturbance. Disturbed eiders would be most likely to avoid disturbances by diving or running along the surface of the water. In order to avoid unnecessary disturbance to ESA-listed seabirds, Coast Guard vessels that encounter flocks of spectacled eiders along their path will maintain a steady speed (typically 3 to 9 kots) and divert around these flocks.

Routine vessel activities (whether in motion or stationary, regardless of location) pose a potential collision risk to the four ESA-listed bird species while in flight. While certain conditions (i.e. nighttime operations or poor visibility events) may exacerbate the risk, collisions may occur at all times of the day and in any weather conditions. Because lights may act as an attractant to birds, vessel lighting will be limited when possible. Appendix A contains bird handling and reporting protocol for strike incidents.

Hydroacoustic Sensor Equipment (Sonars)

All Coast Guard vessels are equipped with standard navigational technologies, including navigational sonars. These technologies allow ships to operate safely in the complex arctic environment, and will be used by all relevant platforms during standard operations, training, and other missions. Additionally, UUVs used in emergency response and training operations may be equipped with sonar equipment to aid in obstacle detection.

Sonars operate at a range of frequencies and source levels, depending on function and specific needs of the operating vessel. Coast Guard (2013b) performed an environmental analysis of high and ultra-high frequency sonars used in U.S. waters outside of the Arctic. Table 4-3 presents a summary of the types of systems evaluated, which may also be used in the Action Area. This evaluation also includes sonars that operate at frequencies below 50 kiloHertz (kHz), which include systems used for ship navigation (Table 4-3, row 1) and scientific research (Table 4-3, row 4) during Icebreaking missions. Frequencies above 200 kHz are not likely to be audible to any endangered species in the Action Area, and so are not addressed here.

Table 4-3: Example Sonar Types (20 – 200 kHz) Potentially Used in the Action Area

Source Type	Frequencies [kHz]	Maximum source level [dB re 1μPa rms @ 1m]	Example systems
Single beam echosounders (Fishfinder, Depth Sounder)	24, 50, 116, 200	227	Syqwest BATHY 1500c, Simrad 50/200 kHz Combi Transducer; Simrad SH80 sonar
Target detection (deployed on UUVs)	60	228	FarSounder (FS3 and FS3DT)
Multibeam Echosounders (used during oil recovery exercises)	90	206	Simrad SM2000
CGC HEALY Science Systems (single- and multi-beam echosounders)	3.5, 12, 75, 150	235	Ocean Surveyor 75 & 150; Kongsberg EM 122; Knudsen 320 B/R

CGC: Coast Guard Cutter; kHz: kiloHertz; UUV: unmanned underwater vehicles
Adapted from Coast Guard 2013b, Table 2-1; also includes information from icefloe.net. Source levels represent maximum for each category of sound sources, not expected operational levels.
CGC Healy science systems are employed by on-board scientists as needed for research missions.

The sonar equipment that would be operated under the Proposed Action is commercially and readily available "off-the-shelf" equipment equivalent to many commercially available, high-frequency fish finders. Shared characteristics of the proposed sonars and such fish finders include low power with short pulse-width (length of the sound pulse) typically designed to focus in a single direction (fish finders are typically focused downward).

With the exception of navigational sonars (12 and 200 kHz single beam echosounders), all sonar use will be of relatively short-term duration and, regardless of the category, only used for the amount of time necessary to complete the mission objectives. Navigational sonars will be used whenever vessels are operating. In no case is the Coast Guard proposing to employ sonar in fixed positions for long-term, continuous operations. In general, the duration of sonar use would be from minutes to as long as several days. During emergency response for environmental disasters, however, sonar equipment might need to be used on site until the emergency has ended. In the case of longer term use of sonar for an emergency or disaster, the Coast Guard will engage in emergency consultation with the Services as appropriate, and as provided for under 50 Code of Federal Regulations (CFR) §402.05.

Effects of sonars on marine species depend on the ability of species to detect the sounds, which is a function of hearing ability and time spent in the area where sound is being produced. For species which spend minimal amounts of time submerged (i.e. birds), or species whose hearing does not overlap with the frequency range of the sonar of interest, there will be no impact of the sonar. The protected marine mammal species listed include members of the low-frequency cetacean and both pinniped functional hearing groups (Table 4-2). Low-frequency cetaceans may be able to detect the navigational sonars used by all ships (12 kHz) and the lower-frequency systems (3.5 and 12 kHz) installed on the CGC HEALY, while phocid pinnipeds may detect sonars up to 100 kHz. There is some evidence that higher-frequency sonar systems (nominally 200 and 375 kHz frequencies) may also have components that are audible to phocid pinnipeds (Hastie et al. 2014).

NMFS has issued criteria and thesholds for injury[2] and behavorial disturbance to marine mammals by active acoustic (impulsive) sources. Exposure thresholds for physical injury (cetaceans: 180 dB re 1 µPa; pinnipeds: 190 dB re 1 µPa) and behavioral disturbance (160 dB re 1 µPa) currently do not account for hearing ability of the functional hearing groups, but provide a rough guideline for determining range to effects from sonars. U.S. Coast Guard (2013b) performed modeling of high frequency (50 – 200 kHz) sources under a range of environmental conditions, assuming spherical spreading and frequency-specific attenuation values. The full equation used to calculate ranges to effects is:

$$RL = SL - 20\log_{10} R - \alpha R - 60$$

where RL represents received level, SL represents source level, R represents range in kilometers, and α represents the frequency-specific attenuation value calculated using the equation given in Figure 7 in Francois and Garrison (1982). A conversion factor of -60 is applied to account for changing units from meters to kilometers (Richardson et al. 1995; U.S. Coast Guard 2013b). Results relevant to the Arctic environment are presented in Table 4-4, below. In all cases, injury zones are less than 600 m from the source, not accounting for the shape of the acoustic beam. The high directionality of echosounder beam patterns will drastically reduce propagation area. In only one case (12 kHz) does the behavioral disturbance zone exceed 850 m.

Table 4-4: Ranges to Acoustic Thresholds for Sonar Effects

Frequency [kHz]	Source level [dB re 1µPa rms @ 1m]	Distance to 190 dB [m]	Distance to 180 dB [m]	Distance to 160 dB [m]
3.5	211	20	40	360
12	236	200	570	3,370
24	221*	40	110	740
50	221	40	100	550
60	228	80	190	770
70	221	40	100	490
75	221*	40	100	480
90	206	10	20	150
100	234	130	280	810
116	210	10	30	200
150	221*	40	90	360
200	227	60	130	410

Also see: U.S. Coast Guard 2013b, Table E-1. Environmental assumptions are: Salinity = 30 ppt; Temperature = -1.8°C. * 221 is not an actual value, but represents a hypothetical upper limit for sources where measured SL was not available.

[2] On 28 December, 2013, NMFS issued "Draft Guidance for Assessing the Effects of Sound on Marine Mammals" (78 FR 78822), which contains updated criteria for evaluating the potential injurious effects of anthropogenic sounds on marine mammals. The draft guidance provide criteria for evaluating the potential for permanent and temporary threshold shifts (PTS and TTS, respectively), but do not contain updated criteria for assessing the behavioral impacts of sound. The public comment period for the draft guidance ended on 13 March, 2014. When the draft criteria are finalized, the Coast Guard will assess whether it is necessary to re-analyze the effects of active hydroacoustic systems on the species covered in this BE and re-consult as necessary.

Physical injury to marine mammals by impulsive acoustic sources includes damage to structures within the ear as a result of high peak pressures or a permanent shift in hearing sensitivity known as a permanent threshold shift (PTS). The likelihood of PTS occurance depends on the total energy of the sound to which an animal is exposed, calculated as a combination of sound intensity and duration of exposure. Sounds from the sonar equipment under the Proposed Action are very short pulses and the beams associated with most equipment are also generally narrow and focused. For example, the L3-Klein 3000 Dual Frequency sonar has a frequency of approximately 132 kHz and a source level of 234 dB re 1 μPa at 1 m, with a pulse length of 25 to 400 μs; a 5 percent duty cycle (i.e., a pulse is only emitted for 5 percent of the time the sonar is in operation); and the beam is extremely narrow at 0.7 to 1 degree, which means that only a very small area of the water is ensonified. Animals exposed to pulses within the beam would be unlikely to receive more than a few pulses due to movement of the vessel and the animal and the narrowness of the acoustic beam. Given these characteristics and the small size of the potential injury zones (Table 4-4), it is extremely unlikely that any protected marine mammal will receive an injurious exposure to sonar sounds from the analyzed hydroacoustic sensors.

Behavioral responses of marine mammals to sonar are highly variable and have included avoidance, startle responses, and changes to vocal behavior (Richardson et al. 1995; Nowacek et al. 2007). With respect to high frequency, short-duration signals such as those emitted by the sonars under consideration, there has been very little research. Most available data comes from studies of acoustic harassment devices intended to deter marine mammals from interfering with fishing gear (Nowacek et al. 2007). In these cases, responses are limited to odontocetes and pinnipeds, which avoided the acoustic sources.

In 2008, a group of melon-headed whales (*Peponocephala electra*) stranded in Madagascar. An investigation by an independent scientific review panel concluded that the most likely trigger for the stranding event was exposure to sound from a 12 kHz multibeam echosounder (Kongsberg EM 122) used during seismic surveys in the week before the stranding event (Southall et al. 2013). Limited information on the behavioral and social context of the animals before the stranding event complicates the inferences that can be drawn from this event. However, it seems possible that some species, particularly those which are most sensitive to sounds above 10 kHz, may exhibit startle responses including flight after exposure to multibeam echosounder sounds. In rare cases, flight responses may result in strandings and mortalities. Of the listed species covered in this BE, pinnipeds are likely to be sensitive to sounds above 10 kHz. However, if flight responses by these species occur, stranding on land or ice is unlikely to result in mortality.

A recent study by Hastie et al. (2014) indicates that phocid pinnipeds may detect and avoid sound from high-frequency sonars that are nominally above their hearing range. This study was conducted with captive seals in a relatively small enclosure (42m x 6m x 2m deep). Phocid seals in the Action Area (bearded and ringed seals) are unlikely to occur within 42 m of a vessel emitting active sonar sounds. If they detect these sounds at longer ranges (as possible; see Table 4-4), behavioral reactions may include avoidance of the vessel and hauling out on nearby ice floes. Responses are expected to be short-term, temporary, and discountable.

Mitigation measures

The Coast Guard employs mitigation measures and BMPs to avoid disturbing or striking protected species. During vessel operations, there is a lookout on duty at all times; this lookout may be the helmsman or the Officer of the Deck, depending on the size of the vessel and number

of personnel in the crew. Average vessel speed under way is dependent on weather conditions, the nature of the mission, and energy conservation guidelines. Typical cruising speeds of the smaller Coast Guard vessels, up to WMECs, are low enough that the risk of harmful collisions with protected species is low. The WHECs cruise at higher speeds, reducing the response time for both the vessel and the marine mammal.

The Coast Guard employs the following BMPs for managing the potential impacts of vessels on wildlife, except as needed during national security, SAR, and law enforcement missions:

- Crew members will be trained in marine mammal identification and alert the Command of the presence of marine mammals and initiate adaptive mitigation responses including reducing vessel speed, posting additional dedicated lookouts to assist in monitoring whales' location, avoiding sudden changes in speed and direction, or if a swimming whale is spotted, attempting to parallel the course and speed of the moving whale so as to avoid crossing its path, and avoiding approach of sighted whales head-on, or from directly behind (see additional Coast Guard guidance above).

- Reductions in vessel speed will be considered when a whale is sighted or known to have been sighted within 5 nautical miles (nm). Vessels will use navigationally prudent courses to avoid striking the whale and, if necessary, reduce speed to bare steerageway or come to a stop. A dedicated marine mammal lookout after the initial sighting will be recommended.

- To avoid potential impacts to seabirds from vessel lights, the Coast Guard will keep deck lights at the minimum necessary for safety.

- Vessels that encounter flocks of spectacled eiders along their path will maintain a steady speed (typically 3 to 9 knots [kts]) and divert around these flocks to avoid unnecessary disturbance.

Specifically for polar bears and Pacific walrus, the following BMPs are in place:

- Vessels must maintain the maximum distance possible from concentrations of walruses or polar bears. No vessels will approach within a 0.5 mi (805 m) radius of walruses or polar bears observed on land or ice.

