UNITED STATES COAST GUARD (COAST GUARD) PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT AND OVERSEAS ENVIRONMENTAL IMPACT STATEMENT FOR THE OFFSHORE PATROL CUTTER ACQUISITION PROGRAM

DOCUMENT NUMBER: USCG-2021-0738
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Abstract: The United States Coast Guard (Coast Guard) prepared this Programmatic Environmental Impact Statement/Overseas Environmental Impact Statement (PEIS/POEIS) to comply with the National Environmental Policy Act (NEPA) and Executive Order 12114, Environmental Effects Abroad of Major Federal Actions. The Coast Guard identified its need to address the current and long-term mission demand with a reliable and operationally available presence to accomplish assigned missions in offshore waters. Typical OPC operations would occur between 12 nautical miles (nm; 22 kilometers (km) from shore and inside 200 nm (370 km), but they can be deployed anywhere around the globe where national interests require. From 1964 to 1991, the Coast Guard acquired thirty Medium Endurance Cutters (MEC); however, as the MECs age, they are becoming technologically obsolete and increasingly expensive to maintain and operate. The Proposed Action would allow the Coast Guard to provide surface assets to bridge the operational capability gap between the National Security Cutters that patrol the open ocean and the Fast Response Cutters, which primarily operate within 50 nm (93 km) from shore to meet mission requirements and support the United States' economic, commercial, maritime, and national security needs. The following four Alternatives were analyzed in the PEIS/POEIS:

- The No Action Alternative included Coast Guard's acquisition and operation of four Offshore Patrol Cutters (OPC) that are under contract and the fulfillment of its missions in the Atlantic Ocean, Gulf of Mexico, and Pacific Ocean (including Alaska and Hawaii and Pacific Islands) using existing assets, which are reaching the end of their service lives.
- Alternative 1 (Preferred Alternative, referred to as the "Proposed Action") included the construction and operation of up to 25 OPCs to fulfill mission requirements in offshore waters.
- Alternative 2 included the acquisition of fewer OPCs after the completion of the first four (which are under contract).
- Alternative 3 included the acquisition of fewer OPCs after the completion of the first four (which are under contract) and various forms of cutter purchase or lease, or inheriting vessels from the United States Navy.

In this PEIS/POEIS, the Coast Guard broadly analyzed potential impacts on physical, biological, and socioeconomic environmental resources resulting from proposed activities under the alternatives. Evaluated resources included: air quality; ambient sound; marine vegetation; invertebrates; fish; essential fish habitat; birds; marine reptiles; marine mammals; commercial fishing; marine construction; mineral extraction; oil and gas exploration; recreation and tourism; research; renewable energy; transportation and shipping; and subsistence hunting and fishing.

DATE OF PUBLICATION: 10 June 2022
COMMENTS MUST BE RECEIVED: 10 July 2022

1 June 2022 Date	Tom Huffman Thomas Huffman Document Preparer[1]	OPC Ship Integration Manager Title/Position	
I reviewed the Programmatic environmental impact statement (PEIS)/overseas environmental impact statement (POEIS) and submitted my written comments to the Proponent.			
01 Jun 2022 Date	Andrew Haley Andrew Haley Environmental Reviewer[2]	Chief, CG-47 Title/Position	*Level III* Provisional, Interim I, II, or III
I reviewed the PEIS/POEIS and submitted my written comments to the Proponent.			
01 Jun 2022 Date	Andrew Haley Andrew Haley Senior Environmental Professional[2]	Chief CG-47 Title/Position	Level III Interim, II, or III
I have reviewed the PEIS/POEIS and submitted my written comments to the Proponent.			
01Jun2022 Date	Margaret P. Howard Margaret Howard Legal Reviewer[1]	Chief, CG-LMIE Title/Position	
In reaching my decision/recommendation on the Coast Guard's proposed action, I considered the information contained in this PEIS/POEIS and considered and acknowledge the written comments submitted to me from the Environmental and Legal Reviewers.			
02 Jun 2022 Date	Andrew T. Pecora Andrew Pecora Proponent[1]	Program Manager USCG Title/Position	

[1] A Coast Guard attorney in District Legal, Legal Services Command, or Commandant (CG-LMI-E) must sign as Legal Reviewer. The individual that signs as the Proponent cannot also sign as Environmental Reviewer or Senior Environmental Professional. All signatories must be Coast Guard military or federal employees. Contractors must not sign Coast Guard environmental planning documents.

[2] A Coast Guard attorney in District Legal, Legal Services Command, or Commandant (CG-LMI-E) must sign as Legal Reviewer. The individual that signs as the Proponent cannot also sign as Environmental Reviewer or Senior Environmental Professional. All signatories must be Coast Guard military or federal employees. Contractors must not sign Coast Guard environmental planning documents.

U.S. Department of Homeland Security

United States Coast Guard

OFFSHORE PATROL CUTTER ACQUISITION PROGRAM

FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT/ OVERSEAS ENVIRONMENTAL IMPACT STATEMENT

U.S. Coast Guard Headquarters

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Washington, DC 20593

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United States Coast Guard

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for

OFFSHORE PATROL CUTTER (OPC) ACQUISITION PROGRAM

Lead Agency:	United States Coast Guard
Cooperating Agency:	None
Title of the Proposed Action:	Offshore Patrol Cutter (OPC) Acquisition Program
Designation:	Final Programmatic Environmental Impact Statement/Overseas Environmental Impact Statement

Abstract

The United States Coast Guard (Coast Guard) prepared this Programmatic Environmental Impact Statement/Overseas Environmental Impact Statement (PEIS/POEIS) to comply with the National Environmental Policy Act (NEPA) and Executive Order 12114, *Environmental Effects Abroad of Major Federal Actions*. The Coast Guard identified its need to address the current and long-term mission demand with a reliable and operationally available presence to accomplish assigned missions in offshore waters. Typical OPC operations would occur between 12 nautical miles (nm; 22 kilometers (km) from shore and inside 200 nm (370 km), but they can be deployed anywhere around the globe where national interests require. From 1964 to 1991, the Coast Guard acquired thirty Medium Endurance Cutters (MEC); however, as the MECs age, they are becoming technologically obsolete and increasingly expensive to maintain and operate. The Proposed Action would allow the Coast Guard to provide surface assets to bridge the operational capability gap between the National Security Cutters that patrol the open ocean and the Fast Response Cutters, which primarily operate within 50 nm (93 km) from shore to meet mission requirements and support the United States' economic, commercial, maritime, and national security needs. The following four Alternatives were analyzed in the PEIS/POEIS:

- The No Action Alternative included Coast Guard's acquisition and operation of four Offshore Patrol Cutters (OPC) that are under contract and the fulfillment of its missions in the Atlantic Ocean, Gulf of Mexico, and Pacific Ocean (including Alaska and Hawaii and Pacific Islands) using existing assets, which are reaching the end of their service lives.
- Alternative 1 (Preferred Alternative, referred to as the "Proposed Action") included the construction and operation of up to 25 OPCs to fulfill mission requirements in waters exceeding 50 nm (93 km).
- Alternative 2 included the acquisition of fewer OPCs after the completion of the first four (which are under contract).
- Alternative 3 included the acquisition of fewer OPCs after the completion of the first four (which are under contract) and various forms of cutter purchase or lease, or inheriting vessels from the United States Navy.

In this PEIS/POEIS, the Coast Guard broadly analyzed potential impacts on physical, biological, and socioeconomic environmental resources resulting from proposed activities under the alternatives.

Evaluated resources included: air quality; ambient sound; marine vegetation; invertebrates; fish; essential fish habitat; birds; marine reptiles; marine mammals; commercial fishing; marine construction; mineral extraction; oil and gas exploration; recreation and tourism; research; renewable energy; transportation and shipping; and subsistence hunting and fishing. A Notice of Availability and request for comments was published in the Federal Register Notice (86 FR 52162; September 20, 2021) to notify the public of the 45-day public review period for the Draft PEIS/POEIS. The comments are reproduced in Appendix I and annotated with Coast Guard's specific responses to comments. Appendix J identifies the changes between the Draft and Final PEIS/POEIS.

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202-372-1821

Executive Summary

ES.1 Introduction

The United States Coast Guard (Coast Guard), a military, multi-mission, maritime service within the Department of Homeland Security (DHS), is proposing to continue the acquisition of up to 25 Offshore Patrol Cutters (OPCs) each with a design service life of 30 years to replace 28 aging Medium Endurance Cutters (MECs; *Famous* and *Reliance*-Class) which would or have already been decommissioned. This Programmatic Environmental Impact Statement/Programmatic Overseas Environmental Impact Statement (PEIS/POEIS) was prepared in accordance with the National Environmental Policy Act (NEPA; 40 CFR 1502.14(d)); the regulations implemented by the Council on Environmental Quality (CEQ); Executive Order (EO) 12114, *Environmental Effects Abroad of Major Federal Actions*; DHS Directive Number 023-01 Rev 01 and DHS Instruction Manual 023-01-001-01, Rev 01; and Coast Guard Commandant Instruction 5090.1. This PEIS/POEIS considers the potential impact or harm of a Proposed Action to acquire up to 21 OPCs and for the full operation of up to 25 total OPCs.

The OPC program is a DHS Level 1 Major Acquisition Program that provides surface assets to bridge the Coast Guard's operational capability gap between the National Security Cutters (NSC) that patrol the open ocean and the Fast Response Cutters (FRC), which primarily operate within 50 nm (93 km) from shore. The purpose of the OPC program is to provide the Coast Guard with a reliable and operationally available presence to accomplish assigned missions in offshore waters (Figure 2-1). Typical OPC operations would occur between 12 nautical miles (nm; 22 kilometers (km) from shore and inside 200 nm (370 km), but they can be deployed anywhere around the globe where national interests require. The complete OPC Program of Record comprises 25 OPCs. OPC Stage 1 is already under contract to provide the first four OPCs. OPC Stage 2 is the focus of this PEIS/POEIS and would provide the remaining 21 OPCs.

This PEIS/POEIS assesses the reasonably foreseeable impact or harm to physical, biological, and socioeconomic resources that could result from the full operation of up to 25 total OPCs. It also describes the affected environment as it currently exists based on available information; the environmental consequences of incorporation of up to 25 OPCs into the Coast Guard's fleet to replace the operational capabilities of the 28 MECs; and associated OPC operations and training in the proposed action areas. Below is a summary of the purpose and need, each of the alternatives, and their potential impact or harm.

ES.2 Purpose and Need for the Proposed Action

The Coast Guard ensures the Nation's maritime safety, security, and stewardship. Its missions have evolved in response to changing national and international maritime security needs. The purpose of the OPC program is to provide the Coast Guard with a reliable and operationally available presence to accomplish assigned missions in offshore waters primarily between 12 nm (22 km) from shore and inside 200 nm (370 km). These missions may require an extended on-scene vessel presence, a long transit time to reach the operational area, or a forward deployment of forces in support of national defense. Therefore, the Coast Guard proposes to acquire and operate up to 25 OPCs to bridge the Coast Guard's operational capability gap between the National Security Cutters that patrol the open ocean and the Fast Response Cutters, which primarily operate within 50 nm (93 km) from shore. The need for new OPCs is to replace the aging MECs (*Famous* and *Reliance*-Class) and the USCGC ALEX HALEY because they are becoming technologically obsolete and increasingly expensive to maintain and operate.

ES.3 Public Involvement

The public scoping period began with issuance of the Notice of Intent (NOI) in the Federal Register (85 FR 73491; November 18, 2020). The scoping period lasted 45 days, concluding on January 4, 2021, and one comment was received. The public was provided a variety of methods to comment on the scope of the PEIS/POEIS during the scoping period. The NOI also announced the public scoping process and invited the public to participate. The Coast Guard developed a website for the public to view the Draft PEIS/POEIS: https://www.dcms.uscg.mil/Our-Organization/Assistant-Commandant-for-Engineering-Logistics-CG-4-/Program-Offices/Environmental-Management/Environmental-Planning-and-Historic-Preservation. A Notice of Availability and request for comments was published in the Federal Register Notice (86 FR 52162; September 20, 2021) to notify the public of the 45-day public review period for the Draft PEIS/POEIS. Comments from the public are addressed in Appendix I.

The Coast Guard will issue a Record of Decision once the Final PEIS/POEIS has been made publicly available for 30 days. Scoping for preparation of the Draft PEIS/POEIS and public commenting on the Draft PEIS/POEIS were used to obtain input from stakeholders, including individuals, public interest organizations, governmental agencies, and tribes. This input was used to develop the alternatives and issues analyzed in this PEIS/POEIS.

ES.4 Environmental Analysis and Mitigation

The Coast Guard has prepared this PEIS/POEIS based on international, federal, state, and local laws, statutes, regulations, and policies that are pertinent to the implementation of the Proposed Action. The topics addressed in this PEIS/POEIS include physical resources (noise and air quality), biological resources (including special status species), and socioeconomic resources. This PEIS/POEIS describes the affected environment as it currently exists based on available information; the environmental consequences of incorporation of up to 25 OPCs into the Coast Guard's fleet to replace the operational capabilities of the 28 operational, aging MECs; and associated OPC operations and training in the proposed action areas. This PEIS/POEIS analyzes expected vessel operation and training activities for OPC-1 up to OPC-25, based on the operations and training activities of the current Coast Guard fleet of MECs. There are no anticipated significant changes between the current fleet's operations and training activities and future OPC operations and training activities.

Stressors associated with the Proposed Action that may potentially impact or harm the environment include: acoustic stressors, such as the fathometer and Doppler speed log, vessel, aircraft, and gunnery noise, and physical stressors, such as vessel and aircraft movement, and military expended materials (MEM). The potential environmental consequences of these stressors have been analyzed in this PEIS/POEIS for resources associated with the physical, biological, and socioeconomic environments. Because the potential for impact or harm was considered to be negligible or nonexistent, the following resources were not evaluated in this PEIS/POEIS: airspace, floodplains and wetlands, geology, land use, terrestrial environment, water quality, wild and scenic rivers, terrestrial wildlife, aesthetic resources, archaeological/historical resources, cultural resources, environmental justice, infrastructure, and utilities.

The Coast Guard submitted a request for consultation under Section 7 of the ESA to the United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) on December 21, 2021 for those endangered or threatened species under their respective jurisdictions. On April 13, 2022, the Coast Guard sent a letter to the USFWS and NMFS under Section 7(d) of the ESA, indicating that the

Coast Guard would proceed with the contract award and vessel construction. The Coast Guard determined that the design and construction of the OPCs would not constitute an irreversible or irretrievable commitment of resources which would foreclose the formulation or implementation of reasonable and prudent alternative measures that may be included in future biological opinions issued by the Services. The Coast Guard also requested consultation under the Magnuson-Stevens Fishery Conservation and Management Act on designated EFH and anticipates completion before the first OPC is constructed. The determinations presented herein may be modified as a result of the ESA and EFH consultations. The Coast Guard anticipates that any reasonable and prudent alternatives would focus on the future operations of the OPCs and not the design and construction of the vessels. Additionally, the design and build of the OPCs would have no effect on ESA-listed species or designated critical habitat.

The Coast Guard anticipates that both NMFS and the USFWS will issue their programmatic biological opinions on the Proposed Action in 2022. The Coast Guard recognizes that new information regarding the Proposed Action and biological resources in the proposed action area may change before the first OPC is operational (as soon as 2024). As part of the programmatic consultation process, the Coast Guard will continue to coordinate with both regulatory agencies and if necessary, reconsult under section 7 of the ESA if there are any changes in the Proposed Action or biological resources in the proposed action areas. The Coast Guard is not requesting authorization under Section 101(a)(5) of the Marine Mammal Protection Act (MMPA) at this time, because the Proposed Action discussed in this PEIS/POEIS would not deliver the first operational OPC until 2024. This PEIS/POEIS may contain information relevant and applicable to assist with future Coast Guard consultations that are in support of a request for future incidental take authorizations under the MMPA. Under the Magnuson-Stevens Fishery Conservation and Management Act, the Coast Guard determined that all activities of the Proposed Action would have no significant adverse effect on designated EFH.

On the basis of the analyses in this PEIS/POEIS, the types of impacts that could occur during routine operations and training activities would be similar among the action alternatives. The alternatives principally differ on the basis of vessel acquisition. Coast Guard currently uses a variety of guidance and proactive operational measures to help minimize the environmental impacts of Coast Guard vessels and aircraft. Although SOPs are established on a vessel-by-vessel basis, standard operating procedures (SOPs) for OPCs are not currently developed, since OPCs are not yet operational; however, those used on MECs are provided in Appendix C of this PEIS/POEIS. These SOPs are subject to change, given the timeframe until all OPC vessels are fully operational.

ES.4.1 Alternative 1: Preferred Alternative or Proposed Action

The Coast Guard is proposing to continue the acquisition of up to 25 OPCs with a design service life of 30 years to replace 28 aging MECs which would be or have already been decommissioned. All acquired OPCs (OPC-1 through OPC-25) would accomplish missions previously assigned to the 28 operational MECs. Similar to the current MEC fleet's operations, the Proposed Action would include vessel and aircraft operations as well as training exercises to meet the Coast Guard's mission responsibilities in the Atlantic and Pacific Oceans (including Alaska), and Gulf of Mexico, as described in the proposed action areas (Section 2.2). The OPC program is considered the Coast Guard's top acquisition priority and these cutters would provide the majority of the Coast Guard's offshore presence (USCG 2019).

The completion of the first OPC is expected in 2023 and it would be operational in 2024. The projected construction completion date of all 25 OPCs is 2037. The missions that OPCs would perform are:

- Ports, Waterways, and Coastal Security,
- Search and Rescue,
- Drug Interdiction,
- Migrant Interdiction,
- Living Marine Resources,
- Other Law Enforcement, and
- Defense Readiness.

Table ES- 1 provides a summary of activities associated with the Proposed Action and defines the proposed action areas where these activities are expected to occur. The activities in Table ES- 1 are not expected to occur during transit. Further information on the Proposed Action is provided in Chapter 2 of this document.

Table ES- 1. Summary of Proposed Action Activities and Applicable Proposed Action Areas

Activity[1]	*Proposed Action Area*						
	NW-ATL	***NW-ATL Florida and the Caribbean***	***GoMEX***	***NEPAC-South***	***NEPAC-North***	***AK***	***HI-PAC***
All Assets							
Law Enforcement	x	x	x	x	x	x	x
Defense Readiness Training		x[3]		x[4]			x[5]
Search and Rescue Training[2]	x	x	x	x	x	x	x
Vessels							
Crew and Passenger Transfer (via OTH boat)	x	x	x	x	x	x	x
Gunnery Training[6]	x	x	x	x	x	x	x
Functionality & Maneuverability Testing and Propulsion Test	x	x	x	x	x	x	x
Vessel Escort[2]	x	x	x	x	x	x	x
Vessel Tow[2]	x	x	x	x	x	x	x
Fueling Underway		x		x			x
Foreign Port of Call Visit		x	x				x
Aircraft							
Vertical Replenishments (Helicopter)	x	x	x	x	x	x	x
Helicopter Landing Qualifications	x	x	x	x	x	x	x
Reconnaissance (Helicopter or UAS)	x	x	x	x	x	x	x
Crew and Passenger Transfer (via Helicopter)	x	x	x	x	x	x	x
UAS deployment	x	x	x	x	x	x	x

[1] Patrols would encompass all activities listed in table.

[2] Excluding the emergency response associated with these activities.

[3] The Navy's Jacksonville Operating Area, off Florida and Georgia.

[4] The Navy's Fleet Training Area Hot range located within the Southern California Offshore range.

[5] In Hawaii, Coast Guard participates in large-scale naval exercises bi-annually, such as Rim of the Pacific Exercise.

[6] Every district has authorized locations for minor caliber gunnery exercises (0.50 caliber/7.62mm). Locations are reviewed and agreed upon by Coast Guard, FAA, and NOAA.

ES.4.2 Summary of Environmental Analysis and Consequences (Preferred Alternative or Proposed Action)

ES.4.2.1. Acoustic Stressors

Acoustic stressors associated with the Proposed Action (Table ES- 2) include the noise from the fathometer and Doppler speed log (i.e., navigational technologies), vessel noise, aircraft noise, and gunnery noise. Acoustic stressors may be analyzed for both in-water and in-air impacts, depending on the ability of the sound to cross the air-water interface and the species presence (underwater or in-air) when able to detect the sound. Potential acoustic impacts may include auditory masking (a sound interferes with the audibility of another sound that marine organisms may rely on), permanent threshold shift, temporary threshold shift, or a behavioral response. In assessing the potential impact or harm to species from acoustic sources, a variety of factors were considered, including source characteristics (Table ES-2), animal presence, animal hearing range, duration of exposure, and impact thresholds for those species that may be present. The Coast Guard evaluated the data and conducted an analysis of the species distribution and likely responses to the acoustic stressors based on available scientific literature. In general, if hearing ranges of different species groups did not overlap with the frequency of the acoustic sources, further analysis was not conducted in this PEIS/POEIS. If hearing ranges did overlap, the analysis in this PEIS/POEIS considered the temporary nature of the Proposed Action and the current ambient noise levels in the proposed action areas, which all limited the exposure and impact from acoustic stressors to those species.

Table ES- 2. Characteristics of Sound Sources Associated with the Proposed Action

Source Type	*Frequency Range (in Hz or kHz)*	*Source Level (1 µPa= in-water 20 µPa= in-air)*	*Associated Action*
Small vessel (OTH boats)	1–7 kHz	175 dB re 1 µPa at 1 m	Law enforcement, SAR training, crew and passenger transfer
Large vessel (OPC)	20–300 Hz	190 dB re 1 µPa at 1 m	OPC operations and training
Single-beam echosounder (i.e., fathometer)	3.5–1,000 kHz (50–200 kHz)[a]	205[b] dB re 1 µPa at 1 m	OPC operations, training, and testing
Doppler speed log	270–284 kHz	-	OPC operations, training, and testing
Helicopter (low flying MH-60 Jayhawk or MH-65 Dolphin; 100 ft above sea surface)	20 Hz–5 kHz	136 dB re 20 µPa 138 dB re 1 µPa	Law enforcement, SAR training, crew and passenger transfer, reconnaissance
UAS	60–150 Hz	80 dB re 20 µPa	Reconnaissance, UAS deployment
Gunnery (inert, non-explosive small caliber [0.50 caliber or MK-38 standard 25 mm]) gun rounds)	Ranging from 150 Hz–2.5 kHz (with a peak from 900 Hz–1.5 kHz)	139–154 dB re 20 µPa at 50 ft (15 m)	Gunnery training

Based on the analysis, impacts from acoustic sources associated with the Proposed Action are expected to result in, at most, minor to moderate behavioral responses over short and intermittent periods. Table ES- 3 summarizes the potential acoustic impacts to all resources from acoustic stressors. For those species listed as endangered or threatened under Section 7 of the ESA, they would not be expected to respond to acoustic stressors associated with the Proposed Action in ways that would significantly disrupt normal behavior patterns, which include, but are not limited to: migration, breathing, nursing, breeding, feeding, or sheltering. Acoustic stressors from the Proposed Action would not cause population level effects to any ESA-listed species in the proposed action areas. The Coast Guard also evaluated the potential impacts to critical habitat and determined that the Proposed Action would not cause the destruction or adverse modification of critical habitat in OPC operational or transit areas.