- Vessel operators must take every precaution to avoid harassment of concentrations of feeding walruses when a vessel is operating near these animals. Vessels will reduce speed and maintain a minimum 0.5 mi (805 m) operational exclusion zone around feeding walrus groups. Vessels will not be operated in such a way as to separate members of a group of walruses from other members of the group. When weather conditions require, such as when visibility drops, vessels will adjust speed accordingly to avoid the likelihood of injury to walruses.

- All vessels and aircraft will avoid areas of active or anticipated walrus or polar bear hunting activity as determined through community consultations.

- When traveling in icy waters or near barrier islands, vessel crews will not engage in activities that will attract polar bears to the vicinity of the vessel such as cooking meat on deck. Bears can smell the meat (including bacon) and can travel miles to investigate, maybe leaving a high-resource area or carcass.

- Each time a walrus or polar bear is sighted; an interaction form will be filled out and submitted to the USFWS.

During sonar activities (excluding use of navigational sonar), the following mitigation measures will be followed:

- Coast Guard personnel would monitor the appropriately sized marine mammal mitigation zones at all times of deployment. The size of the marine mammal mitigation zone would be determined through sound propagation loss modeling based on empirical data and sonar specifications, which will result in estimates of distance from source that sound will dissipate to levels unlikely to cause harassment. All monitors would have marine mammal monitoring training per Coast Guard standard lookout training, and vessels would be equipped with whale wheels to aid in identification.

- During a short-term emergency, if a marine mammal is observed in or approaching the marine mammal mitigation zone, the operational commander would take prudent measures to avoid impacting the wildlife, such as shutting down the system, moving away from the animal, or slowing down the platform, tactical situation permitting. Prudent measures are based on the operational commander's knowledge and professional assessment of the situation with respect to safety and feasibility as to whether or not to operate the sonar in the presence of a marine mammal.

- If a threatened or endangered species of marine mammal is affected (i.e., "take" as defined by the ESA or Level A or B harassment, as defined by Marine Mammal Protection Act [MMPA]) during longer-term (i.e., more than 2 weeks), emergency operational missions, the Coast Guard would conduct emergency consultation with NMFS or the USFWS, as appropriate, and as provided for under 50 CFR §402.05. During emergency consultation, NMFS or the USFWS can provide recommendations on how to minimize or avoid adverse effects on listed species during the emergency response. Such recommendations are strictly advisory and are to be implemented at the discretion of the emergency response personnel. If, during an emergency situation, an unauthorized take under the MMPA should occur, the Coast Guard would conduct activities that are necessary to protect human lives but consult with NMFS immediately to investigate the circumstances of the unauthorized take and jointly consider the steps that should be taken to avoid similar occurrences in the future.

- For training exercises and research and development missions, if a marine mammal is detected within or approaching the marine mammal mitigation zone, sonar systems would be shut down until the marine mammal has left the area or marine mammal mitigation zone.

- Except for short-term emergency situations during which initial response time is crucial, the marine mammal mitigation zone would be visually monitored for 30 minutes prior to turning on the sonar device to ensure that marine mammals are not present.

- Ramp-up (also known as soft-start) would entail the gradual increase in intensity of a sound source. When the operational situation allows, ramp-up or soft-start procedures would be used prior to operating the sonar. Ramp up will take place over no less than 10 minutes.

- Sonar systems would not be employed in a location that interferes with obvious marine mammal movements, or prevents entry or exit of marine mammals into and out of an area (e.g., the mouth of a bay or narrow chokepoints), where sonar could deter them from traveling through or by. The only exception to this is under rare circumstances that require deployment for emergency purposes. If the emergency is more than 2 weeks, the Coast Guard will engage in emergency consultation as appropriate, and as provided for under 50 CFR §402.05.

4.2.3.1 Routine Sea Patrols, Enforcement of Safety Zones, and Small Boat Training

Routine sea patrols are used to detect, deter, and disrupt maritime terrorist attacks, sabotage, or subversive acts; detect and investigate violations of the MMPA, ESA, and MSA; and reduce the threat of foreign poaching of U.S. fish stocks. Enforcement of safety zones involves Coast Guard vessels operating in the Action Area to ensure safe navigation of all vessels (including commercial and private craft), particularly around oil exploration activities and unusual events (i.e. oil spills, salvage work or other activities). These activities involve only vessel movements, with the associated potential impacts of behavioral disturbance and ship strike as addressed in Section 4.2.3.

Small boat training exercises include boat launching and maneuvers in the vicinity of small boat stations. Exercises include coxswain training, helicopter hoisting training, and vessel boarding and inspections. Small boats could be deployed from shore-based or Coast Guard cutter-based launching stations. Small boat training may include support from Coast Guard aircraft, including helicopters. Helicopter hoisting training would involve low-altitude hovering (less than 100 ft). These exercises are intended to ensure safety and efficiency when boats and crews participate in Coast Guard sea operations, as described in Section 4.2.2.

4.2.3.1.1 National Marine Fisheries Service Jurisdictional Species

Marine mammals, including bowhead, fin, humpback, and North Pacific right whales, bearded seals, ringed seals, and Steller sea lions, may be exposed to vessel passages (including high speed movements) during enforcement of safety zones and routine sea patrols. Based on previous studies, the responses of these species to vessel approaches can include avoidance, changes in breathing patterns, or no visible response. Behavioral reactions are expected to be temporary and short-term, with animals returning to their normal behavior within minutes to hours of the exposure. Risk of physical strikes will be mitigated with use of posted lookouts, established BMPs, and avoidance of marine mammals when feasible.

Small boats produce higher frequency noise and tend to move in less predictable paths than larger ships (Richardson et al. 1995). Both of these factors increase the likelihood of a behavioral response from marine mammals. Bowhead whales, which are hunted from small boats in the Action Area, may be more likely to respond strongly to these vessels than other species. Small boats are more maneuverable, making them less likely to strike a marine mammal, and are less likely to cause serious injury or mortality should a strike occur. Locations and timing of small boat exercises will be planned to avoid known concentrations of marine mammals, and will avoid training near bowhead whales when possible. Crews will exercise the BMPs outlined above to further minimize the risk of physical strikes or behavioral reactions to vessel presence and noise. It is unlikely that any marine mammal will experience more than a short-term behavioral reaction to a small boat or aircraft used during these training exercises.

Operational use of 24 kHz and 200 kHz navigational sonars will occur routinely during vessel movements. The four protected cetacean species are members of the low-frequency cetacean functional hearing group, and are unlikely to perceive these frequencies. Pinnipeds, including bearded seals, ringed seals, and Steller sea lions, may detect 24 kHz sonars and respond behaviorally by avoiding the sound source. Avoidance responses to other noise sources have included hauling out or swimming away (Richardson et al. 1995; Nowacek et al. 2007), and a return to normal behavior within minutes to hours of exposure. Any potential behavioral reactions to navigational sonars would be similar. Injury zones for pinnipeds and cetaceans exposed to 24 kHz sonars extend approximately 40 and 110 m from the sound source, respectively. However given the highly-focused directionality and narrow beamwidth of single-beam echosounder signals (Simmonds and MacLennan 2005), an animal would need to be directly underneath the vessel to receive an injurious exposure. This scenario is very unlikely. Additionally, animals would likely not be exposed to more than a few pings from the sonar before moving out of the beam (due either to vessel movement or animal movement, or a combination), thus avoiding the likelihood of a temporary or permanent threshold shift. The Coast Guard therefore finds the likelihood of injury to pinnipeds to be discountable.

Conclusions:

- Enforcement of Safety Zones and Routine Sea Patrols may affect, but is not likely to adversely affect bowhead, fin, humpback, and North Pacific right whales, bearded seals, ringed seals, and Steller sea lions.

4.2.3.1.2 United States Fish and Wildlife Service Jurisdictional Species

Marine Mammals

Data on the effects of vessel approaches to Pacific walrus and polar bears indicate that behavioral reactions can include avoidance of the vessel source, no reaction, or approach (Richardson et al. 1995). Walrus have been observed abandoning haulouts in response to vessel approach, potentially exposing calves to higher predation risk when separated from their herd (Richardson et al. 1995). During enforcement of safety zones and routine sea patrols, Coast Guard vessels will not approach walrus or polar bears except as necessary for the protection of human life and property; explicit guidance for vessel movements around walrus and polar bears is given in the BMPs presented above. Behavioral reactions from these species are expected to be rare and temporary. Given the large area and low density of vessels in the Action Area, it is highly unlikely that animals will experience more than one high speed vessel approach..

Small boats are often used by subsistence hunters targeting walrus in the Action Area, and may elicit a stronger reaction from this species than approaches by larger vessels (Richardson et al. 1995). Locations and timing of small boat exercises will be planned to avoid known concentrations of Pacific walrus and polar bears, and crews will exercise the BMPs outlined above to further minimize the risk reactions to vessel presence and noise. It is unlikely that any walrus or polar bear will experience more than a short-term behavioral reaction to a small boat or aircraft used during these training exercises.

Pacific walrus and polar bears are unlikely to hear 200 kHz sonar signals, but they may detect 24 kHz sonars and respond behaviorally by avoiding the sound source. Avoidance responses to other noise sources have included hauling out or swimming away (Richardson et al. 1995; Nowacek et al. 2007) and a return to normal behavior within minutes to hours of exposure. Any potential behavioral reactions to navigational sonars would be similar. While there are no formal injury criteria for these species, repeated exposure to high sound levels may induce permanent or temporary threshold shifts in these species (Southall et al. 2007; Finneran and Jenkins, 2012). However given the highly-focused directionality and narrow beamwidth of single-beam echodounder signals (Simmonds and MacLennan 2005), an animal would need to be directly underneath the vessel to receive an injurious exposure. This scenario is very unlikely, particularly for polar bears. Additionally, animals would likely not be exposed to more than a few pings from the sonar before moving out of the beam (due either to vessel movement or animal movement, or a combination), thus avoiding the likelihood of a temporary or permanent threshold shift. The Coast Guard therefore finds the likelihood of injury to these species to be discountable.

Birds

The level of impact to the four ESA-listed bird species will depend on the duration, frequency, timing, and the presence of the birds at the location of the vessel activity. These activities take place in a variety of locations in the marine environment. Access to the patrol areas would include a variety of boat types. Small boat training takes place in coastal waters up to 10 nm (19 km) offshore, and is typically short-term in duration lasting less than 1 day. Duration and frequency of routine patrols, training activities, and safety zone enforcement would be highly variable and occur throughout the year as needed. These operations have variable duration and frequency, and may include large areas of the marine environment.

Due to the variable nature of operational vessel activities and the presence of ESA-listed species within the Action Area, it is likely the distributions of the four listed bird species overlap with the location of some vessel activities. Therefore, it is likely that routine sea patrols, enfocement of safety zones, and/or small boat training may impact the ESA-listed species in their marine habitats. The most likely impact would be one or more birds temporarily alerting, diving or flying in response to an approaching boat. However, due to the short duration of most boat encounters, adherence to BMPs and and low density of two of the listed species (short-tailed albatross and yellow-billed loon), these impacts would be considered minor and discountable.

Small boat training may involve the use of helicopters during some activities. Operational requirements during helicopter hoist training requires low-altitude (less than 100 ft) hovering,

which may cause increased noise and an increased likelihood of behavioral disturbance and physical strike to listed birds. However, given the infrequent nature of helicopter hoist training, small spatial scale of small boat activities, and adherence to BMPs restricting low-altitude flight during seasons of heightened bird sensitivity, it is unlikely that small boat training will have more than a short-term, temporary, and discountable effect on ESA-listed bird species.

Conclusions:

- Enforcement of Safety Zones and Routine Sea Patrols may affect, but is not likely to adversely affect polar bears and Pacific walrus.
- Enforcement of Safety Zones and Routine Sea Patrols may affect, but is not likely to adversely affect short-tailed albatross, spectacled eiders, Steller's eiders, and yellow-billed loons.

4.2.3.2 Search and Rescue Operations and Training

Vessel operations during SAR missions are coordinated with aircraft support, as aircraft are dispatched to the target location in advance of surface ships. During a SAR operation, the Coast Guard response vessel proceeds to the approximate position of the vessel in distress at maximum safe speed. Once on location, Coast Guard vessels begin a search pattern to locate the distressed vessel. Rescue equipment and marine markers may be deployed from vessels or aircraft; see section 4.2.1.1 for a discussion of the potential impacts of these materials.