Table ES- 3. Summary of Impacts to Resources in the Proposed Action Areas from Acoustic Stressors

Potentially Impacted Resource	*Summary of Impacts from Acoustic Stressors*
Ambient sound	No significant impact or harm
Marine invertebrates	No significant impact or harm
Birds	No significant impact or harm
Marine fish	No significant impact or harm
Essential fish habitat (EFH)	No significant impact or harm
Marine reptiles	No significant impact or harm
Marine mammals	No significant impact or harm

ES.4.2.2. Physical Stressors

Physical stressors (Table ES- 4) associated with the Proposed Action that may impact or harm the environment include vessel movement, aircraft movement, and MEM. Vessels and aircraft associated with the Proposed Action would be widely dispersed throughout the proposed action areas. The physical presence of aircraft, vessels, and crew elicit behavioral reactions cause by visual or auditory cues. In assessing the potential impact or harm to species from physical sources, a variety of factors were considered, including vessel and aircraft operation characteristics, animal presence, and likelihood of exposure. The Coast Guard evaluated the data and conducted an analysis of the species distribution and likely responses to the physical stressors based on available scientific literature. Behavioral responses often include changes in general activity (e.g., from resting or feeding to active avoidance), changes in surface respiration or dive cycles (marine mammals), and changes in speed and direction of movement. The severity and type of response exhibited by an individual may also include previous encounters with vessel or aircraft. Some species have been noted to tolerate slow-moving vessels within several hundred meters, especially when the vessel is not directed toward the animal and when there are no sudden changes in direction or engine speed (Richardson et al. 1995). However, vessels and aircraft could collide with resources found in all proposed action areas.

Table ES- 4. Characteristics of Physical Stressors Associated with the Proposed Action

Physical Stressor	*Speed*	*Activity*
Vessel movement: OPC vessel	12–16 knots	General operation
	5 knots	Towing another vessel
	7–19 knots	Escort of another vessel
	-	Anchoring
Vessel movement: OTH boat	10–20 knots	
Aircraft movement: Helicopter (MH-60 Jayhawk)	159 knots	Transport of personnel, training
Aircraft movement: Helicopter (MH-65 Dolphin)	148 knots	Transport of personnel, training
Aircraft movement: UAS	Estimated <50 mi/hr [80 km/hr])	Data collection
MEM: inert small caliber (0.50 caliber or MK-38 standard [25 mm]) gun rounds and surface targets	floating, sinking	Gunnery training

Table ES- 4 details the operational speeds for the OPCs and OTH boats, depending on activity type, including specialized tasks, such as vessel tow or vessel escort. OPCs and OTH boats would not operate at their maximum speeds unless involved in an emergency response, which would not be part of the Proposed Action.

Anchoring the OPC would not occur during vessel transit and would only occur in soft-bottom areas that are intended for this purpose. Areas typically used by Coast Guard vessels are commonly used by all types of vessels to set an anchor and, as a result, these areas are frequently disturbed by regular vessel anchoring activity.

Table ES- 4 details the speeds at which the aircraft, including helicopters and UAS would generally operate, depending on activity. In general, helicopter flights would primarily maintain altitudes of 2,000 ft (610 m) as long as navigationally safe to do so. Typically, aircraft stay at or above 2,000 ft (610 m) in environmentally sensitive areas (COMDTINST M3710.1 [series]).

Based on the analysis, impacts from physical stressors associated with the Proposed Action are expected to result in, at most, minor to moderate behavioral responses over short and intermittent periods. Table ES- 5 summarizes the potential impacts to all resources from physical stressors.

Table ES- 5. Summary of Impacts to Resources in the Proposed Action Areas from Physical Stressors

Potentially Impacted Resource	*Summary of Impacts from Physical Stressors*
Marine vegetation	No significant impact or harm
Marine invertebrates	No significant impact or harm
Birds	No significant impact or harm
Marine fish	No significant impact or harm
Essential fish habitat (EFH)	No significant impact or harm
Marine reptiles	No significant impact or harm
Marine mammals	No significant impact or harm

Devices associated with the Proposed Action with a potential for entanglement include the lines used in vessel tow. For an organism to become entangled in a line or material, the materials must have certain properties, such as the ability to form loops and a high breaking strength. Towing lines would not be expected to have any loops or slack. The likelihood that a biological resource would become entangled in tow lines is extremely low. As shown in Table ES- 5, vessel movement, aircraft movement, and MEM would not result in significant impact or harm to marine vegetation, marine invertebrates, birds, marine fish, EFH, marine reptiles, and marine mammals.

Those species listed as endangered or threatened under Section 7 of the ESA would not be expected to respond in ways that would significantly disrupt normal behavior patterns, which include, but are not limited to: migration, breathing, nursing, breeding, feeding, or sheltering. Physical stressors from the Proposed Action would not cause population level effects to any ESA-listed species in the proposed action areas. The Coast Guard also evaluated the potential impacts to critical habitat and determined that the Proposed Action would not cause the destruction or adverse modification of critical habitat in OPC operational or transit areas.

ES.4.2.3. Socioeconomic Resources

Socioeconomic resources include those that provide economic value to the communities within the proposed action areas. For the Proposed Action, these industries are commercial fishing, marine construction, mineral extraction, oil and gas extraction, marine recreation and tourism, renewable energy, research, subsistence fishing and hunting, and transportation and shipping.

These resources may be found nearshore (within 3 nm of shore), coastally (more than 3 nm offshore but less than 12 nm offshore), and offshore (more than 12 nm offshore). To evaluate the Proposed Action, the Coast Guard considered the area from shore to 12 nm as the area where an OPC would be expected to transit to and from its respective homeport to the operational area. The operational area of the OPC, therefore, would be defined as more than 12 nm from shore within each proposed action area. The Coast Guard analyzed the patterns of existing and emerging ocean uses in the U.S. waters similar to D'Iorio et al. (2015), summarizing the overall footprint of marine uses throughout state (0–3 nm) and federal (3–200 nm) waters. For the purposes of the analysis in this PEIS/POEIS, nearshore, coastal, and oceanic zones are presented as reference points for the zones in which OPCs would be expected to transit or conduct operational activities.

ES.4.3 Alternative 2: Reduced Acquisition

Under Alternative 2, the Coast Guard would explore the acquisition of fewer OPCs after the completion of OPC-1 through OPC-4 (which are still under contract). Five, ten, or fifteen OPCs would be considered via a re-competition of the original OPC contract as replacements for a corresponding number of in-service MECs. The Coast Guard would then replace the remaining MECs on a one-for-one basis, using whatever replacement hulls the Coast Guard could obtain when deterioration or obsolescence requires decommissioning. Operations and training using OPCs acquired under Alternative 2 are the same as for Alternative 1. The life cycle training and logistical costs of maintaining several unique hulls would exceed the corresponding costs of maintaining a class of 25 cutters that would be built specifically to conduct missions in proposed action areas. Costs and challenges are similar to what are described under Alternative 3.

Alternative 2 would not result in significant impact or harm to physical, biological, or socioeconomic resources. Under Alternative 2, those species listed as endangered or threatened under Section 7 of the ESA would not be expected to respond in ways that would significantly disrupt normal behavior patterns, which include, but are not limited to: migration, breathing, nursing, breeding, feeding, or sheltering. Alternative 2 would not cause population level effects to any ESA-listed species in the proposed action areas. The Coast Guard also evaluated the potential impacts to critical habitat and determined that the Alternative 2 would not cause the destruction or adverse modification of critical habitat in OPC operational or transit areas.

ES.4.4 Alternative 3: Purchase, Lease, or Inherit

Under Alternative 3, the Coast Guard would explore various forms of cutter purchase or lease, or inherit vessels from the U.S. Navy as the need arises. This would mean that as each MEC reaches or surpasses the end of its economic service life, that cutter would not necessarily be replaced with the same type of asset or by an asset with similar capabilities. This one-for-one MEC replacement would cost far more per replacement hull because it eliminates any workforce savings associated with a ship with capabilities designed specifically to conduct Coast Guard missions in areas primarily between 12 nm (22 km) from shore and inside 200 nm (370 km) from shore. One of the major challenges with this approach is that the Coast Guard would not have an integrated system of systems, thus assets would not be able to communicate in real time, they would operate at differing levels of efficiency (resulting in decreased efficiency throughout the system), and maintenance costs would be higher.

Alternative 3 would not result in significant impact or harm to physical, biological, or socioeconomic resources. Under Alternative 3, those species listed as endangered or threatened under Section 7 of the ESA would not be expected to respond in ways that would significantly disrupt normal behavior patterns, which include, but are not limited to: migration, breathing, nursing, breeding, feeding, or sheltering. Alternative 3 would not cause population level effects to any ESA-listed species in the proposed action areas. The Coast Guard also evaluated the potential impacts to critical habitat and determined that the Alternative 3 would not cause the destruction or adverse modification of critical habitat in OPC operational or transit areas.

ES.4.5 Alternative 4: No Action

The evaluation of a No Action Alternative is required by the regulations implementing NEPA (40 CFR 1502.14(d)). Under the No Action Alternative, the Coast Guard would acquire OPC-1 through OPC-4, then would fulfill its missions in the Atlantic Ocean, Gulf of Mexico, and Pacific Ocean (including Alaska, and Hawaii and Pacific Islands) using existing assets, which are reaching the end of their service lives. The existing assets would continue to age, causing a decrease in efficiency of machinery as well as an increased risk of equipment failure or damage, and would not be considered reliable for immediate emergency response. In addition, it would become more difficult for an aging fleet to remain in compliance with environmental laws and regulations and standards for safe operation. Further Service Life Extensions become more challenging as significant systems and parts are no longer available, which requires contracting for systems or parts to be made specifically for the vessel.

The No Action Alternative would also not meet the Coast Guard's statutory mission requirements in the Atlantic and Pacific Oceans and Gulf of Mexico by providing air, surface, and shore-side presence in those areas. The Coast Guard also enforces the Marine Mammal Protection Act (MMPA) and ESA, and without reliable Coast Guard presence, enforcement of these laws would be significantly reduced. As such, the No Action Alternative does not meet the purpose and need, but is included here for comparison of environmental impacts with the Preferred Alternative.

ES.5 Conclusion

The Proposed Action supports the Coast Guard's acquisition of up to 25 OPCs to fulfill mission requirements in offshore waters primarily between 12 nm (22 km) from shore and inside 200 nm (370 km). This PEIS/POEIS is consistent with the requirements of NEPA (42 U.S.C. 4321), CEQ regulations for implementing NEPA (40 CFR Part 1500); DHS Directive Number 023-01 Rev 01 and DHS Instruction Manual 023-01-001-01, Rev 01; Coast Guard Commandant Instruction 5090.1, Executive Order 12114, *Environmental Effects Abroad of Major Federal Actions*. The Coast Guard will issue a Record of Decision once the Final PEIS/POEIS has been made publicly available for 30 days. Scoping for preparation of the Draft PEIS/POEIS and public commenting on the Draft PEIS/POEIS were used to obtain input from stakeholders, including individuals, public interest organizations, governmental agencies, and tribes. This input was used to develop the alternatives and issues analyzed in this PEIS/POEIS. On the basis of the analyses in this PEIS/POEIS, the types of impacts that could occur during routine operations and training activities would be similar among the action alternatives. The alternatives principally differ on the basis of vessel acquisition. The first OPCs would potentially be operational as soon as 2024, with up to 25 OPCs delivered and operational by 2037. This PEIS/POEIS documents the acquisition and full operation of up to 25 OPCs.

The Coast Guard evaluated the Proposed Action, including acoustic stressors and physical stressors. Any potential environmental impacts would be temporary or short term and the Coast Guard's SOPs would appropriately and reasonably reduce the potential environmental impact or harm resulting from the Proposed Action. In the analysis of stressors, it was concluded that the Proposed Action would not likely result in significant impact or harm to the physical, biological, or socioeconomic environment.

Table ES- 6 provides a summary of impacts to each resource under each alternative. Pursuant to Section 7 of the ESA, the Coast Guard has made preliminary "may affect" those species under NMFS' and USFWS' jurisdiction (Table 3-27). Based on the information and analyses included in this PEIS/POEIS on the past, present, and reasonably foreseeable future actions within the proposed action areas, the Coast Guard has determined that the proposed OPC operations and training within the proposed action areas would not be expected to significantly contribute to the cumulative impacts on species, critical habitat, the environment, or socioeconomics.

Table ES- 6. Summary of Potential Impacts to Resources under each Alternative Considered

Resource	*Alternative 1*	*Alternative 2: Reduced Acquisition*	*Alternative 3: Purchase, Lease, or Inherit*	*Alternative 4: No Action*
Physical Environment				
Air Quality	The majority of the states within the proposed action areas are in attainment of the criteria pollutants; therefore, the General Conformity Rule does not apply. In those states which are not in attainment of the NAAQS (i.e., California, Connecticut, the Commonwealth of the Northern Mariana Islands, Florida, Georgia, Louisiana, Maryland, New Jersey, New York, Texas, Virginia, and Washington DC), air pollutant emissions would not result in violations of state or federal air quality standards because they would not have a measurable impact on air quality in land areas. Because MECs would be replaced with new, more efficient OPC vessels (overall fewer OPCs than MECs in the current fleet), there would be no change to baseline air quality conditions as a result of the Proposed Action.			No change to environmental baseline.
Ambient Sound	Ambient sound within the proposed action areas would be similar to what is currently present because the new OPC fleet would replace the aging MEC fleet. In addition, OPC assets would not be expected to alter current levels of ambient sound because noise created by the Proposed Action would occur intermittently (only for the duration that the sound is active) in any given location and would be spread over a very large area. Because vessels would be replaced with new, more efficient vessels (overall fewer OPCs than MECs in the current fleet) that have been built to modern stringent noise and vibration standards, there would be no change to baseline ambient sound conditions as a result of the Proposed Action.			No change to environmental baseline.
Biological Environment				
Marine Vegetation	Any impacts to marine vegetation would be limited to individual plants or seaweeds impacted by vessel movement or MEM. There would be no population level impacts to marine vegetation as a result of the Proposed Action.			No change to environmental baseline.
Marine Invertebrates	Any potential impacts to marine invertebrates would be limited to vessel noise and vessel movement. The area exposed to vessel disturbance would be a very small portion of the surface and water column in all proposed action areas, and only a small number of individuals would be affected compared to overall abundance. Therefore, the impact of vessel movement on marine invertebrates would be inconsequential. Activities are not expected to yield any lasting effects on the survival, growth, recruitment, or reproduction of invertebrate species at the population level. Potential impacts to marine invertebrates as a result of vessel noise include masking and behavioral responses in those species that may detect low-frequency noise. However, effects from vessel noise would be intermittent and would only impact those individual marine invertebrates that would be close to the vessel noise while in transit through the proposed action areas and is unlikely that any vessel noise would penetrate the benthic zone, the area inhabited by the higher densities of marine invertebrates.			No change to environmental baseline.

Resource	*Alternative 1*	*Alternative 2: Reduced Acquisition*	*Alternative 3: Purchase, Lease, or Inherit*	*Alternative 4: No Action*
Birds (Seabirds and Shorebirds)	Any potential impacts to birds would be from vessel noise, vessel movement, aircraft noise, aircraft movement, gunnery noise, and MEM associated with gunnery training from the Proposed Action. Most vessel use associated with the Proposed Action would occur in waters primarily between 12 nm (22 km) from shore and inside 200 nm (370 km) and would be widely distributed throughout the proposed action areas. The area exposed to noise and disturbance from vessels would be a small portion of the proposed action areas, and only a small number of individuals would be affected compared to overall abundance. Therefore, the impact of vessel movement and vessel noise on birds would be inconsequential and would not result in significant impact or harm to birds. Noise and movement resulting from overflights of aircraft would not be expected to cause more than short term behavioral responses in birds, including those ESA-listed species that may occur within the proposed action areas. Most weapons firing activities would occur far from shore, and those seabirds that forage or migrate greater than 3 nm (6 km) offshore are likely to detect and potentially respond to gunnery noise. Because of the small numbers of targets and gun rounds, and due to the distance and depth at which they would be dispersed across the proposed action areas, MEM would not present a significant threat to bird populations.			No change to environmental baseline.
Marine Fish	Any potential impacts to marine fish would be limited to fathometer and Doppler speed log noise and vessel noise, vessel movement, and MEM associated with gunnery training from the Proposed Action. Most vessel use associated with the Proposed Action would occur in waters primarily between 12 nm (22 km) from shore and inside 200 nm (370 km) and would be widely distributed throughout the proposed action areas. Vessel use in nearshore waters would limited to transit to and from the vessel's homeport. The area exposed to noise and disturbance from vessels would be a small portion of the proposed action areas, and only a small number of individuals would be affected compared to overall abundance. Due to the infrequent occurrence and the offshore location of gunnery training, MEM would not present a significant threat to marine fish populations.			No change to environmental baseline.
Essential Fish Habitat	Potential impacts to EFH would be limited to fathometer and Doppler speed log noise, vessel noise, vessel movement, and MEM associated with the Proposed Action. The potential reduction in the quality of the acoustic habitat as a result of fathometer and Doppler Speed log and vessel noise, as well as vessel movement, would be localized and temporary. Due to the attenuation of the echosounder and movement of the vessels throughout the proposed action areas, the quality of the water column environment as EFH would be restored to normal levels immediately following the departure of vessels. Additionally, anchoring would only occur in soft-bottom areas designated for this purpose. Due to the low density of gun rounds expected to be expended (500 per year), the reduction in quantity of benthic EFH in the offshore area as a result of MEM associated with gunnery training would be small in relation to the available EFH within the proposed action areas.			No change to environmental baseline.

Resource	*Alternative 1*	*Alternative 2: Reduced Acquisition*	*Alternative 3: Purchase, Lease, or Inherit*	*Alternative 4: No Action*
Marine Reptiles	Any potential impacts to marine reptiles would be limited to vessel noise, vessel movement, and MEM associated with gunnery training from the Proposed Action. Most vessel use associated with the Proposed Action would occur in waters primarily between 12 nm (22 km) from shore and inside 200 nm (370 km) and would be widely distributed throughout the proposed action areas. Vessel use in nearshore waters would be limited to transit to and from the vessel's homeport. The area exposed to noise and disturbance from vessels would be a small portion of the proposed action areas, and only a small number of individuals would be affected compared to overall abundance. Due to the infrequent occurrence and the offshore location of gunnery training, MEM would not present a significant threat to marine reptile populations.			No change to environmental baseline.
Marine Mammals	Any potential impacts to marine mammals would be from fathometer and Doppler speed log noise, vessel noise, aircraft noise, gunnery noise, vessel movement, aircraft movement, and MEM associated with the Proposed Action. Although there is a potential for behavioral responses by some species of marine mammals exposed to fathometer and Doppler speed log noise, Coast Guard would follow SOPs to minimize the impact or harm of this noise to marine mammals and federally-designated critical habitat. Effects from vessel noise would be intermittent and would only impact those individual marine mammals that would be close to the vessel while in transit through the proposed action areas. Though there may be some short term changes in behavior, any disturbance is expected to be temporary and any exposed animal is expected to return to its normal behavior after the vessel moves through the area. Aircraft would not operate at an altitude lower than 2,000 ft (610 m) within 0.5 mi (805 m) of marine mammals and would follow requirements of the Coast Guard Air Operations Manual (COMDTINST M3710.1 (series)). Short term behavioral responses to vessel movement would not be expected to result in long term impacts to individuals and marine mammals would be expected to return to their normal behavior once the vessel has moved through the area. Gunnery training would occur far from shore and in designated areas and marine mammals would not be expected to ingest MEM associated with the Proposed Action.			No change to environmental baseline.
Socioeconomic Environment				
Commercial and Recreational Fishing	The Proposed Action would positively impact all the proposed action areas through Coast Guard law enforcement (e.g., illegal fishing), national security activities, and maritime safety/search and rescue. The Proposed Action would not result in significant negative impacts or significant harm to commercial or recreational fishing.			No change to environmental baseline.
Research, Transportation and Shipping, and Tourism	The Proposed Action would positively impact all the proposed action areas through Coast Guard law enforcement (e.g., unlawful activities), national security activities, and maritime safety/search and rescue. The Proposed Action would not result in significant negative impacts or significant harm to research, transportation and shipping, or tourism.			No change to environmental baseline.

Resource	***Alternative 1***	***Alternative 2: Reduced Acquisition***	***Alternative 3: Purchase, Lease, or Inherit***	***Alternative 4: No Action***
Marine Construction, Mineral Extraction, Oil and Gas Extraction, and Renewable Energy	The Proposed Action would positively impact all the proposed action areas through Coast Guard law enforcement, national security activities, emergency response, and maritime safety/search and rescue. The Proposed Action would not result in significant negative impacts or significant harm to marine construction, mineral extraction, oil and gas extraction, or renewable energy.			No change to environmental baseline.
Subsistence Fishing and Hunting and Cultural Resources	The Proposed Action would positively impact subsistence fishing and hunting in the proposed action areas through Coast Guard law enforcement (e.g., illegal fishing), maritime safety/search and rescue, and emergency response. The Proposed Action would not result in significant negative impacts or significant harm to subsistence hunting. The Proposed Action would have no significant impact or significant harm on cultural resources in all proposed action areas as cultural resources would be avoided.			No change to environmental baseline.