The primary risk to protected species during SAR operations is physical collision with the vessel. SAR response in Alaska requires the fastest possible response due to the speed with which vessels can sink due to the weight of ice or wet snow on built up on vessel superstructures during storms. Vessels participating in SAR missions proceed at maximum safe speeds to protect human life and property, but also perform mitigations (including posting lookouts and avoiding marine mammals) to the extent possible without jeopardizing SAR mission success. The low density of vessel traffic in the area and the mitigation measures employed by Coast Guard vessels reduce the risk of vessel strikes during SAR missions.

Behavioral reactions to vessels increase in severity and duration when vessels approach at high speeds and move in unpredictable ways (Richardson et al. 1995). SAR missions that involve high speed vessel transits may elicit behavioral reactions in ESA-listed species, and increase the risk for vessel strikes. During 2010, the Coast Guard performed 645 SAR missions in Alaskan waters, mostly in Southeast Alaska. The density of vessel traffic in the Action Area is much lower than in southeast Alaska, resulting in fewer likely SAR missions. Given the large area of the Action Area and low density of vessels (including Coast Guard vessels), it is unlikely that any individual animal will experience more than a single high-speed passage during a SAR mission. Any behavioral reactions to the approach (see Section 4.2.3) are likely to be short-term, temporary, and discountable.

4.2.3.2.1 National Marine Fisheries Service Jurisdictional Species

Marine mammals, including bowhead, fin, humpback, and North Pacific right whales, bearded seals, ringed seals, and Steller sea lions, may be exposed to high-speed vessel passages during SAR missions. Based on previous studies, behavioral responses of these species to vessel approaches can include avoidance, changes in breathing patterns, or no response at all (see Section 4.2.3 (Sea Operations and Training) for more detail). Because it is unlikely that any

marine mammal will receive more than a short-term exposure to high-speed vessel presence and noise, behavioral reactions are expected to be minor, with animals returning to their normal behavior within minutes to hours of the exposure. High speeds are known to affect the likelihood of ship strikes and the chance of serious injury or mortality to whales from strikes (Laist et al. 2001, Jensen and Silber 2004). While reducing speed is not feasible during SAR operations, risk of physical strikes will be mitigated with use of Coast Guard's other BMPs, including posted lookouts to enable avoidance of marine mammals.

Conclusions:

- Vessel activity during SAR operations and training may affect, but is not likely to adversely affect bowhead, fin, humpback, and North Pacific right whales, bearded seals, ringed seals, and Steller sea lions.

4.2.3.2.2 United States Fish and Wildlife Service Jurisdictional Species

Marine Mammals

Effects of vessel movement on Pacific walrus and polar bears are addressed in Section 4.2.3 (Sea Operations and Training). Data on the effects of vessel approaches to Pacific walrus and polar bears indicates that behavioral reactions can include avoidance of the vessel source, no reaction, or approach (Richardson et al. 1995). Walrus have been observed abandoning haulouts in response to vessel approach, potentially exposing calves to higher predation risk when separated from their herd (Richardson et al. 1995). SAR vessels will not approach walrus or polar bears except as necessary for the protection of human life and property; explicit guidance for vessel movements around walrus and polar bears is given in the BMPs presented above. Behavioral reactions from these species are expected to be rare and temporary. Given the large area and low density of vessels in the Action Area, it is highly unlikely that animals will experience more than one high speed vessel approach.

Birds

The level of impact to the four ESA-listed bird species will depend on the duration, frequency, timing, and the presence of the birds at the location of the vessel activity. SAR operations and training activities take place in a variety of locations in the marine environment, and may include a variety of vessel types, including but not limited to cutters, small boats, and icebreakers. Duration and frequency of SAR vessel operations and training activities will be highly variable and occur throughout the year as needed. Training activities will typically be scheduled events, but may occur throughout the Action Area as needed. These operations have variable duration and frequency, and may include large areas of the marine environment.

Due to the variable nature of SAR vessel activities and the presence of ESA-listed species within the Action Area, it is likely the distributions of the four listed bird species overlap with the location of some SAR operations and training activities. These events may therefore impact the ESA-listed species in their marine habitats. Impacts to the four ESA-listed bird species may include risk of physical strike and behavioral reactions as addressed in Section 4.2.3, Sea Operations and Training. High speed vessel movements required during SAR operations and training may increase the risk of strike and behavioral reactions in these species. However, due to the short duration of most boat encounters and linear transit paths when moving towards a

SAR target and the general low frequency of the SAR operations and training exercises these impacts are likely to be short-term, minor and discountable.

Conclusions:

- Vessel activity during SAR operations and training may affect, but is not likely to adversely affect Pacific walrus and polar bears.
- Vessel activity during SAR operations and training may affect, but is not likely to adversely affect short-tailed albatross, spectacled eiders, Steller's eiders, and yellow-billed loons.

4.2.3.3 Passing and Towing and Mass Recue Operation Rescue Exercises

Rescue exercises include passing and towing exercises (TOWEX), which simulate Coast Guard surface assets towing a distressed vessel to safety and a MRO to simulate the rescue of a large number of people during a single exercise.

TOWEX exercises involve the use of a Coast Guard vessel to tow a distressed ship to safety. In these exercises the vessel in distress would be simulated by another Coast Guard vessel. Towing involves passing lines between the distressed and rescue vessels and coordinated movements of the two ships. Towing would proceed at maximum safe speeds for two vessels moving together, which is substantially slower than a single Coast Guard vessel on a SAR mission.

MROs simulate a large ship in distress with deployed life boats and life rafts, and may also include the use of aircraft, high-speed surface vessels, small boats, and marine markers. Locations of training events would be selected to minimize potential impacts to wildlife, and all BMPs would be followed when selecting times and locations for events. During such exercises, flares and water dye signal packs may be used to further simulate real-life scenarios. MROs will occur no more than once per year. The use of flares would be similar to that discussed in Section 4.2.1.1 (Search and Rescue Missions). All dyes used as in-water signals are environmentally safe and would disperse fairly quickly once applied to the water. Dispersal rates would be dependent upon conditions at the time of dye release. All rescue equipment used during the exercise would be collected upon completion of the training event.

4.2.3.3.1 National Marine Fisheries Service Jurisdictional Species

Slow-speed vessel movements as discussed in Section 4.2.3 (Sea Operations) have minimal potential impacts on marine mammals in the Action Area. Risks of behavioral disturbance and vessel strikes are further minimized by adherence to BMPs and mitigation measures during training exercises.

Vessel movements in the exercise area during MROs could include high speed movements, potentially increasing the risk of behavioral disturbance or vessel strikes to marine mammals in the MRO exercise area. Vessels participating in the MRO would follow BMPs to ensure these risks are minimized during training exercises. The effects of aircraft overflights and any expended rescue equipment would be similar to those predicted from SAR air operations (Section 4.2.2.2), and are not expected to elicit more than a temporary behavioral response from any whale or pinniped species exposed. The rarity of MRO training exercises (no more than once per year), precautions taken when scheduling events, and large area over which events could take place mean that it is unlikely that any marine mammal would experience any more than a

temporary and short-term behavioral response to aircraft or vessel passage associated with the event.

Conclusions:

- TOWEX and MRO training exercises may affect, but are not likely to adversely affect bowhead, fin, humpback, and North Pacific right whales, bearded seals, ringed seals, and Steller sea lions in the Action Area.

4.2.3.3.2 United States Fish and Wildlife Service Jurisdictional Species

Marine Mammals

Slow-speed vessel movements as discussed in Section 4.2.3 (Sea Operations) have minimal potential impacts on marine mammals in the Action Area. Risks of behavioral disturbance and vessel strikes are further minimized by adherence to BMPs and mitigation measures during training exercises.

Vessel movements in the exercise area during MROs could include high speed movements, potentially increasing the risk of behavioral disturbance or vessel strikes to marine mammals in the MRO exercise area. Vessels participating in the MRO would follow BMPs to ensure these risks are minimized during training exercises. The effects of aircraft overflights and any expended rescue equipment would be similar to those predicted from SAR air operations (Section 4.2.2.2), and are not expected to elicit more than a temporary behavioral response from any whale or pinniped species exposed. The rarity of MRO training exercises (no more than once per year), precautions taken when scheduling events, and large area over which events could take place mean that it is unlikely that any marine mammal would experience any more than a temporary and short-term behavioral response to aircraft or vessel passage associated with the event.

Birds

The level of impact to the four ESA-listed bird species from marine water-based rescue training will depend on the duration, frequency, timing, and the presence of the birds at the location of the operations. These activities take place in a variety of locations in the marine environment. Access to the rescue training areas would include a variety of boat types. These operations have variable duration and frequency that is determined based on each event requirement and vessel limitations. Rescue training may include large areas of the marine environment. Rescue training are generally scheduled activities but can occur at all times of the year in response to operation requirements.

Rescue exercise activities include vessel activites which pose a potential collision risk to the four ESA-listed bird species while in flight. While certain conditions (i.e. nighttime operations or poor visibility events) may exacerbate the risk, collisions may occur at all times of the day and in any weather conditions. Because lights may act as an attractant to birds, vessel lighting will be limited when possible. Appendix A contains bird handling and reporting protocol for strike incidents.

The four ESA-listed bird species spend the majority of their lives in marine waters or nesting in coastal lands. Due to the variable nature of rescue training and the presence of listed species in the marine habitats within the Action Area, it is likely that their distribution does overlap with

the location of some rescue training. Therefore, it is likely that some rescue training may impact one or more of the ESA-listed bird species in marine habitats. The most likely impact would be one or more individuals temporarily alerting, diving or flying in response to an approaching boat. However, due to the short duration of most boat encounters, and the general low frequency of the rescue training along with the low density of two of the listed species (short-tailed albatross and yellow-billed loon), these impacts would be considered minor and discountable.

Conclusions:

- TOWEX and MRO training exercises may affect, but are not likely to adversely affect Pacific walrus and polar bears in the Action Area.
- TOWEX and MRO training exercises may affect, but are not likely to adversely affect short-tailed albatross, spectacled eiders, Steller's eiders, and yellow-billed loons in the Action Area.

4.2.3.4 Icebreaking

The Coast Guard operates two icebreaking vessels in offshore waters of Alaska – the CGC HEALY and the CGC POLAR STAR - which operate primarily in the Bering, Chukchi and Beaufort Seas (Figure 4-2) between April and September each year, though missions can occur year-round as dictated by operational needs. Most icebreaker missions last approximately 60 days, although missions of 180 - 200 days will routinely occur on CGC HEALY. Most HEALY missions are in support of other agencies' missions (the potential effects of these missions are evaluated separately by the responsible agency).

Each icebreaker carries two HH-65C helicopters for ice reconnaissance, logistics supply, and support of specific science projects, and several boats up to a length of about 37 ft. Helicopters conduct reconnaissance flights to detect open water leads in the ice, through which the icebreaker can more easily transit. Cameras on UAVs may also be used to identify leads and areas of reduced ice coverage or thickness.

The icebreakers have a cruising speed of 10 to 12 kts and a maximum speed of about 17 kts. During icebreaking operations, they usually travel at 3 to 8 kts, and may travel even slower when breaking heavy ice. The general method for icebreaking is simply driving the ship up on top of the ice until the weight of the ship breaks the ice. The blunted bow of the icebreaker enables it to ride up on top of the ice while the stern sinks lower in the water. The force of buoyancy acting on the submerged portion of the stern creates a lever-like action bringing the icebreaker's weight down onto the ice and breaking it. A secondary method is called "backing and ramming", and involves repeatedly driving the ship into pack ice to crack it.

Some of the stressors associated with icebreaking have been analyzed previously in this document. Effects from icebreakers during transits are equivalent to other large ships moving at similar speeds, discussed in Section 4.2.3. Effects from helicopters during reconnaissance flights and UAVs are expected to be similar to helicopter overflights analyzed in Section 4.2.2.

Stressors unique to icebreaking include noise produced during backing and ramming operations; habitat modifications, including temporary destruction of ice habitat and generation of open-water leads; and direct injury or mortality if an animal is on the ice or in an ice den and is hit or crushed during icebreaking.

Noise produced during icebreaking activities includes sounds from the ship's engines and impacts with ice. During the preferred icebreaking method, sound is generated from the ship's propeller and the cracking of ice. Noise from ice cracking would generally be comparable to natural ice-cracking noise, but in some cases may be louder. The loudest noise levels are generally produced during backing and ramming activities due to propeller cavitations. Measurements taken from the CGC HEALY during icebreaking activities indicated that source levels could reach 190 – 200 dB re 1 μPa in frequency bands around 10, 50 and 100 Hertz at 1 m from the ship hull (Roth et al. 2013). Underwater noise exposure levels for marine mammals near icebreakers will be lower, as animals will generally not occur within 1m of the ship hull. Many species of marine mammals are likely to avoid icebreakers at ranges from 1 to several tens of kilometers (Richardson et al. 1995), and would not be exposed to noise at injurious levels. Behavioral responses are likely to subside within hours of the ship's passage and ultimately not significantly affect the survival or reproduction of disturbed individuals.