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ACRONYMS AND ABBREVIATIONS

° C	degrees Celsius
° F	degrees Fahrenheit
° N	degrees North latitude
° S	degrees South latitude
° W	degrees West latitude
AK	Alaska proposed action area
BIA	Biologically Important Areas
BOEM	Bureau of Ocean Energy Management
CAA	Clean Air Act
CATEXs	Categorical Exclusions
CEQ	Council on Environmental Quality
CFMC	Caribbean Fishery Management Council
CFR	Code of Federal Regulations
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
cm	centimeter(s)
CNMI	Commonwealth of the Northern Mariana Islands
CNP	Central North Pacific
CO	carbon monoxide
CO_2	carbon dioxide
Coast Guard	United States Coast Guard
COP	Construction and Operations Plan
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibels
dBA	A-weighted decibel
dB re 1 µPa	decibels referenced at 1 micropascal (in-water)
dB re 20 µPa	decibels referenced at 20 micropascal (in-air)
DHS	Department of Homeland Security
DI	Drug Interdiction
DLQ	Deck Landing Qualifications
DPS	distinct population segment
DoD	Department of Defense
DR	Defense Readiness
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EFHA	Essential Fish Habitat Assessment
EIS	Environmental Impact Statement
ENP	Eastern North Pacific
ENOW	National Oceanic and Atmospheric Administration's Economics: National Ocean Watch
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act

ESU	evolutionary significant unit
ft^3	cubic feet
FAA	Federal Aviation Administration
FMC(s)	Fishery Management Councils
FMP(s)	Fishery Management Plan(s)
FR	Federal Register
FRC	Fast Response Cutter
FY	Fiscal Year
ft	foot (feet)
GDP	gross domestic product
GHGs	Greenhouse gases
GMFMC	Gulf of Mexico Fishery Management Council
GoMEX	Gulf of Mexico proposed action area
HAP	Hazardous Air Pollutants
HAPC	Habitat Areas of Particular Concern
HF	high-frequency
HI-PAC	Hawaii and Pacific Islands proposed action area
Hz	hertz
IMO	International Maritime Organization
in	inch(es)
IUCN	International Union for Nature Conservation
IWC	International Whaling Commission
kHz	kilohertz
km	kilometer(s)
km^2	square kilometers
km/hr	kilometers per hour
lb	pound(s)
LF	low-frequency
LMR	Living Marine Resources
m	meter(s)
m^3	cubic meters
MAFMC	Mid-Atlantic Fishery Management Council
MARPOL	International Convention for the Prevention of Pollution from Ships
MBTA	Migratory Bird Treaty Act
MEC	Medium Endurance Cutter
MEM	Military Expended Materials
MF	mid-frequency
mg/m^3	milligrams per cubic meter
$\mu g/m^3$	micrograms per cubic meter
MHI	Main Hawaiian Islands
mi	mile(s)
mi^2	square miles
mi/hr	miles per hour
MI	Migrant Interdiction
mm	millimeters
MMPA	Marine Mammal Protection Act
MRIP	Marine Recreational Information Program

MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSAT	Mobile Source Air Toxics
mtDNA	mitochondrial Deoxyribonucleic Acid
NAAQS	National Ambient Air Quality
Navy	U.S. Department of the Navy
NEC	North Equatorial Current
NEFMC	New England Fishery Management Council
NEPA	National Environmental Policy Act
NEPAC-North	Northeast Pacific-North proposed action area
NEPAC-South	Northeast Pacific-South proposed action area
NHPA	National Historic Preservation Act
nm	nautical mile(s)
NMFS	National Marine Fisheries Service
NMSA	National Marine Sanctuaries Act
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPFMC	North Pacific Fishery Management Council
NSC	National Security Cutter
NW-ATL	Northwest Atlantic proposed action area
NW-ATL-Florida and the Caribbean	Northwest Atlantic-Florida and the Caribbean proposed action area
NWHI	Northwestern Hawaiian Islands
0_3	Ozone
OLE	Other Law Enforcement
OPA	Oil Pollution Act
OPC	Offshore Patrol Cutter
OPSUM	Operational Summary
ORD	Operational Requirement Document
OTH	Over the Horizon
OW	otariid and non-phocid marine carnivores
Pb	Lead
PBF(s)	physical and biological features
PCE(s)	primary constituent elements
PEIS	Programmatic Environmental Impact Statement
PFMC	Pacific Fishery Management Council
POEIS	Programmatic Overseas Environmental Impact Statement
PM	particulate matter
ppm	parts per million
ppt	parts per thousand
PTS	Permanent Threshold Shift
PW	Phocid pinnipeds
PWCS	Ports, Waterways, and Coastal Security
RCRA	Resource and Recovery Act
SAFMC	South Atlantic Fishery Management Council
SAR	Search and Rescue

SCB	Southern California Bight
SEL	Sound Exposure Level
SIP	State Implementation Plan
$S0_2$	Sulfur dioxide
SOP(s)	Standard Operating Procedure(s)
SOSUS	Sound Surveillance System
SPL	Sound Pressure Level
SRKW	Southern Resident killer whale
TTS	Temporary Threshold Shift
UAS	Unmanned Aircraft Systems
U.S.	United States
U.S.C.	United States Code
USD	U.S. dollars
USCGC	United States Coast Guard Cutter
USFWS	U.S. Fish and Wildlife Service
VHF	Very high frequency
VOC(s)	volatile organic compounds
WMSM	Maritime Security Cutter, Medium
WNP	Western North Pacific
WPRFMC	Western Pacific Fishery Management Council
yd	yard

CHAPTER 1 Introduction

1.1 Background

The United States Coast Guard (Coast Guard) is a military, multi-mission, maritime service within the Department of Homeland Security (DHS) and one of the nation's five armed services. In executing its various missions, the Coast Guard protects the public, the environment, and United States (U.S.) economic and security interests in any maritime region, including international waters and the Nation's coasts, ports, and inland waterways, as required in support of national security. The Coast Guard is the only maritime agency that combines regulatory and law enforcement authority, military capabilities, and humanitarian operations.

Coast Guard operations occur in inland (e.g., the Great Lakes, the Mississippi River), coastal (within 12 nautical miles [nm] from shore [22 kilometers, [km]), and offshore waters (outside 12 nm [22 km] from shore). Mission demands in offshore waters 50 nm[1] (93 km) or more from shore may require an extended on-scene vessel presence, a long transit time to reach the operational area, or a forward deployment of forces in support of national defense. Coast Guard personnel may be deployed on missions that take place in offshore waters for several months at a time in a variety of climates.

From 1964 to 1991, the Coast Guard acquired thirty Medium Endurance Cutters (MEC). Cutters in the *Reliance*-class (210 feet [ft]; 64 meters [m]) were commissioned between 1964 and 1969. Of these cutters, 14 of the 16 MECs are still operational and homeported in the Atlantic, Pacific, and Gulf of Mexico Coast Guard operational areas. These cutters primarily execute maritime law enforcement and search and rescue (SAR) missions. Cutters in the *Famous*-class (270 ft [82 m]) were commissioned between 1979 and 1991 and all 13 are operational and homeported in the Atlantic and Gulf of Mexico Coast Guard operational areas. Additionally, a former U.S. Navy (Navy) rescue and salvage ship, U.S. Coast Guard Cutter (USCGC) ALEX HALEY, stationed in Kodiak, Alaska, was reconfigured for Coast Guard MEC missions and transferred to Coast Guard service in 1999. All of the MECs feature a flight deck for helicopter operations to primarily execute maritime law enforcement and SAR missions. As the MECs age, they are becoming technologically obsolete and increasingly expensive to maintain and operate.

1.2 Purpose and Need

The Coast Guard ensures the Nation's maritime safety, security, and stewardship. Its missions have evolved in response to changing national and international maritime security needs. The Offshore Patrol Cutter (OPC) program is a DHS Level 1 Major Acquisition Program to provide surface assets to bridge the Coast Guard's operational capability gap between the National Security Cutters (NSC) that patrol the open ocean and the Fast Response Cutters (FRC), which primarily operate within 50 nm (93 km) from shore. The purpose of the OPC program is to provide the Coast Guard with a reliable and operationally available presence to accomplish assigned missions in offshore waters. Typical OPC operations would occur between 12 nm (22 km) from shore and inside 200 nm (370 km), but they can be deployed anywhere around the globe where national interests require.. The need for new OPCs is to replace the aging MECs *(Famous* and *Reliance*-Class) and the USCGC ALEX HALEY because they are too old and costly to be operationally effective. Therefore, the Coast Guard proposes to acquire and operate up to 25 OPCs.

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[1] The 50 nm (93 km) demarcation of offshore operations is based on the following: 1) Per the Coast Guard's Search and Rescue Addendum, the maximum offshore distance is 50 nm (93 km) for a vessel under 50 ft (15 m). 2) Per 33 Code of Federal Regulations (CFR) Part 3, the Coast Guard limits the jurisdiction of all 35 sectors to 50 nm (93 km). Any mission operations that require assets to respond beyond 50 nm (93 km) fall under the jurisdiction of the District Commander or Pacific or Atlantic Area Commander.

1.3 Proposed Action

The Coast Guard is proposing to continue the acquisition of up to 25 OPCs with a design service life of 30 years to replace 28 aging MECs which would be or have already been decommissioned. This Programmatic Environmental Impact Statement (PEIS)/Overseas Environmental Impact Statement (POEIS) documents the acquisition of OPC-5 through OPC-25 (via a re-competition of the original OPC contract), as well as the operations and training of OPC-1 through OPC-25. All acquired OPCs (OPC-1 through OPC-25) would accomplish missions previously assigned to the 28 operational MECs. Once operational, the training tempo for OPCs would be similar to that of the current MEC fleet.

The initial OPC construction contract was awarded to Eastern Shipbuilding Group, Inc. located in Panama City, Florida in 2016. The Integrated Deepwater System Project Final Environmental Impact Statement (EIS) (USCG 2002) and associated Record of Decision provided the National Environmental Policy Act of 1969 (NEPA) compliance documentation to support that major federal action as defined by NEPA, which included the proposed acquisition and replacement of MECs. However, because of changes to the original acquisition program since 2002, the Coast Guard has prepared this PEIS/POEIS to provide NEPA compliance for the new OPC-5 through OPC-25 acquisition program. Further information on the Proposed Action is provided in Chapter 2 of this document.

1.4 Regulatory Setting

The Coast Guard's objectives are to ensure maritime safety, national maritime security, and to enforce laws under the Coast Guard's purview. The eleven Coast Guard missions are mandated by Public Law 107-296 and are covered under Title 14 United States Code (U.S.C.) and 6 U.S.C. § 468. The eleven Coast Guard missions are ports, waterways, and coastal security; drug interdiction; aids to navigation; search and rescue; living marine resources; marine safety; defense readiness; migrant interdiction; marine environmental protection; ice operations; and other law enforcement (e.g., illegal fishing). The subset of missions that OPCs would perform, are:

- Ports, Waterways, and Coastal Security,
- Search and Rescue,
- Drug Interdiction,
- Migrant Interdiction,
- Living Marine Resources,
- Other Law Enforcement, and
- Defense Readiness.

1.4.1 Scope of the Programmatic Environmental Impact Statement/Overseas Environmental Impact Statement

The Coast Guard has prepared this PEIS/POEIS in accordance with NEPA, as implemented by the Council on Environmental Quality (CEQ) Regulations (40 Code of Federal Regulations [CFR] §§ 1500 *et seq.*); DHS Directive Number 023-01, Rev 01 and DHS Instruction Manual 023-01-001-01, Rev 01; and Coast Guard Commandant Instruction 5090.1. The Coast Guard will issue a Record of Decision once the Final PEIS/POEIS has been made publicly available for 30 days.

The purposes for preparing this PEIS/POEIS are to:

- Update information in the Integrated Deepwater System Project Final EIS (USCG 2002) as it relates to MEC operations and training,
- Identify and assess the potential impacts on the natural and human environment that would result from the implementation of the Proposed Action,
- Describe and evaluate reasonable alternatives to the Proposed Action,
- Identify and recommend specific mitigation measures, as necessary, to avoid or minimize environmental effects, and
- Encourage and facilitate involvement by the public and interested agencies in the environmental review process.

The topics addressed in this PEIS/POEIS include physical resources (noise and air quality), biological resources (including special status species), and socioeconomic resources. This PEIS/POEIS describes the affected environment as it currently exists based on available information, the environmental consequences of incorporation of up to 25 OPCs into the Coast Guard's fleet to replace the operational capabilities of the 28 operational, aging MECs, and associated OPC operations and training in the proposed action areas (Figure 2-1). It also compares the project's potential impact or harm to that of various alternatives.

In April 2012, the Coast Guard received formal approval from DHS to contract for design and construction of the first replacement vessel for the MEC (referred to as OPC-1 in this document). The associated Integrated Deepwater System Project Final EIS (USCG 2002) and Record of Decision provided the NEPA documentation to support that major federal action.

As discussed above, the Eastern Shipbuilding Group, Inc. in Panama City, Florida was awarded the initial OPC contract in 2016. On October 18, 2018, their facility sustained widespread damage from Hurricane Michael, resulting in major construction delays. DHS determined extraordinary relief was necessary and allowed an adjustment to the contract, which included options for construction of up to four new vessels to replace the MEC (referred to as OPC-1 through OPC-4). On April 2, 2020, the Coast Guard further modified its contract with the Eastern Shipbuilding Group, Inc. to begin construction of the second vessel (referred to as OPC-2) and to acquire long lead-time material for OPC-3. The Coast Guard also awarded multiple industry study contracts on March 20, 2020 to assist in preparing a Request for Proposal for OPC follow-on production (for OPC-5 up to OPC-25).

The Coast Guard anticipates that supplemental NEPA documentation would be prepared in support of individual proposed homeporting, maintenance, and decommissioning. New information would be tiered[2] to this PEIS/POEIS and may include, but is not limited to, changes to a species listing status or any other applicable laws and directives. Categorical Exclusions (CATEXs) have been prepared or approved for the homeporting of OPC-1 through OPC-4. In addition to the acquisition of OPC-5 up to OPC-25, this PEIS/POEIS analyzes expected vessel operation and training activities for OPC-1 up to OPC-25, based on the operations and training activities of the current Coast Guard fleet of MECs. There are no anticipated significant changes between the current fleet's operations and training activities and future OPC operations and training activities.

[2] Tiering refers to the coverage of general matters in broader NEPA documentation (e.g., Environmental Impact Statement) with subsequent narrower-focused NEPA documents that incorporate by reference the general discussions from the broader NEPA document. This more focused NEPA document concentrates on the project-specific action(s) and appropriate specific issues (40 CFR 1508.28; see also 40 CFR 1500.4(i), 1502.4(d), 1502.20).

1.4.2 Agency Coordination Process

CEQ NEPA implementing regulations (85 FR 43304; July 16, 2020) require lead federal agencies preparing an EIS to determine if other federal agencies are interested and appear to be capable of assuming the responsibilities of becoming a cooperating agency under 40 CFR § 1501.8. "Cooperating agency" as defined under this title includes any other federal agency other than the lead agency that has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or reasonable alternative) for legislation or other major federal action that may significantly affect the quality of the human environment that should be addressed in the PEIS/POEIS.

In a 2002 Memorandum from CEQ for the Heads of Federal Agencies[3]: "The benefits of enhanced cooperating agency participation in the preparation of NEPA analyses include: disclosing relevant information early in the analytical process; applying available technical expertise and staff support; avoiding duplication with other Federal, State, Tribal and local procedures; and establishing a mechanism for addressing intergovernmental issues. Other benefits of enhanced cooperating agency participation include fostering intra- and intergovernmental trust (e.g., partnerships at the community level) and a common understanding and appreciation for various governmental roles in the NEPA process, as well as enhancing agencies' ability to adopt environmental documents. It is incumbent on Federal agency officials to identify as early as practicable in the environmental planning process those Federal, State, Tribal and local government agencies that have jurisdiction by law and special expertise with respect to all reasonable alternatives or significant environmental, social or economic impacts associated with a proposed action that requires NEPA analysis."

The Coast Guard is the lead federal agency for preparing this PEIS/POEIS. There are no cooperating federal agencies under 40 CFR § 1501.8.

1.5 Applicable Laws and Policies

The Coast Guard has prepared this PEIS/POEIS based on international, federal, state, and local laws, statutes, regulations, and policies that are pertinent to the implementation of the Proposed Action, including the following[4] :

- NEPA; 42 U.S.C. sections 4321–4370h, which requires an environmental analysis for major federal actions that have the potential to significantly impact the quality of the human environment;
- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR parts 1500–1508); and
- Executive Order (EO) 12114, which directs federal agencies to be informed of, and take account of, environmental considerations when making decisions regarding major federal actions outside the U.S., its territories, and possessions.

In accordance with NEPA and EO 12114, the Coast Guard has prepared this PEIS/POEIS, assessing the environmental impact of, and alternatives to, a major federal action that has the potential to significantly impact or harm the environment within the U.S. Exclusive Economic Zone (EEZ) and extending to the High Seas. Given the time frame between document preparation and when the first OPC may be operational, the Coast Guard acknowledges that updates to the information provided in this PEIS/POEIS may be necessary and would therefore follow appropriate processes to ensure compliance.

[3] Memorandum for the Heads of Federal Agencies, January 30, 2002, from James Connaughton, Chair "Cooperating Agencies in Implementing the Procedural Requirements of the National Environmental Policy Act."

[4] For a complete description of all the federal, tribal, state, and local statutes and regulations that are potentially applicable to the Proposed Action and Alternatives presented in this PEIS/POEIS, refer to Appendix A.

1.6 Public Outreach, Review and Comment

1.6.1 Project Website

A project website was established and can be found here:

https://www.dcms.uscg.mil/Our-Organization/Assistant-Commandant-for-Acquisitions-CG-9/Programs/Surface-Programs/Offshore-Patrol-Cutter/.

To facilitate public input, comments identified by docket number USCG-2020-0667 could be received using the Federal portal at https://www.regulations.gov or via email at HQS-SMB-OPCEIS@uscg.mil.

1.6.2 Scoping Period

The public scoping period began with issuance of the Notice of Intent (NOI) in the Federal Register (85 FR 73492; November 18, 2020). The scoping period lasted 45 days, concluding on January 4, 2021. The public was provided a variety of methods to comment on the scope of the PEIS/POEIS during the scoping period, including the email address provided in Section 1.6.1 above.

The NOI also announced the public scoping process and invited the public to participate.

The Coast Guard developed a website for the public to view the Draft PEIS/POEIS: https://www.dcms.uscg.mil/Our-Organization/Assistant-Commandant-for-Engineering-Logistics-CG-4-/Program-Offices/Environmental-Management/Environmental-Planning-and-Historic-Preservation.

1.6.2.1 Scoping Comments

Per 40 CFR § 1502.17, Coast Guard requested comments from the public during the scoping process that would serve to identify alternatives, information, and analyses for the agency's consideration. The U.S. Fish and Wildlife Service (USFWS) Alaska Region submitted comments, but they pertained to the ESA. The Coast Guard intends to address these comments from the USFWS during the ESA Section 7 consultation. No additional comments were received from the public. Additional information on the content of the correspondence and Coast Guard’s specific responses can be found in Appendix I, Response to Public Comments.

1.6.3 Notification of Availability of the Draft Programmatic Environmental Impact Statement

A Notice of Availability and request for comments was published in the Federal Register Notice (86 FR 52162; September 20, 2021) to notify the public of the 45 day public review period of the Draft PEIS/POEIS. The Coast Guard received comments from the U.S. Environmental Protection Agency and two comments from the public. Additional information on the content of the correspondence can be found in Appendix I.

1.7 Organization of this PEIS/POEIS

This PEIS/POEIS is organized as follows:

- Chapter 1: Provides background information, identifies the purpose and need for the Proposed Action, and the regulatory setting.
- Chapter 2: Describes proposed action areas and alternatives, including the preferred alternative and the Proposed Action.
- Chapter 3: Describes the affected environment and environmental consequences of the Proposed Action, including acoustic and physical stressors, and socioeconomic impacts.
- Chapter 4: Describes the consultation and coordination process.

- Chapter 5: Presents the conclusion.
- Chapter 6: Presents a list of preparers of the document.
- Chapter 7: Provides references.
- Appendix A: Describes applicable laws and policies referenced in this document.
- Appendix B: Describes foreign Exclusive Economic Zone or EEZ in applicable proposed action areas.
- Appendix C: Describes Coast Guard Standard Operating Procedures applicable to activities associated with the Proposed Action.
- Appendix D: Provides more detail on the propagation of sound.
- Appendix E: Describes the National Ambient Air Quality Standards or NAAQS.
- Appendix F: Describes species-specific hearing capabilities.
- Appendix G: Provides additional information about biological resources in the existing environment.
- Appendix H: Provides additional information about marine mammals that may occur in OPC transit areas.
- Appendix I: Provides comments to the Draft PEIS/POEIS and Coast Guard responses to public comments.
- Appendix J: Identifies changes made between the Draft PEIS/POEIS and the Final PEIS/POEIS.

CHAPTER 2 Proposed Action and Alternatives

The Coast Guard is proposing to continue the acquisition of up to 25 OPCs with a design service life of 30 years to replace 28 operational MECs which would be or have already been decommissioned. Two of the aged MECs have already been decommissioned. This PEIS/POEIS specifically documents the acquisition of OPC-5 through OPC-25 and the operations and training of OPCs-1–25. The Coast Guard's current OPC acquisition strategy is to acquire the first four OPCs under a contract already in place, and to re-compete the OPC contract for construction of OPC-5 through up to OPC-25.

The official class designation for a delivered OPC is Maritime Security Cutter, Medium (WMSM). The OPC program name and the WMSM cutter designation are used interchangeably, but principally differentiate between an OPC under construction and a WMSM after delivery. For example the first OPC, referred to herein as OPC-1, would become USCGC ARGUS (WMSM 915) after delivery to the Coast Guard in 2023. However, for the purposes of this PEIS/POEIS, the term OPC is used in this document.

Several possible alternatives to completing the Proposed Action were considered (Section 2.5). The no action alternative considered cancelling all future OPC acquisitions after completion of OPC-1 through OPC-4, which are already under contract with Eastern Shipbuilding Group, Inc. and replacing the remaining MECs on a one-for-one (asset for asset) basis, using whatever replacement hulls the Coast Guard could purchase, lease, or inherit from the Navy, as the need arose. Other alternatives considered included the OPC re-competition for a reduced quantity of OPCs (e.g., an additional 5, 10, or 15) to replace a corresponding number of in-service MECs, and then replacing the remaining MECs on a one-for-one basis, using whatever replacement hulls the Coast Guard could obtain when deterioration or obsolescence would force their decommissioning. This chapter identifies and describes the proposed action, and its alternatives, including the no action alternative. Because there are no anticipated significant changes to the Coast Guard's missions in the proposed action areas (Section 2.1), this PEIS/POEIS analyzes expected OPC operation and training activities based on the current MEC fleet's operation and training activities.

2.1 Description of Proposed Action Areas

In order to accurately capture all areas that may be impacted, both directly and indirectly, by the proposed operations and training activities of up to 25 OPCs, the Coast Guard analyzes seven proposed action areas in this PEIS/POEIS: Northwest Atlantic; Northwest Atlantic-Florida and the Caribbean; Gulf of Mexico; Northeast Pacific-South; Northeast Pacific-North; Alaska; and Hawaii and Pacific Islands (Figure 2-1). Missions would be conducted primarily 12 nm (22 km) beyond U.S. shores and within the 200 nm (370 km) boundary of the U.S. EEZ referred to as the "offshore operational area;" however, OPCs could be called upon to provide humanitarian aid and a law enforcement and military presence that may require that they operate globally in international waters. For the purposes of this analysis, each proposed action area may include waters classified as the High Seas—defined as international waters not within any nation's EEZ or territorial seas, as well as waters under the jurisdiction of a foreign government, classified as a Foreign EEZ (Appendix B) (USCG 2008). Therefore, each proposed action area extends beyond the U.S. EEZ, but within the Coast Guard's corresponding district boundary (Figure 2-1). OPCs may spend limited amounts of time in inland harbors, canals, or navigable waterways; however, this would only occur when the vessel is in transit between ports (e.g., shipbuilder and homeports) and not during vessel operations or training activities.