Acoustic stimuli produced during Icebreaking missions also include sounds from navigational and scientific sonar systems. Navigational sonar (24 and 200 kHz) effects were addressed in Section 4.2.3.1. Scientific sonar systems currently installed on the CGC HEALY (Table 4-5) include single and multibeam systems operating at a wide range of frequencies. As discussed for navigational sonars, injurious exposure to sonars would require an animal to be within the acoustic beam of the signal and within the range to injury (Table 4-4).

Scientific sonars would not be used continuously during icebreaker missions, and would only operate for periods of a few hours per day over the course of a mission. During scientific sonar use, mitigation practices, including safety zones, dedicated lookouts, and soft-start procedures would be followed to minimize the risk of injury to marine mammals. Behavioral responses to sounds produced by scientific sonar systems could include avoidance of the vessel or hauling out on ice (pinnipeds), but are likely to abate after the sound has ceased or the ship has passed.

Table 4-5: Scientific Sonar Systems Installed on the Coast Guard Cutter HEALY

System	Frequencies [kHz]	Maximum source level [dB re 1μPa @ 1m]	Single or Multi-beam	Maximum range to 190 dB rms	Maximum range to 180 dB rms	Maximum range to 160 dB rms
Knudsen 320 B/R	3.5	211	Single	20	40	360
Kongsberg EM122	12	236	Multi	200	570	3,370
Acoustic Doppler Current Profiler (ADCP; OS75, OS150)	75, 150	221*	Single	40	100	480

Adapted from icefloe.net; * Hypothetical maximum value; measured value not available.

Icebreaking has the potential to modify habitat for animals in ice. In areas with loose ice, habitat modification is likely to be minimal, as floes will drift around the ship during transit. In heavy ice or pack ice, habitat destruction may be more significant and time to recovery will depend on environmental conditions. Animals living on or under pack ice may be able to avoid icebreakers by fleeing into the water through existing breathing holes or leads (Richardson et al. 1995), but may also be limited in their ability to escape under or on top of solid ice. In such cases, an

individual that does not avoid an icebreaker may not be undisturbed; rather, it could be disturbed and unable to avoid the ship. In locations where icebreaking is required, ships travel more slowly than they do during open water transits. However, during icebreaking operations ships generally move at 3 to 8 kts, and would pass by seals on the ice within a few hours. Behavioral reactions to icebreaking activities are likely to subside after the ship has passed. The low-frequency of icebreaking operations and the large size of the Action Area make it unlikely that any animal will be disturbed multiple times by icebreaking activity.

Unless the icebreaker's mission specifically involves investigating an endangered species, the icebreaker will plan its passage through the ice to avoid any known sanctuaries or feeding grounds. Trained and dedicated crewmembers look specifically for marine mammals during operations. In accordance with Coast Guard BMPs, ships avoid active subsistence hunting areas during the spring and fall bowhead whale migrations so as not to interfere with hunts.BMPs (Section 2.4.7) also guide use of ship lights and stand-off distances to sensitive species during icebreaking operations.

Additionally, to account for concerns from villages dependent on subsistence whaling that migrating bowhead whales may follow open leads created by icebreakers avoiding hunting areas, observers will monitor for bowhead whales following the CGC HEALY. If whales are observed following the icebreaker, they will be reported to District 17 and NMFS and necessary mitigations will be discussed at that time.

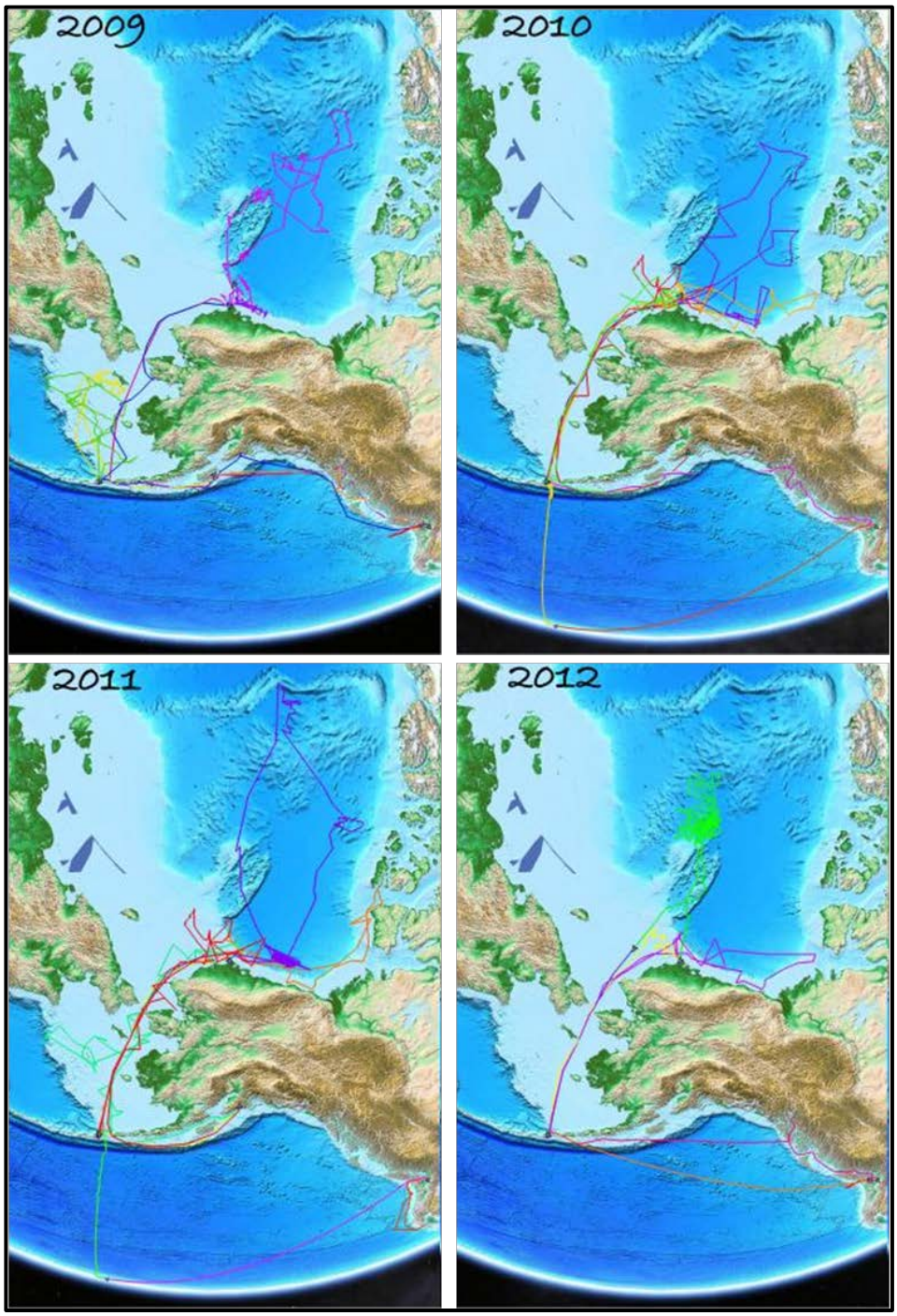

Figure 4-2: Routes of the Coast Guard Cutter HEALY Missions from 2009 -2012

4.2.3.4.1 National Marine Fisheries Service Jurisdictional Species

Fin and humpback whales are migratory species that typically move to lower latitudes during the winter months (October – April), and these species have not been observed in the areas with moderate to heavy ice cover in which icebreaking activities typically occur. It is extremely unlikely that icebreaking activities would overlap with the normal distribution of fin and humpback whales.

Icebreaker transits in ice-free or low-ice areas are expected to have only short-term and discountable effects on protected species. In areas with heavier ice cover, increased noise levels may increase the level of behavioral reactions, with cetaceans and pinnipeds known to avoid icebreakers at ranges from 1 – 50 km (Richardson et al. 1995; Erbe and Farmer 2000). Behavioral responses to icebreakers are expected to be short-term and temporary, and animals are likely to resume their original behaviors within hours of the vessel moving out of the area.

Impacts from helicopter and UAV overflights are expected to be similar to those analyzed in section 4.2.2 (Air Operations). Heavy or solid ice cover may reduce animals' ability to avoid overflights and noise by limiting escape routes to one or a few breathing holes in the ice. However, overflights will not circle or target marine mammals observed on the ice or in open-water leads, and any impacts are expected to abate within minutes after the aircraft has passed. Additionally, aircraft can report presence of marine mammals to crew on the icebreaker and assist in avoiding marine mammals when feasible.

Use of scientific sonars during icebreaking operations will occur intermittently as part of missions dedicated to scientific investigations of the arctic environment. Scientific sonars may operate at a wide range of frequencies (3.5 – 175 kHz), which are likely to be audible to marine mammals. The four protected cetacean species are members of the low-frequency cetacean functional hearing group, and are likely to perceive frequencies below 22 kHz, including the 3.5 and 12 kHz systems installed on the CGC HEALY. Pinnipeds, including bearded seals, ringed seals, and Steller sea lions, may detect sonars emitting sounds at or below 100 kHz.

In 2008, a group of melon-headed whales (*Peponocephala electra*) stranded in Madagascar. An investigation by an independent scientific review panel concluded that the most likely trigger for the stranding event was exposure to sound from a 12 kHz multibeam echosounder (Kongsberg EM 122) used during seismic surveys in the week before the stranding event (Southall et al. 2013). Limited information on the behavioral and social context of the animals before the stranding event complicates the inferences that can be drawn from this event. However, it seems possible that some species, particularly those which are most sensitive to sounds above 10 kHz, may exhibit startle responses including flight after exposure to multibeam echosounder sounds. In rare cases, flight responses may result in strandings and mortalities. Of the listed species covered in this BE, pinnipeds are likely to be sensitive to sounds above 10 kHz. However, if flight responses by these species occur, stranding on land or ice is unlikely to result in mortality.

A recent study by Hastie et al. (2014) indicates that phocid pinnipeds may detect and avoid sound from high-frequency sonars that are nominally above their hearing range. This study was conducted with captive seals in a relatively small enclosure (42m x 6m x 2m deep). Phocid seals in the Action Area (bearded and ringed seals) are unlikely to occur within 42 m of a vessel emitting active sonar sounds. If they detect these sounds at longer ranges (as possible; see Table 4-4), behavioral reactions may include avoidance of the vessel and hauling out on nearby ice floes. Responses are expected to be short-term, temporary, and discountable.

Avoidance responses to other noise sources have included hauling out or swimming away (Richardson et al. 1995; Nowacek et al. 2007) and a return to normal behavior within minutes to hours of exposure. Any potential behavioral reactions to scientific sonars are expected to be similar. Injury zones extend a maximum of 570 m from the sound source. However given the highly-focused directionality of echosounder signals (Simmonds and MacLennan 2005), an animal would need to be directly underneath the vessel to receive an injurious exposure. For single-beam echosounders (including the low-frequency sonars likely to be detected by cetaceans), the beamwidth is extremely narrow, and the likelihood of injurious exposure is remote. Additionally, any animals that do swim through the acoustic beam would likely not be exposed to more than a few pings from the sonar before moving out of the beam (due either to vessel movement or animal movement, or a combination), thus avoiding the likelihood of a temporary or permanent threshold shift. The Coast Guard therefore finds the likelihood of injury and behavioral disturbance by scientific echosoundsers to be discountable.

North Pacific right whales and Steller sea lions are found in the Bering Sea between the Bering Strait and 62.5˚N latitude, where several icebreaking missions have occurred in previous years (Figure 4-2). A lack of acoustic detections indicate that North Pacific right whales may leave the Bering Sea for other as-yet-unknown habitat areas during the winter months (late November – April), reducing the potential for interactions with icebreaking activities. Steller sea lions are found year round in the Bering Sea in mostly open-water areas. They are not known to associate with the ice edge or areas of moderate to heavy ice cover. While both North Pacific right whales and Steller sea lions may encounter icebreaking ships transiting to and from mission locations, they are unlikely to experience noise or other stressors unique to icebreaking activities, and potential interactions would be similar to those analyzed in Section 4.2.3 (Sea Operations and Training).