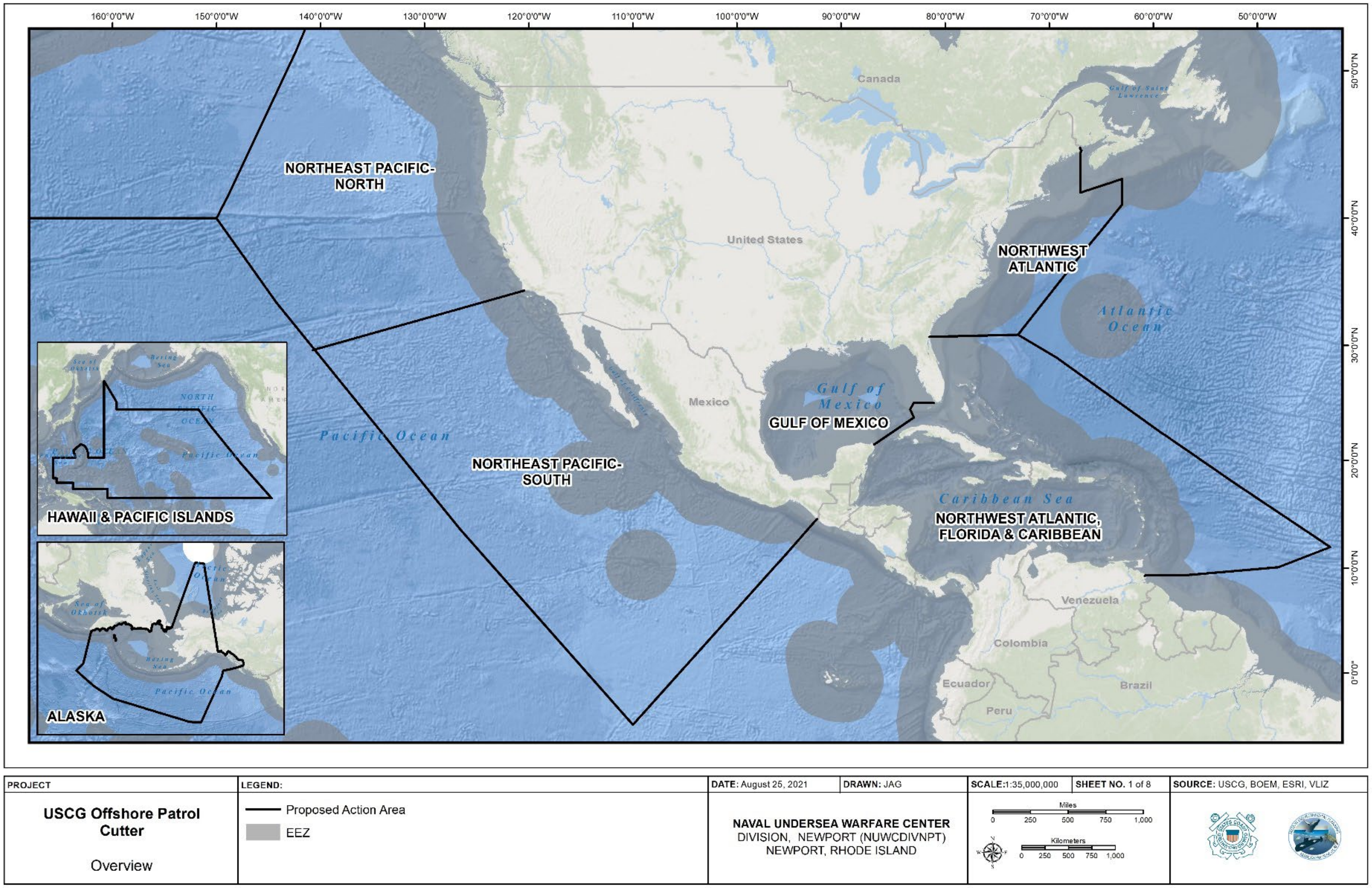


Figure 2-1. Overview of All OPC Proposed Action Areas

2.1.1 Northwest Atlantic Proposed Action Area

The Northwest Atlantic (NW-ATL) proposed action area (Figure 2-2) includes the U.S. state and territorial waters extending to the U.S. EEZ from the Canada/Maine border to the Georgia/Florida border, and areas of the Western Atlantic Ocean including areas of the Canadian EEZ (Appendix B) and the High Seas. The First and Fifth Coast Guard Districts manage this area. Ports within this proposed action area where OPCs may be berthed or deploy from include Norfolk, Virginia; Charleston, South Carolina; and Boston, Massachusetts (although none have been officially designated). Aircraft operations in support of the Proposed Action would primarily occur within 100 nm (185 km) of air stations such as Savannah, Georgia; Atlantic City, New Jersey; Elizabeth City, North Carolina; and Buzzards Bay (Cape Cod), Massachusetts.

2.1.2 Northwest Atlantic-Florida and the Caribbean

The Northwest Atlantic-Florida and the Caribbean (NW-ATL-Florida and the Caribbean) proposed action area (Figure 2-3) includes state and territorial waters extending to the U.S. EEZ off the east coast of Florida, including the Florida Keys (off of Monroe County, Florida), the Virgin Islands, the Bahamas, Cuba, the Commonwealth of Puerto Rico; and areas of the Western Atlantic Ocean, including the High Seas and Foreign EEZs (Appendix B) beyond the U.S. EEZ. The Seventh and Eighth Coast Guard Districts manage this area. A port where OPCs may be berthed or deploy from in this proposed action area is Mayport, Florida (although none have been officially designated). Aircraft operations in support of the Proposed Action would primarily occur within 100 nm (185 km) of air stations such as those in Miami, Florida or Borinquen, Puerto Rico.

2.1.3 Gulf of Mexico Proposed Action Area

The Gulf of Mexico (GoMEX) proposed action area (Figure 2-4) includes state and territorial waters extending to the U.S. EEZ off the West Coast of Florida, excluding the Florida Keys (off of Monroe County, Florida), to the East Coast of Mexico, including the Mexico Basin and Yucatán Shelf, as well as areas of the High Seas and Foreign EEZs (Appendix B). The Seventh and Eighth Coast Guard Districts manage this area. A port within this proposed action area where OPCs may be berthed or deploy from is Galveston, Texas (although none has been officially designated). Aircraft operations in support of the Proposed Action would primarily occur within 100 nm (185 km) of air stations such as those in Clearwater, Florida; Corpus Christi and Houston, Texas; and New Orleans, Louisiana.

2.1.4 Northeast Pacific–South Proposed Action Area

The Northeast Pacific-South (NEPAC-South) proposed action area (Figure 2-5) includes the Pacific Coast of the continental U.S from Central California (Point Conception) to Mexico, and Central America, and areas of the High Seas and Foreign EEZs (Appendix B). Operations in this proposed action area may also require transit through the Panama Canal. The Eleventh Coast Guard District manages this area. A port within the proposed action area where OPCs may be berthed or deploy from is Los Angeles/Long Beach, California. Air operations in support of the Proposed Action would primarily occur within 100 nm (185 km) of air stations such as that in San Diego, California. At least two OPCs would be homeported in Los Angeles/Long Beach (USCG 2016).

2.1.5 Northeast Pacific–North Proposed Action Area

The Northeast Pacific-North (NEPAC-North) proposed action area (Figure 2-6) extends from Point Conception, California, north to Oregon, Washington and into Canada, the High Seas and Foreign EEZs (Appendix B) beyond the U.S. EEZ. The Eleventh and Thirteenth Coast Guard Districts manage this area, including Canadian waters in the jurisdiction of the Thirteenth Coast Guard District. Ports within this proposed action area where OPCs may be berthed or deploy from could include Seattle, Washington (although none has been officially designated). Air operations in support of the Proposed Action would primarily occur within 100 nm (185 km) of air stations such as those in Sacramento, San Francisco, and Humboldt Bay, California and Seattle, Washington. At least two OPCs may be homeported in this proposed action area.

2.1.6 Alaska Proposed Action Area

The Alaska (AK) proposed action area (Figure 2-7) includes all waters surrounding the state of Alaska, the High Seas and Foreign EEZs (Appendix B) beyond the U.S. EEZ. This proposed action area covers a vast amount of ice-free open ocean, rivers, bays, and inlets extending from the Canadian border around the Aleutian Chain, above the Arctic Circle (which circles the Earth at 66 degrees [°] 30 minutes [′] North latitude [N]), and back to the Canadian border. The OPCs would not perform ice operations and would not typically operate in the Arctic Ocean, but may provide support to the Coast Guard's Polar Security Cutter that operates in this area. This proposed action area overlaps with the Seventeenth Coast Guard District. A port within this proposed action area where OPCs may be berthed or deploy from is Kodiak, Alaska. Air operations in support of the Proposed Action would primarily occur within 100 nm (185 km) of air stations such as those in Kodiak and Sitka, Alaska. At least two OPCs will be homeported in this proposed action area in Kodiak, Alaska (USCG 2008).

2.1.7 Hawaii and Pacific Islands Proposed Action Area

The Hawaii and Pacific Islands (HI-PAC) proposed action area (Figure 2-8) includes the waters surrounding the Hawaiian Islands and other Pacific U.S. protectorates and territories (including Guam, American Samoa, and regions of the Commonwealth of the Northern Mariana Islands [CNMI], collectively referred to as the Pacific Islands), as well as areas of the High Seas and Foreign EEZs (Appendix B). A port within this proposed action area where OPCs may be berthed or deploy from is Honolulu, Hawaii (although none has been officially designated). Aircraft operations in support of the Proposed Action would primarily occur within 100 nm (185 km) of air stations such as that in Barbers Point, Hawaii.

2.1.8 Proposed Action Area Maps

Maps of the NW-ATL proposed action area (Figure 2-2), the NW-ATL-Florida and the Caribbean proposed action area (Figure 2-3), the GoMEX proposed action area (Figure 2-4), the NEPAC-South proposed action area (Figure 2-5), NEPAC-North proposed action area (Figure 2-6), the AK proposed action area (Figure 2-7), and the HI-PAC proposed action area (Figure 2-8) are provided below.