Protected species under NMFS jurisdiction that may be affected by habitat modification and injury due to icebreaking activities include bowhead whales, bearded seals, and ringed seals. Bowhead whales are associated with loose ice throughout most of the year, and may forage in areas with heavier ice cover during the summer. Bearded and ringed seals rely on ice for resting areas, breeding, and protection from predators, migrating north and south with the seasonal movement of the ice edge. Icebreaking activity has the potential to displace or injure animals living in or on heavy ice, but there are no available data on actual levels of mortality due to icebreaking (Richardson et al. 1989). Seasonal risks are likely to increase during early spring (March), when ringed seal pups are born and nursed in subnivian lairs and are not visible to watchstanders or lookouts associated with the ship.

Documented behavioral reactions to icebreaking include avoidance of ships, alerting, and changes to behavioral states, as well as fleeing into the water from ice (Richardson et al. 1989, 1995). Bearded and ringed seals on ice avoided the ships by diving into water when an icebreaker came within 0.5 n mi (930 m) (Richardson et al. 1995). In areas of solid ice cover, bearded and ringed seals' ability to avoid icebreakers may be limited by their dependence on one or a few breathing holes in the ice, and so an individual that does not avoid an icebreaker may not be undisturbed; rather, it could be disturbed and unable to avoid the ship. In locations where icebreaking is required, ships travel more slowly than they do during open water transits. However, during icebreaking operations ships generally move at 3 to 8 kts, and would pass by seals on the ice within a few hours. Behavioral reactions to icebreaking activities are likely to subside after the ship has passed. The low-frequency of icebreaking operations and the large size

of the Action Area make it unlikely that any animal will be disturbed multiple times by icebreaking activity.

Mitigations and BMPs associated with icebreaking include planning passage through the ice to avoid any known sanctuaries or feeding grounds for endangered species. Icebreakers will only approach these areas if their mission involves specifically investigating an endangered species (the effects of other agencies' missions are evaluated separately by the respective agency), or as required during a SAR mission. Trained and dedicated crewmembers look specifically for marine mammals during operations in order to mitigate the risk of physical strikes to endangered species.

Few icebreaker missions are conducted each year. Given the rarity of missions and the large area in which icebreakers operate (Figure 4-2), it is unlikely that icebreaking activities will cause more than minor behavioral disturbance to marine mammals in the study area.

Conclusions:

- Icebreaking activities would have no effect on fin and humpback whales in the Action Area.
- Icebreaking activities may affect, but are unlikely to adversely affect bowhead whales and North Pacific right whales, bearded seals, ringed seals, and Steller sea lions in the Action Area.

4.2.3.4.2 United States Fish and Wildlife Service Jurisdictional Species

Marine Mammals

Icebreaker transits in ice-free or low-ice areas are expected to have only short-term and discountable effects on protected species. In areas with heavier ice cover, increased noise levels may increase the level of behavioral reactions, with cetaceans and pinnipeds known to avoid icebreakers at ranges from 1 – 50 km (Richardson et al. 1995; Erbe and Farmer 2000). Behavioral reactions of walrus to icebreakers have included fleeing from ice into water, and fleeing from water onto ice during icebreaker approaches (Richardson et al. 1995). Walruses tended to respond at ranges of approximately 1-2 km. Polar bears show little or no reaction to icebreaking, and may be attracted to novel or food-related odors on the ship (Richardson et al. 1995).

Walrus and polar bears may be affected by habitat modification and injury due to icebreaking activities; however, there are no available data on actual levels of mortality of walrus or polar bears due to icebreaking (Richardson et al. 1989).

Documented behavioral reactions to icebreaking include avoidance of ships, alerting, and changes to behavioral states, as well as fleeing into the water from ice (Richardson et al. 1989, 1995). In areas of solid ice cover, walrus' and polar bears' ability to avoid icebreakers may be limited by dependence open water leads in the ice, and so an individual that does not avoid an icebreaker may not be undisturbed; rather, it could be disturbed and unable to avoid the ship. In locations where icebreaking is required, ships travel more slowly than they do during open water transits. However, during icebreaking operations ships generally move at 3 to 8 kts, and would pass by animals on the ice within a few hours. Behavioral reactions to icebreaking activities are likely to subside after the ship has passed. The low frequency of icebreaking operations and the

large size of the Action Area make it unlikely that any animal will be disturbed multiple times by icebreaking activity.

Impacts from helicopter and UAV overflights are expected to be similar to those analyzed in section 4.2.2 (Air Operations). Heavy or solid ice cover may reduce animals' ability to avoid overflights and noise by limiting escape routes. However, overflights will not circle or target walrus or polar bears observed on the ice, and any impacts are expected to abate after the aircraft has passed. Additionally, aircraft can report presence of marine mammals to crew on the icebreaker and advise about ways to avoid marine mammals.

Mitigations and BMPs associated with icebreaking include planning passage through the ice to avoid any known sanctuaries or feeding grounds for endangered species. Icebreakers will only approach these areas if their mission involves specifically investigating an endangered species (the effects of other agencies' missions are evaluated separately by the respective agency), or as required during a SAR mission. Trained and dedicated crewmembers look specifically for marine mammals during operations in order to mitigate the risk of physical strikes to endangered species.

Few icebreaker missions are conducted each year. Given the rarity of missions and the large area in which icebreakers operate (Figure 4-2), it is unlikely that icebreaking activities will cause more than minor behavioral disturbance to Pacific walrus and polar bears in the study area.

Use of scientific sonars during icebreaking operations will occur intermittently as part of missions dedicated to scientific investigations of the arctic environment. Scientific sonars may operate at a wide range of frequencies (3.5 – 175 kHz), which are likely to be audible to marine mammals. Polar bears and Pacific walrus are likely to detect sonar signals below 50 kHz, including some systems installed on the CGC HEALY. Avoidance responses to other noise sources have included hauling out or swimming away (Richardson et al. 1995; Nowacek et al. 2007), and a return to normal behavior within minutes to hours of exposure. Any potential behavioral reactions to scientific sonars are expected to be similar. While there are no formal injury criteria for these species, repeated exposure to high sound levels may induce permanent or temporary threshold shifts in these species (Southall et al. 2007; Finneran and Jenkins, 2012). However given the highly-focused directionality of echosounder signals (Simmonds and MacLennan 2005), an animal would need to be directly underneath the vessel to receive an injurious exposure. For single-beam echosounders (including the low-frequency sonars likely to be detected by cetaceans), the beamwidth is extremely narrow, and the likelihood of injurious exposure is remote. Additionally, any animals that do swim through the acoustic beam would likely not be exposed to more than a few pings from the sonar before moving out of the beam (due either to vessel movement or animal movement, or a combination), thus avoiding the likelihood of a temporary or permanent threshold shift. The Coast Guard therefore finds the likelihood of injury to pinnipeds to be discountable.

Birds

The level of impact to the four ESA-listed bird species will depend on the duration, frequency, and timing of icebreaker activities, and the presence of the birds at the location of the icebreaking. Icebreaking operations have variable duration and frequency that is determined based on each event requirement and vessel limitations. Icebreaking vessel movements may include large areas of the marine environment.

Effects of icebreakers during transit to and from areas where icebreaking activities are required would be similar to those described for vessel movements in Section 4.2.3 (Sea Operations and Training). Effects of associated aircraft would be similar to those described in Section 4.2.2 (Air Operations and Training).

The four ESA-listed bird species spend the majority of their lives in marine waters or nesting in coastal lands. Only one of the four ESA-listed species, the spectacled eider, is likely to be found closely associated with ice cover. This species is found in and around the polynya south of St. Lawrence Island during the winter months. This distribution overlaps with previous icebreaker missions (Figure 4-2), indicating a potential for interactions during future icebreaking operations. The most likely impact would be one or more spectacled eiders temporarily alerting, diving or flying in response to an approaching icebreaker. But, due to the short duration of most boat encounters, and the general low frequency of the icebreaking vessel movements, these impacts would be considered minor and discountable. Therefore, the Coast Guard concludes that

The remaining three ESA-listed bird species are not generally found in ice-covered waters. While their distributions do overlap with areas in which icebreaking activities could occur, there is unlikely to be any seasonal overlap between the presence of these species and icebreaking activities. Effects of icebreakers would therefore be limited to those impacts associated with vessel movements, as described in section 4.2.3.

Conclusions:

- Icebreaking may affect, but is not likely to adversely affect Pacific walrus and polar bears in the Action Area.
- Icebreaking operations may affect, but are not likely to adversely affect spectacled eiders, short-tailed albatross, Steller's eiders, and yellow-billed loons.

4.2.3.5 Oil Recovery Training Exercises

Locations and timing of Oil Recovery Exercises would be selected to minimize potential impacts on protected species. Training may be conducted during any season in order to simulate realistic conditions in the event of an unexpected spill, but known concentrations of endangered species would be avoided and BMPs would be followed.

Oil recovery exercises include the use of aircraft for surveillance, large vessels moving at relatively slow speeds, and small boats. The potential impacts of these stressors have been described in Sections 4.2.2 and 4.2.3.

An additional stressor during these exercises is the use of oil-simulation products, which include buoyant, organic, and biodegradable products like moss or fruit and non-toxic dyes. These items float at the surface of the water column and drift with currents, simulating how oil would move during a spill, and the intent of the exercise is to contain and recover as much of the "spill" as possible. However, some product may not be recovered and will drift away. Any simulated spill products missed during the exercise would remain floating at the sea surface and would break down or degrade over a short period of time.

Spilled Oil Recovery System (SORS) and Vessel of Opportunity Skimming System (VOSS) Exercises

Exercises to practice skimming spills and debris from the surface of the ocean for planning purposes and future use in response to an environmental emergency involve the deployment of either a SORS or a VOSS over the side of vessels. These systems involve the use of booms to entrain the oil or debris and a skimmer deployed within the entrained oil/debris to siphon it from the surface of the water.

Spilled Oil in Ice Recovery Capabilities Demonstration

During these demonstrations, the Coast Guard Research and Development Center would conduct tests involving UUVs and UAVs. The UAVs would be used to conduct reconnaissance over the water and ice to look for areas of oil. Likewise, UUVs would be deployed to look for pockets of oil trapped under the ice. Tests would also be conducted at the edge of summer ice to determine the effectiveness of removing simulated oil spills from the along the edge of the ice, as well as from underneath it or from within leads in the ice.

UAVs would fly at relatively low altitudes, and may produce noise that could be detected by animals on land or at the water surface. Potential impacts could include physical strikes to birds, and behavioral disturbance equivalent to that caused by low-altitude helicopter flights.

UUVs would produce low levels of noise that could disturb animals under water. Animals disturbed by UUVs could exhibit horizontal or vertical avoidance behaviors; those that are able to do so may flee to surrounding ice floes or land areas. In addition, some UUVs are equipped with obstacle-avoidance sonars operating at frequencies at or above 60 kHz (U.S. Coast Guard 2013b). Effects of sonars have been addressed in Sections 4.2.3.1 (navigational sonars) and 4.2.3.4 (scientific sonars). Impacts of sonars mounted on UUVs would be similar to high-frequency scientific sonars; they would be audible only to two of the listed marine mammal species (bearded and ringed seals), and would not be expected to have any significant effects.

An array of optical equipment may also be integrated into the systems for navigation and detailed imaging. Low-powered lasers, including point lasers for close-quarters navigation and line lasers for detailed imaging may be used. Laser components would typically be used less than 16 ft (5 m) from a target. The light emissions of low-powered lasers attenuate within a short distance. Under normal conditions, it would not be expected that sonar and lasers would be directed into open water, but only toward the intended target.

Table 4-6: Example Laser Systems

Type	Wavelength (nm)	Power (mW)	Effective Distance	Laser Rating	Equipment Example
Point laser – navigation	630 – 670	3	7 ft (2m)	Class IIIA	Tritech Image Scaling System
Line laser – imaging	Green: ~532; Red: ~685	Green: 440 Red: <1	Green: < 16 ft (5m) Red: 7 ft (2m)	Class IIIB	USF Laser Line Scanner

Adapted from U.S. Coast Guard (2006).

The operation of the lasers associated with the underwater inspection/detection systems is not expected to result in adverse impacts on marine mammals. Lasers that meet current human laser safety standards would have no harmful impacts on the eyes of marine mammals (Zorn et al., 1998). Marine mammal eyes are less sensitive to laser radiation than the human eye. The point laser used for navigation is a Class IIIA laser. This laser classification is only hazardous when the human eye is exposed to all or part of a laser beam. Under normal use, the Class IIIA laser cannot cause biological damage to the human eye or skin and therefore would not cause damage to marine mammal eyes or skin.

The line laser is rated as a Class IIIB laser. Absorption and scatter of the line lasers would occur as soon as it is turned on. In a typical port environment and in clear seawater, it is expected that the laser beams would lose most of their power in less than 3.3 feet (1 m). Both lasers have effective distances of less than 16 feet (5 m). Under water this laser is not expected to cause damage to marine mammal eyes or skin.

Under normal conditions, lasers would not be directed into open water, but only toward the intended target. The lasers would only be used for the detailed targeted inspections. The expected maximum distance from targeted structures should be no more than 16 feet (5 m) during a targeted inspection. Laser use would also be temporary and short-term. Effective laser distance is expected to be about 7 to 10 feet (2 to 3 m). This would reduce the possibility of a marine mammal coming into contact with a laser. A 660-foot (200-m) safety zone around the system would be visually monitored by a USCG-trained observer for 20 minutes prior to using lasers to ensure it was clear of marine mammals. If marine mammal activity approached the safety zone during operations, the underwater inspection/detection system would be shut down and retrieved until the activity exited the area. The testing would not block marine mammals from foraging, breeding, or nesting areas.

4.2.3.5.1 National Marine Fisheries Service Jurisdictional Species

Any simulated spill products missed during the exercise would remain floating at the sea surface and would break down or degrade over a short period of time with no additional impact on marine mammals. UAVs and UUVs do not pose an injury threat to marine mammals, but may cause behavioral disturbances which are expected to be equivalent to aircraft or vessel passages, respectively, and to be short-term and temporary. The laser systems that may be mounted on the UUVs are low-power and extremely short range (< 20 ft) and are therefore extrely unlikely to impact marine mammals. Obstacle-avoidance sonars mounted on UUVs are expected to have similar effects as high-frequency scientific sonars (addressed in Section 4.2.3.4). Animals are expected to return to normal behavior within minutes to hours of exposure.

Conclusions:

- Oil Recovery Exercises may affect, but are not likely to adversely affect bowhead, fin, humpback, and North Pacific right whales, bearded seals, ringed seals, and Steller sea lions in the Action Area.

4.2.3.5.2 United States Fish and Wildlife Jurisdictional Species

Marine Mammals

Any simulated spill products missed during the exercise would remain floating at the sea surface and would breakdown or degrade over a short period of time with no additional impact Pacific

walrus or polar bears. UAVs and UUVs do not pose an injury threat to marine mammals, but may cause behavioral disturbances which are expected to be equivalent to aircraft or vessel passages, respectively, and to be short-term and temporary. The laser systems that may be mounted on the UUVs are low-power and extremely short range (< 20 ft) and are therefore extrely unlikely to impact marine mammals. Obstacle-avoidance sonars mounted on UUVs are expected to have similar effects as high-frequency scientific sonars (addressed in Section 4.2.3.4).Animals are expected to return to normal behavior within minutes to hours of exposure.

Birds

The level of impact to the four ESA-listed bird species from deployment of SORS and VOSS Systems and spilled oil in ice recovery capabilities demonstrations will depend on the duration, frequency, timing, and the presence of the birds at the location of these operations. These activities take place in a variety of locations in the marine environment and the ice-covered marine environment. Access to the operations would include a variety of vessel types. These operations have variable duration and frequency that is determined based on each event requirement and vessel limitations. These operations are generally scheduled activities but can occur at all times of the year in response to operation requirements.

Vessel movements during oil recovery exercises pose a potential collision risk to the four ESA-listed bird species while in flight. While certain conditions (i.e. nighttime operations or poor visibility events) may exacerbate the risk, collisions may occur at all times of the day and in any weather conditions. Because lights may act as an attractant to birds, vessel lighting will be limited when possible. Appendix A contains bird handling and reporting protocol for strike incidents.

Birds at the surface of the water during Oil Recovery Exercises involving SORS and VOSS devices are at risk for physical injury if they interact with the devices. Birds are unlikely to be attracted to the devices, and would likely avoid the vessels well before they come within the range of physical injury.

The four ESA-listed bird species spend the majority of their lives in marine waters or nesting in coastal lands. While the four species have different preferred habitats, all are found in open water areas; spectacled eiders may be found closer to the ice edge than the other three species, and are likely to be present in winter when other species have migrated south. Due to the variable nature of these various oil recovery exercises and the presence of the ESA-listed species in the marine habitats within the Action Area, it is likely that their distributions do overlap with the location of some oil recovery exercises. Therefore, it is likely that some oil recovery exercises may impact the four ESA-listed bird species in their marine habitats. The most likely impact would be one or more birds temporarily alerting, diving or flying in response to an approaching vessel. Due to the short duration of most boat encounters, and the general low frequency of the various oil recovery exercises, these impacts would be considered minor and discountable.

Conclusions:

- Oil Recovery Exercises may affect, but are not likely to adversely affect Pacific walrus and polar bears.
- Oil Recovery Exercises may affect, but are not likely to adversely affect short-tailed albatross, spectacled eiders, Steller's eiders, and yellow-billed loons.

4.2.3.6 At-Sea and Shoreside Berthing and Support Facilities

Berthing and facilities for operations and support personnel are required to sustain Coast Guard response capabilities for the Arctic region. Two of the three options for support personnel in the Proposed Action include at-sea components: acquisition of ocean-capable barges for operational staging and support; and mobile sea bases including helicopter support. Barges and mobile sea bases will have the same potential risks as other Coast Guard vessels; however, due to their size and function these vessels would be considerably slower than vessels used in SAR and routine sea patrols. Slower vessels pose less risk of strikes to wildlife, as slow speeds give animals and operators more time to avoid collisions and reduce the risk of severe injury in the event that a collision does occur.

If the Coast Guard acquires either ocean-capable barges or mobile sea bases for staging and housing personnel during operations, it is likely only a single barge or base would be obtained. The footprint from one barge is exceedingly small when compared to the size of the Action Area. The small footprint and slow speed of these vessels combine to present a minimal risk of impact to marine wildlife. Mitigation measures would be used to minimize the effects of vessel lighting on seabirds, in accordance with the BMPs presented above.

4.2.3.6.1 National Marine Fisheries Service Jurisdictional Species

Acquisition and operation of an ocean-capable barge or mobile sea base presents the same risks as vessel operations at slow speeds. Based on previous studies, behavioral reactions from ESA-listed species under NMFS jurisdiction are expected to be minimal, short-term, and discountable.

Conclusions:

- Acquisition and operation of At-Sea and Shoreside Berthing and Support Facilities may affect, but is not likely to adversely affect bowhead, fin, humpback, and North Pacific right whales, bearded seals, ringed seals, and Steller sea lions.

4.2.3.6.2 United States Fish and Wildlife Service Jurisdictional Species

Marine Mammals

Acquisition and operation of an ocean-capable barge or mobile sea base presents same risks as vessel operations at slow speeds. Based on previous studies, behavioral reactions from ESA-listed species under USFWS jurisdiction are expected to be minimal, short-term, and discountable.

Birds

The level of impact to the four ESA-listed bird species from At-Sea Berthing platforms will depend on the location of berthing platforms, timing, and the presence of the birds at the location. At-Sea berthing platforms are used to provide support for emergency response; as such, they may be located anywhere in the Action Area where large-scale emergency response is required. Access to platforms may include aircraft and vessel movements. Duration of vessel activity and platform presence would be determined based on each event requirement.

The four ESA-listed bird species spend the majority of their lives in in marine waters or nesting in coastal lands. While the four species have different preferred habitats, all are found in open water areas and may occur in coastal areas. No breeding areas would be impacted by at-sea berthing platforms; the only impacts that may occur would take place in marine habitat areas.

Mobile sea bases (in motion or stationary and regardless of location) may pose a potential collision risk to ESA-listed seabirds while in flight. Collision may occur at any time of the day and in any weather conditions. Certain conditions, such as nighttime operations or poor visibility events such as storms and fog, may exacerbate the risk. Facility lighting for safety purposes will be limited when possible to reduce attraction of birds, in accordance with Coast Guard BMPs. Whlie the surface structure of the platforms poses a potential strike hazard and mortality risk for individual birds, the minimal footprint of the single platform likely to be acquired reduces the overall risk of collision. Appendix A contains bird handling and reporting protocol for strike incidents.

Conclusions:

- Acquisition and operation of At-Sea and Shoreside Berthing and Support Facilities may affect, but is not likely to adversely affect Pacific walrus and polar bears.
- Acquisition and operation of At-Sea and Shoreside Berthing and Support Facilities may affect, but are not likely to adversely affect the population of short-tailed albatross, spectacled eiders, Steller's eiders, and yellow-billed loons.

4.3 CRITICAL HABITAT

Provisions of the ESA require a determination of whether proposed Federal actions may destroy or adversely modify critical habitat for listed endangered or threatened species. Critical habitat designation is based on the presence and condition of certain physical and biological habitat factors called primary constituent elements that are considered essential for the conservation of the listed species (NMFS, 1998; ESA §3(5)(A)(i); 50 CFR §424.12(b)).

4.3.1 National Marine Fisheries Service Jurisdiction

Critical habitat for ESA-listed species under NMFS jurisdiction has been designated in or near the Action Area for North Pacific right whales (73 FR 19000) and the Western U.S. population of Steller sea lions (50 CFR §226.202). Potential impacts to those habitat areas are described below.

4.3.1.1 North Pacific Right Whale

North Pacific right whale critical habitat has been designated in the southeastern portion of the Bering Sea, 285 nm (528 km) from the boundary of the Action Area. No part of the Proposed Action is expected to affect this area. Vessels and aircraft will operate within the boundaries of the Action Area, and expended materials are not expected to drift into the right whales' critical habitat.

Conclusion:

- The proposed action will have no effect on North Pacific right whale critical habitat.

4.3.1.2 Steller Sea Lion

There is designated critical habitat for the Western U.S. population of Steller sea lions inside the Action Area, around the eastern and western ends of St. Lawrence Island in the Bering Sea. The

Coast Guard will implement BMPs that require its operations remain outside the critical habitat zone around each rookery, unless entry is required for SAR or LE purposes. Thus, Coast Guard

Conclusion:

- The proposed action may affect, but is not likely to adversely affect the haulouts or breeding rookeries or designated critical habitat for Steller sea lions.

4.3.2 United States Fish and Wildlife Service Jurisdiction

Critical habitat for ESA-listed species under USFWS jurisdiction has been designated in or near the Action Area for spectacled eiders (66 FR 9146) and Steller's eiders (66 FR 8850). Potential impacts to those habitat areas are described below.

4.3.2.1 Spectacled Eider

Designated spectacled eider critical habitat falls within the Action Area, including all of unit 3 (Norton Sound), unit 4 (Ledyard Bay) and portions of unit 1 (Central and Southern Yukon-Kuskokwim Delta) and the wintering areas in unit 5 (Waters South of St. Lawrence Island). Effects are described by units below.

Unit 1 (Central and Southern Yukon-Kuskokwim Delta): Only a portion of this unit is within the Action Area. The critical habitat located in the Central Yukon-Kuskokwim Delta is primarily an intertidal zone used for nesting and brood-rearing (USFWS 2001). Unit 1 critical habitat will not be impacted by water-based or air-based activities of the various Coast Guard operations and all land-based activities occur at existing facilities.

Units 3 (Norton Sound) and 4 (Ledyard Bay): All of units 3 and 4 are within the Action Area. The critical habitat located in Norton Sound and Ledyard Bay is primarily used as a molting and foraging ground by the spectacled eider (USFWS 2001). Activities will occur in these units and will be include a variety of water-based and air-based activities by the Coast Guard. Examples of impacts may include temporary wave production by boats and ships, water surface coverage by temporary platforms, small number of water debris such as dye packs, life rafts, and flares, icebreaking operations, biodegradable items used for oil recovery exercises, and use of skimming systems for oil recovery exercises in ice covered waters. All of these activities will have localized, temporary and discountable impacts to the coastal waters.

Unit 5 (Waters South of St. Lawrence Island): Only a portion of unit 5 is within the Action Area. The critical habitat located in the waters south of St. Lawrence Island is primarily used as a wintering ground by the spectacled eider (USFWS 2001). Activities will occur in these units and will be include a variety of water-based and air-based activities by the Coast Guard. Examples of impacts may include temporary wave production by boats and ships, water surface coverage by temporary platforms, small number of water debris such as dye packs, life rafts, and flares, icebreaking operations, biodegradable items used for oil recovery exercises, and use of skimming systems for oil recovery exercises in ice covered waters. All of these activities will have localized, temporary and discountable impacts to the coastal waters.

4.3.2.2 Steller's Eider

Critical habitat for the Steller's eider has been designated in the southeastern portion of the Bering Sea, 50 nm (93 km) from the boundary of the Action Area. No part of the Proposed Action is expected to affect this area. Vessels and aircraft will operate within the boundaries of

the Action Area, and expended materials are not expected to drift into the designated critical habitat.

Conclusions:

- The proposed action will have no effect on spectacled eider critical habitat.
- The proposed action will have no effect on Steller's eider critical habitat.

4.4 ESSENTIAL FISH HABITAT

This section evaluates how and to what degree the operation and training activities that make up the Proposed Action could impact marine EFH within the Action Area. A stressor is evaluated for impacts on a designated habitat if it has the potential to alter the quality or quantity of that habitat (e.g., water column, soft sediments, hard bottom, biogenic habitats). Only a few of the operations and training activities proposed as part of the Proposed Action have the potential to impact EFH:

- Search and rescue missions;
- Icebreaking;
- Rescue exercises; and
- Oil recovery exercises.

The stressors will vary in intensity, frequency, duration, and location within the Action Area. The analysis of the operations and training activities considers the type of stressor, how it will impact the environment, and its co-occurrence with EFH designations within the Action Area. If there is a reasonable likelihood of co-occurrence, then a conclusion of adverse impact is made. The duration of effects is based on either duration of stressor or recovery of the habitat:

- Temporary – stressor duration or recovery in hours, days, or weeks;
- Short term – stressor duration or recovery in less than 3 years;
- Long term – stressor duration or recovery in more than 3 years but less than 20 years; and
- Permanent – stressor duration or recovery in more than 20 years.

The Coast Guard recognizes that anadromous fish, including all five Pacific salmon species, have both marine and freshwater EFH. However, as Coast Guard operations and training in the Action Area will not impact freshwater systems, there will be no effect to anadromous fishes' designated freshwater EFH.

4.4.1 Search and Rescue Missions

During SAR operations, Coast Guard vessels and aircraft may deploy flares and expendable self-locating datum marker buoys. Flares would be ignited and burn out on the surface. Any flare remnants would either remain floating at the surface or gradually sink over time. Flare remnants would be small and pose little impact to the environment. Expendable self-locating buoys are described in Section 4.2.1.2.

Expendable self-locating buoys would have no impact on the water through which they traveled and would therefore have no effect on water column EFH. Should the floats become unattached from the main unit, it is conceivable that the unit would sink through the water and settle on the seafloor.

While at the surface or suspended within the water column, the buoys and their deployment casings and parachutes would not affect designated EFH. However, these items may impact hard and soft substrates and biogenic structures designated as EFH should operations overlap with areas of existing designations. The primary impact buoys, casings, and parachutes could have on substrates would be to cover them and/or impair their ability to function as habitat. This reduction in the overall quality and quantity of localized EFH could range from temporary to long-term depending on the expended material and the environment into which it settles. However, given the relative infrequency of annual SAR operations, the few number of self-locating buoys deployed per operation, and the amount of designated EFH available relative to the size of the impact, the overall potential impact to designated EFH would be minimal.

Conclusions:

- SAR missions may affect, but are not likely to adversely affect designated EFH.

4.4.2 Icebreaking

Icebreakers will be employed to conduct scientific research and to assist with SAR operations, when necessary. Icebreakers are used to travel through frozen portions of the sea by forging a path through the ice. As these operations would not impact any substrates or biogenic structures designated as EFH. The process of breaking the ice may temporarily reduce the quality of water column EFH through an increase in ambient noise levels. Icebreaking activities, therefore, have the potential to expose fish to sound and general disturbance, which could result in short-term behavioral or physiological responses (e.g., avoidance, stress, increased heart rate). Operations involving icebreaker vessels occur intermittently and are widely dispersed throughout the Action Area. While icebreaking has the potential to expose fish occupying the water column to sound and general disturbance, potentially resulting in short-term behavioral or physiological responses, such responses would not be expected to compromise the general health or condition of individual fish.

Conclusions:

- Icebreaking operations would have no adverse effect on any designated EFH.

4.4.3 Rescue Exercises

MROs simulate a large ship in distress with deployed life boats and life rafts. During such exercises, flares and water dye signal packs may be used to further simulate real-life scenarios. The use of flares would be similar to that discussed in Section 4.2.1.1 (Search and Rescue Missions). All dyes used as in-water signals are environmentally safe and would disperse fairly quickly once applied to the water. Dispersal rates would be dependent upon conditions at the time of dye release. All rescue equipment used during the exercise would be collected upon completion of the training event.

Conclusions:

- Rescue exercises would have no adverse effect on any designated EFH.

4.4.4 Oil Recovery Training Exercises

4.4.4.1 Spilled Oil Recovery System and Vessel of Opportunity Skimming System Exercises

Exercises to practice skimming spills and debris from the surface of the ocean for planning purposes and future use in response to an environmental emergency involve the deployment of either a SORS or a VOSS over the side of vessels. These systems involve the use of booms to entrain the oil or debris and a skimmer deployed within the entrained oil/debris to siphon it from the surface of the water. During these exercises, products consisting of buoyant, organic, and biodegradable items (e.g., moss or fruit) are used to simulate spills. The purpose of the exercise would be to remove the simulated spill products from the water. Any simulated spill products missed during the exercise would remain floating at the sea surface and would breakdown or degrade over a short period of time with no harm to the environment.

4.4.4.2 Spilled Oil in Ice Recovery Capabilities Demonstration

During these demonstrations, the Coast Guard Research and Development Center would conduct tests of UUVs and UAVs. The UAVs would be used to conduct reconnaissance over the water and ice to look for areas of oil. Likewise, UUVs would be deployed to look for pockets of oil trapped under the ice. Tests would also be conducted at the edge of summer ice to determine the effectiveness of removing simulated oil spills from the along the edge of the ice, as well as from underneath it or from within leads in the ice. As with the exercises involving VOSS and SORS, all simulated oil spills will be composed of buoyant, organic, and biodegradable items. The purpose of the tests would be to evaluate the effectiveness of the equipment in removing the simulated spill products from the water. Any simulated spill products missed during the tests would remain floating at the sea surface or would become entrapped in the ice and would breakdown or degrade over time with no harm to the environment.

Conclusions:

- Oil recovery exercises would have no adverse effect on any designated EFH.

5 CUMULATIVE EFFECTS

"Cumulative effects" under the ESA are those effects of future State, municipal, or private activities, not involving federal activities, that are reasonably certain to occur within the Proposed Action area of the federal action subject to consultation (50 C.F.R. 402.02). Future Federal actions that are unrelated to the Proposed Action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act.

5.1 ACTIVITIES AND PROCESSES ANALYZED FOR CUMULATIVE EFFECTS

Identifiable effects of reasonably foreseeable activities are summarized in this section, to the extent they may be additive to impacts of the Proposed Action. This section lists and analyzes the effects of foreseeable activities only where appropriate and includes all likely future development of the region even when a foreseeable action is not planned in sufficient detail to permit complete analysis (Council on Environmental Quality 1997). Table 5-1 lists reasonably foreseeable activities in the Action Area with the potential to contribute to cumulative impacts. In addition to analyzing those reasonably foreseeable projects listed in Table 5-1, a description follows of other activities that were also considered in the cumulative impact analysis.

Table 5-1: Reasonably Forseeable Activities in the Action Area

Category	Activity	Location	Agency[3,4]	Timeframe
Subsistence hunting and fishing	Subsistence hunting for marine mammals and seabirds.	Coastal areas of the Bering, Chukchi, and Beaufort Seas.	State of Alaska and Tribal authorities	2014 – 2019
Marine traffic	Alaska Deep Draft Arctic Ports Study	Coastal settlements from Bethel west, north, and east to the Canadian border	State of Alaska/ Army Corps of Engineers	2008 – 2015
Oil and Gas Exploration	Seismic Exploration Surveys	Beaufort and Chukchi Sea Lease Areas (see Figure 2-5)	Private companies	2015 – 2019
Oil and Gas Extraction	Oil and gas drilling and extraction	Beaufort and Chukchi Sea Lease Areas (see Figure 2-5)	Private companies	2015 – 2019
Oil and Gas Extraction	Land based oil and gas leases and extraction	Coastal areas of the Beaufort Sea (see Figure 2-5)	State of Alaska	2015 – 2019

5.1.1 Subsistence Hunting and Fishing[5]

Living off the land, or "subsistence", is a lifestyle adhered to by many Alaska Natives. Coastal Alaskans' subsistence harvests are comprised mostly of marine mammals and fish, with some harvesting of seabirds and eggs. Protected species currently subject to subsistence harvest in Alaska include both NMFS' and USFWS' jurisdictional species.

Subsistence hunting of cetacean species is regulated by the International Whaling Commission, which in 2012 renewed catch limits for bowhead whales for Russian Native sand Alaska Eskimos through 2018. The maximum annual strike quota is 82 strikes per year for both groups combined; per international agreement, no more than 306 whales will be landed by Alaska Eskimos between 2012 and 2018 (78 FR 4143). This amounts to less than one percent of the Bering-Chukchi-Beaufort stock of bowhead whales each year. Only a single humpback whale has been reported as a subsistence take since 2006.

Subsistence harvest data on NMFS' jurisdictional species is no longer being collected (Angliss and Allen 2013), but harvest of bowhead whales, bearded seals, ringed seals, and Steller sea

[3] Activities conducted in partnerships with federal agencies are included in this analysis.

[4] Private companies include oil and gas exploration and development companies such as Royal Dutch Shell, BP, ConocoPhillips, and ExxonMobil, among others.

[5] The Federal Subsistence Management Program is administered by both federal and state agencies (50 CFR 100).

lions is important to the communities of northern Alaska. Of USFWS jurisdictional species, polar bears, Pacific walrus, spectacled eider, Stellar's eider, and yellow-billed loons are harevested during subsistence hunts. Harvested animals are used for food, traditional ceremonies, and handicrafts. Hunting is regulated monitored and managed by State and Federal agencies.

5.1.2 Commercial Fishing

There are no active commercial fisheries in the Arctic Management Area (waters of the U.S. EEZ of the Chukchi and Beaufort Seas ≥ 3 nautical miles offshore). In November 2009, the final Fishery Management Plan for the Fish Resources of the Arctic Management Area was published (74 FR 56734). The plan prohibits commercial fishing within the management area until more information is available to support sustainable fisheries management.

In the Bering Sea portion of the Action Area, there are active commercial fisheries for groundfish, shellfish, salmon, and pollock, which are regulated by the National Marine Fisheries Service. While none of these species are endangered in the Action Area, protected species found in the Bering Sea during months when commercial fisheries are active may interact with fishing vessels and gear, and may be indirectly affected by impacts to prey species. These species include the North Pacific right whale, humpback whale, fin whale, Steller sea lion, Pacific walrus, and all four ESA-listed seabird species. Fisheries interactions with marine mammals are described in Angliss and Allen (2013).

Commercial fisheries take place in habitats that are used by marine mammals and sea birds; the location and timing of those activities are regulated by the state within state waters (up to 3 miles offshore in most cases). However, the frequency and duration of any disturbances of ESA-listed species by commercial or recreational fisheries is unlikely to change in the near future as these fisheries are managed for sustainable harvest, and thus an increase in harvest levels is not expected.

5.1.3 Scientific Research

Scientific research in the Arctic environment is likely to occur during the study period, and may involve cooperation with the Coast Guard and/or use of the Coast Guard's scientific facilities aboard the CGC HEALY. Agencies anticipating use of the Coast Guard's facilities are required to conduct Section 7 consultations with the appropriate agencies and apply for permits as required.

Private facilities and State agencies may also conduct research in and around the Action Area during the study period. Previous studies have included environmental research related to the changing arctic environment, fisheries stocks, habitat preferences and behavior of protected species, and oceanographic and passive acoustic monitoring of the marine environment.

5.1.4 Marine Traffic

Marine traffic in the Action Area is expected in relation to fisheries (in the Bering Sea) and to Oil and Gas Exploration and Extraction (discussed below in sections 5.1.6 and 5.1.7). Additionally, shipping traffic through the Bering Strait is expected to increase as the arctic ice field diminishes due to global climate change. Increases in shipping traffic and oil and gas vessel traffic cannot be predicted with certainty at this time; however, the State of Alaska and the Army Corps of Engineers have begun a study of potential locations for a deep-draft arctic port along the Northwestern coast of Alaska.

Marine traffic has the potential to affect protected species through behavioral disturbance (due to vessel presence and activity or to vessel noise) and the potential for physical injury if animals are struck by a vessel. Risks are likely to increase as the number of vessels transiting through the Action Area increases, and should be re-assessed as more data on shipping traffic becomes available.

5.1.5 Air Traffic

Alaska's towns and villages are often isolated and dependent on aircraft for connections with major population centers and road networks. Personal aircraft are common, and small commercial aircraft fly a number of standard and charter routes throughout the state. Air traffic activity in the Action Area is not expected to increase over current levels, except as associated with potential oil and gas support activities.

5.1.6 Oil and Gas Exploration

The Chukchi and Beaufort Seas contain a number of unexplored prospects for oil and natural gas development. The Bureau of Ocean Energy Management (BOEM) has the authority to issue lease sales in this area, and must conduct appropriate consultations. Current lease blocks are shown in Figure 2-5.

Lease blocks are explored for oil development potential using extensive surveys consisting of towed airgun arrays and hydroacoustic mapping of the lease blocks, introducing the potential for acoustic injury and behavioral disturbance to marine mammals in and around the survey areas. Companies that have been involved in oil and gas exploration activities in the Action Area in the last 5 years include: BP, Royal Dutch Shell, ConocoPhillips, ExxonMobil, and StatOil. Surveys were most recently conducted during the summer of 2013. While there are no existing approved Incidental Harrassment Authorizations for seismic surveys in the Action Area during 2014, future surveys in 2015 and beyond are reasonably forseeable. The exact impact of such surveys will depend on the survey area and size of vessels, airgun arrays, and support craft. Given the importance of domestic energy development and declining prospects for oil extraction onshore, the likelihood of oil and gas exploration activities increasing during the study period is very high.

5.1.7 Oil and Gas Extraction

If oil and gas exploration activities determine that a lease area is worth developing, private companies may invest in drilling and extraction activities. While there are no current offshore extraction activities in the Action Area, it is reasonably forseeable that drilling may occur during the study period. Drilling at one site in the Chukchi Sea was planned for the summer of 2014, but the request was withdrawn by ConocoPhillips Company in April of 2013 (78 FR 24731). Similarly, Royal Dutch Shell had plans for exploratory drilling in the Action Area during summer 2013 and 2014, but has postponed drilling until at least 2015.

Oil and gas extraction involves an increase in vessel traffic, installation of large movable or semi-permanent drilling platforms, and aircraft support. The risks associated with such vessels and platforms would be similar to those from other marine traffic; behavioral disturbance to protected species as a result of noise or vessel presence, and the risk of injury from physical strikes. An additional risk to mineral extraction is the potential for oil spills, which can have catastrophic effects on the environment, as seen during the 2010 Deepwater Horizon spill in the Gulf of Mexico. The Coast Guard is currently developing response plans, should an oil spill

result from extraction activities in arctic offshore waters, and training activities covered in the proposed action include spilled oil recovery exercises.

5.2 CUMULATIVE IMPACTS ANALYSIS

The Proposed Action, in combination with the other reasonably foreseeable activities, would not substantially contribute to cumulative impacts in the Action Area because of the minor nature and magnitude of the specific impacts which may occur. Additionally, the Coast Guard's mission includes mitigation and regulatory enforcement of potential cumulative risks, such as fishing and oil spill response. Risks associated with increases in marine traffic must be addressed as more data become available; however, the low density of Coast Guard vessels in the large Action Area and BMPs will minimize effects to listed species present in the Action Area as a result of Coast Guard activities.

Both natural and human-induced factors affect the health of marine species populations. Temporary disturbance associated with Coast Guard activities could result in an incremental contribution to cumulative impacts on listed species, but the contribution from the proposed activities are minimal compared to other activities such as oil and gas exploration and extraction. Generally, if there is any effect on marine species, those would likely be brief behavioral disturbances. While it is remotely possible that a marine species could be injured during operational and training activities, the contribution from the proposed activities are minimal. Therefore, the incremental impacts of the Proposed Action would not present a significant contribution to the effects on marine mammals and seabirds when added to effects from other reasonably foreseeable actions.

6 CONCLUSIONS

Tables 6-1 and 6-2 summarize the effects determinations for Endangered Species Act-listed species and Critical Habitats under National Marine Fisheries Servie and United States Fish and Wildlife Service jurisdictions, respectively.

6.1 NATIONAL MARINE FISHERIES SERVICE JURISDICTIONAL SPECIES

6.1.1 Marine Mammals

Table 6-1: Determination for Endangered Species Act-Listed species under National Marine Fisheries Service Jurisdiction

Species	Population/DPS	Federal Status[1]	Coast Guard Determinations	
			Species	Critical Habitat
Cetaceans				
Bowhead whale	Western Arctic	E	NLAA	N/A
Fin whale	Alaska (Northeast Pacific)	E	NLAA	N/A
Humpback whale	Western and Central North Pacific Stocks	E	NLAA	N/A
North Pacific right whale	Eastern North Pacific	E	NLAA	No effect
Pinnipeds				
Bearded seal	Beringia Stock	T	NLAA	N/A
Ringed seal	Arctic Stock	T	NLAA	N/A
Steller Sea Lion	Western DPS	E	NLAA	NLAA

DPS: Distinct Population Segment; E: endangered; N/A: not applicable; NLAA: may affect, not likely to adversely affect; T: threatened

6.1.2 Essential Fish Habitat

United States Coast Guard (Coast Guard) operation and training activities under the Proposed Action are minor, and mainly involve the movement of surface vessels in and around Port Clarence, Nome, and Barrow and helicopter support out of existing facilities. Most of these activities would have no impacts to fish populations or designated Essential Fish Habitat (EFH) within the Bering, Chukchi, or Beaufort seas. The sole exception would be SAR operations involving the use of expendable self-locating buoys. However, given the infrequency of use and small number deployed, any impacts to EFH would be minimal. Likewise, when combining these factors with the amount of habitat designated as EFH for a given species and life stage and the low probability of that EFH being impacted, potential effects from deployed self-locating buoys would be near negligible and may affect, but are not likely to adversely affect designated EFH in the action area.

In contrast, implementation of the Preferred Alternative would increase the Coast Guard's presence in Alaska and, subsequently, increase their ability and capacity to respond to environmental threats and enforce fishing restrictions and prohibitions. As a result,

implementation of the Preferred Alternative may also have some indirect beneficial effects to federally-managed species and EFH.

6.2 UNITED STATES FISH AND WILDLIFE SERVICE JURISDICTIONAL SPECIES

Table 6-2: Determination for Endangered Species Act-Listed species under United States Fish and Wildlife Service Jurisdiction

Species	Population/DPS	Federal Status[1]	Coast Guard Determinations	
			Species	Critical Habitat
Marine Mammals				
Pacific walrus	N/A	C	NLAA	N/A
Polar bear	Chukchi Sea, Southern Beaufort Sea	T	NLAA	N/A
Birds				
Short-tailed albatross		E	NLAA	N/A
Spectacled eider		T	NLAA	No effect
Steller's eider		T	NLAA	No effect
Yellow-billed loon		C	NLAA	N/A

C: candidate for listing; DPS: Distinct Population Segment; E: endangered; N/A: not applicable; NLAA: may affect, not likely to adversely affect; T: threatened

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APPENDIX A – BIRD INTERACTION PROTOCOL AND REPORTING

For each **DEAD** bird collected, the following information will be included in a report to the USFWS (see data sheet, page A-3):

- Bird ID number as follows: *vesselname_date_00x*
- Bird species and sex, if known. DO NOT GUESS. If "unknown," indicate by UNBI
- Date of collision, if known.
    - If the collision date is unknown, record that the collision date as "unknown." If not known, indicate date bird collection date *in a separate data field*.
- Exact or estimated time of collision. A time range is okay, up to 12 hours.
    - If the time cannot be estimated, record that the time as "unknown."
- Vessel name
- Vessel activity
- Specific location on vessel where the bird was collected
- Vessel location decimal degrees
- Sea where collision took place
- Lighting conditions on vessel at time of collision
    - If the lighting conditions are unknown at time of collision, record this as "unknown."
- Estimated weather conditions at time of collision (e.g., cloud cover or fog, wind direction and speed, and precipitation (rain, snow, sleet)
    - If the weather conditions are unknown at time of collision, record this as "unknown."
- Carcass condition
- Photos of the bird as found in the field as well as close-ups of the bird with wings spread and with breast visible
- Include a "notes" section for other information, including a narrative regarding the incident

For each **LIVE** bird collected, include all the information above, except:

- Instead of "carcass condition," record as "alive." In the "notes" section, describe the condition of the (alive) bird, including injuries and behaviors.

All bird interaction reports for each vessel will also be summarized in a single spreadsheet.

Collecting birds:

Birds are to be frozen as collected and then sent at one time at the end of the project. Please collect all sea ducks (for example, all eiders and long-tailed ducks) and loons. Collect these birds in the following manner:

- Label each bird with the bird ID from above, date collected, and date of collision (this may be "unknown").
- Place each bird in a separate, closed bag.
- Place in freezer

Collected birds should be chilled and packaged for shipping. A copy of the Report should be included in the package. Keep a separate copy of the report on file. The bird or birds should be shipped to the Fairbanks FWS office (usually via GoldStreak – **with instructions <u>on the outside of the box</u> to be kept chilled when it arrives in Fairbanks**). Contact Angela Matz or Chris Latty (with Shannon Torrence as the third backup) to inform you are sending a bird. Birds should NOT be shipped on a Friday as there will be no one to pick up the package until Monday (or Tuesday, if Monday is a holiday).

Report all bird interactions via email to alaskabirdreport@fws.gov with "**USCG Operations, SEASON YEAR**" in the Subject Line (Replace SEASON and YEAR with appropriate date). Use current format of placing all information and pictures in a pdf.

If the bird is thought to be an endangered or threatened species (short-tailed albatross or spectacled or Steller's eider) or candidate species (yellow-billed loon) contact either Ted Swem or Shannon Torrence directly, either by phone or email, *in addition to sending the Report/photos to the alaskabirdreport email*. You do not need to send photos or detailed information to Ted or Shannon, as that information will be included in the alaskabirdreport email. Just inform them you may have a threatened or candidate species.

Contacts:

Threatened/Candidate Species
Ted Swem
Ted_Swem@fws.gov
907-456-0441

or

Shannon Torrence
Shannon_Torrence@fws.gov
907-455-1871

*Shipping (all birds)**
Angela Matz or Chris Latty
U.S. Fish and Wildlife Service
Fairbanks Field Office
101 12th Ave., Rm 110
Fairbanks, AK 99701
(907) 456-0291
***Mark all packages as "perishable – refrigerate immediately"**

BIRD STRIKE/DOWNING FORM
U.S. Coast Guard District 17
VESSEL _____
Site/Location _____

E-mail form to: alaskabirdreport@fws.gov and Shannon_Torrence@fws.gov
Information: Louise_Smith@fws.gov, 907-456-0306, Eiders and Loons: Shannon_Torrence@fws.gov 907-455-1871.

Record number: _____ Date (DD/MM/YY): _____

Observer(s): _____Time found (00:00–23:59):_____

Lat: N Long: W Datum: (NAD83 WGS84, decimal degrees): _____

Operational activity: _____

Photos taken: Y / N Photo filenames: _____
(Please fill camera frame with bird, preferably with wing out for "unknown," small birds. A 2nd picture with breast showing would also help with ID.)

ENVIRONMENT
Light conditions: _____ daylight _____ dusk (dim light)_____night (dark)
Cloud or Fog cover (circle/darken most appropriate): 0% 25% 50% 75% 100%
General weather when bird was found (clear, fog, rain, snow, wind, moon phase, etc.):

_____

General weather in past 24 hours: _____

BIRD
Collision/downing observed? Y N Bird location: _____

Species: _____ Number of birds in this downing event: _____

Bird collided with (describe, if known): _____

Sex (if known): male female unknown _____

Age (if known): juvenile subadult adult unknown _____

Status: (alive, injured, dead, recovered, flew away, etc.) _____

Describe injury (if applicable): _____

ADDITIONAL COMMENTS/DESCRIPTION OF EVENT (if known):

_____
_____
_____
_____
_____