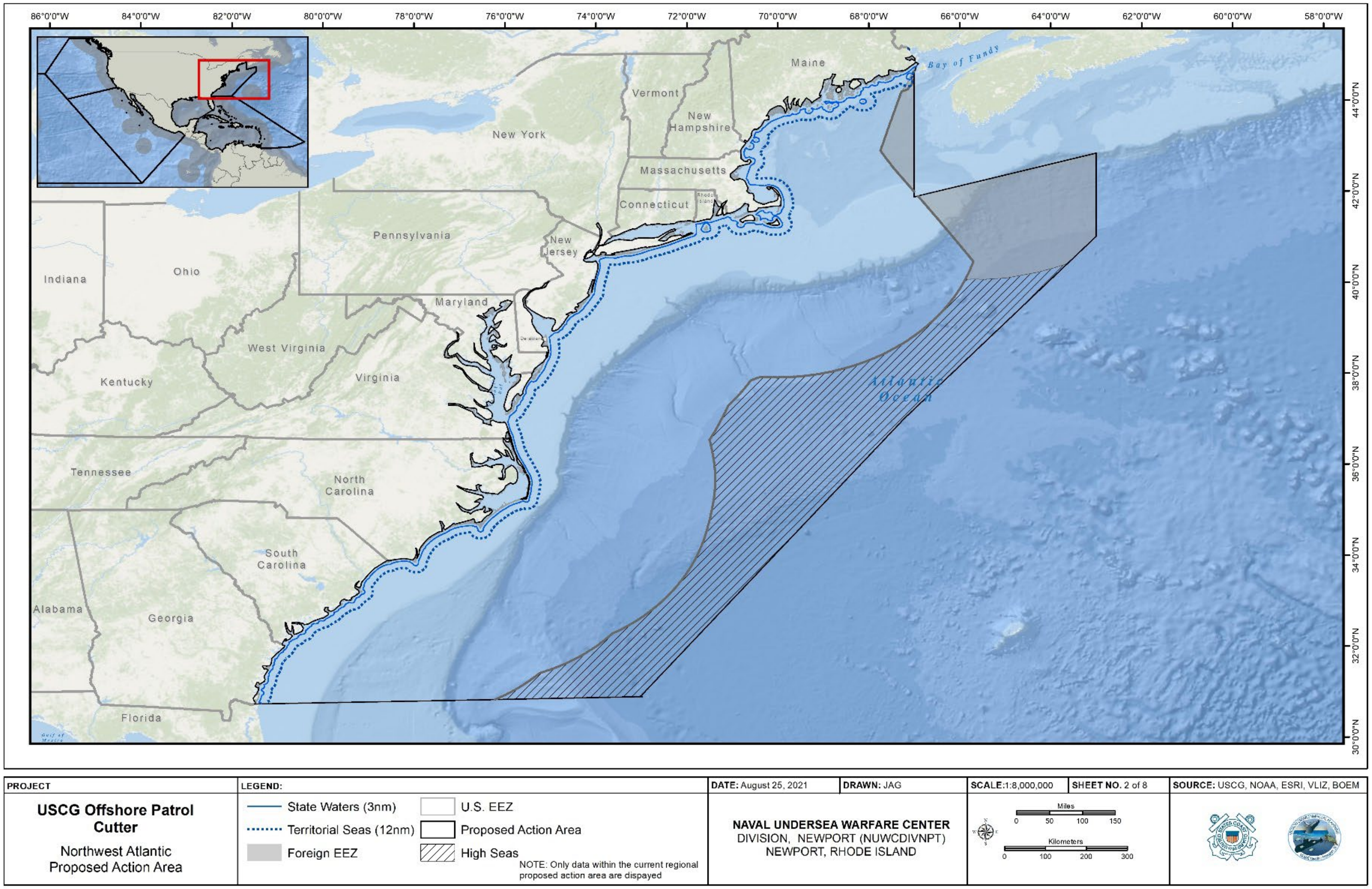
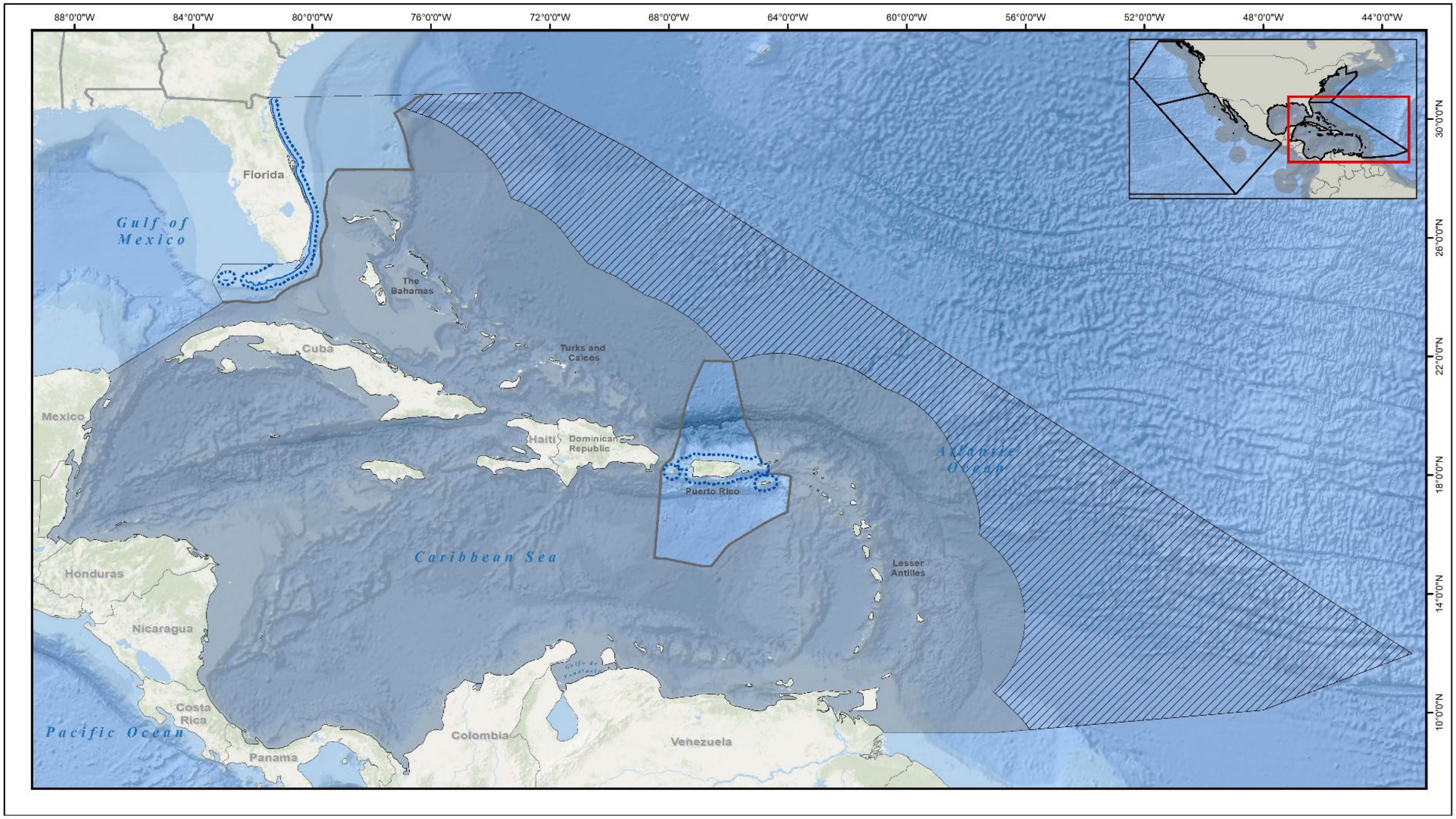


Figure 2-2. Northwest Atlantic Proposed Action Area



PROJECT	LEGEND:	DATE: August 25, 2021	DRAWN: JAG	SCALE:1:13,000,000	SHEET NO. 3 of 8	SOURCE: USCG, NOAA, ESRI, VLIZ, BOEM
USCG Offshore Patrol Cutter Northwest Atlantic, Florida and Caribbean Proposed Action Area	State Waters (3nm) Territorial Seas (12nm) Foreign EEZ U.S. EEZ Proposed Action Area High Seas NOTE: Only data within the current regional proposed action area are dispayed	**NAVAL UNDERSEA WARFARE CENTER** DIVISION, NEWPORT (NUWCDIVNPT) NEWPORT, RHODE ISLAND		Miles 0 50 100 150 200 250 Kilometers 0 100 200 300 400 500		

Figure 2-3. Northwest Atlantic-Florida and the Caribbean Proposed Action Area

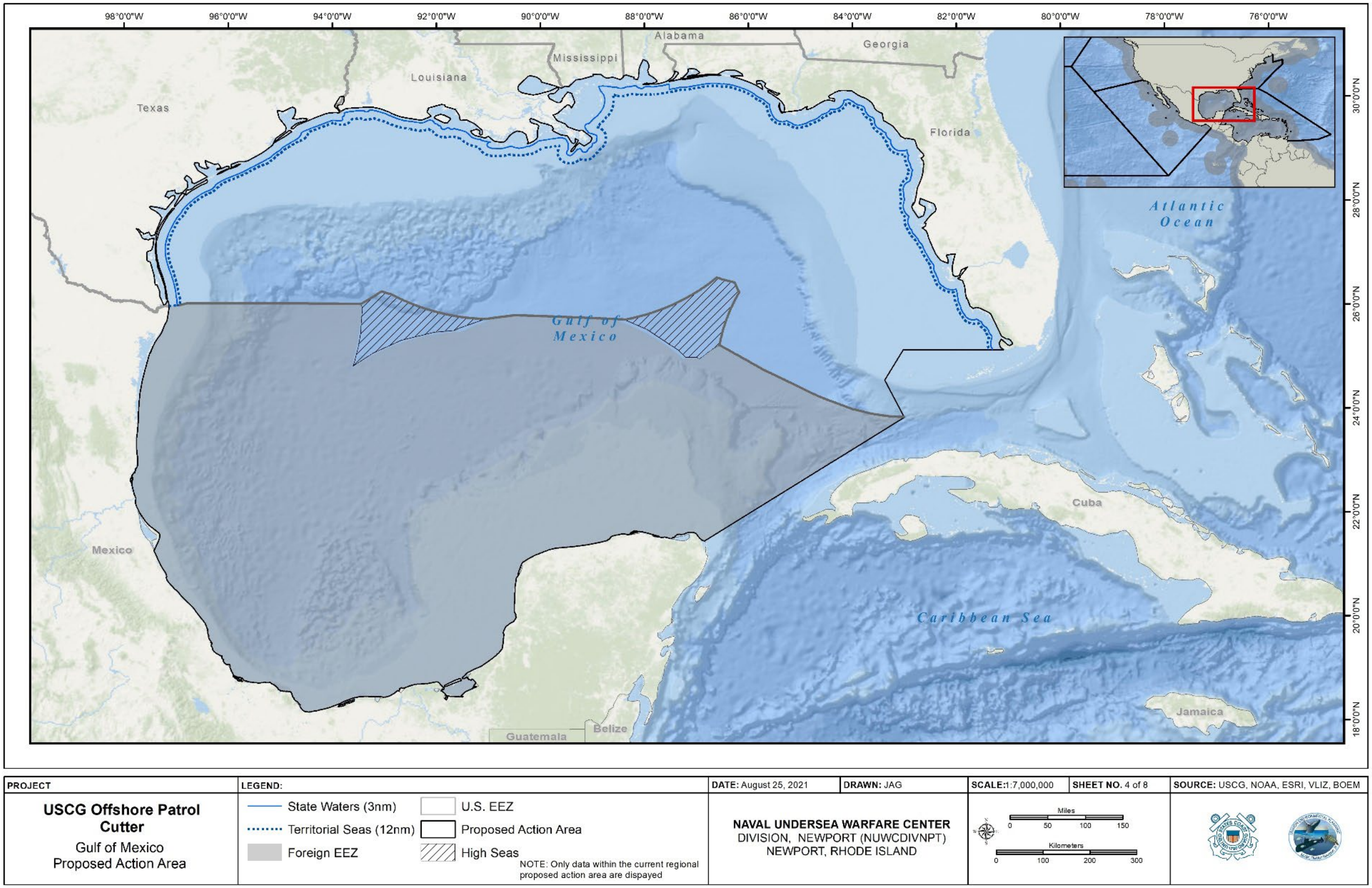


Figure 2-4. Gulf of Mexico Proposed Action Area

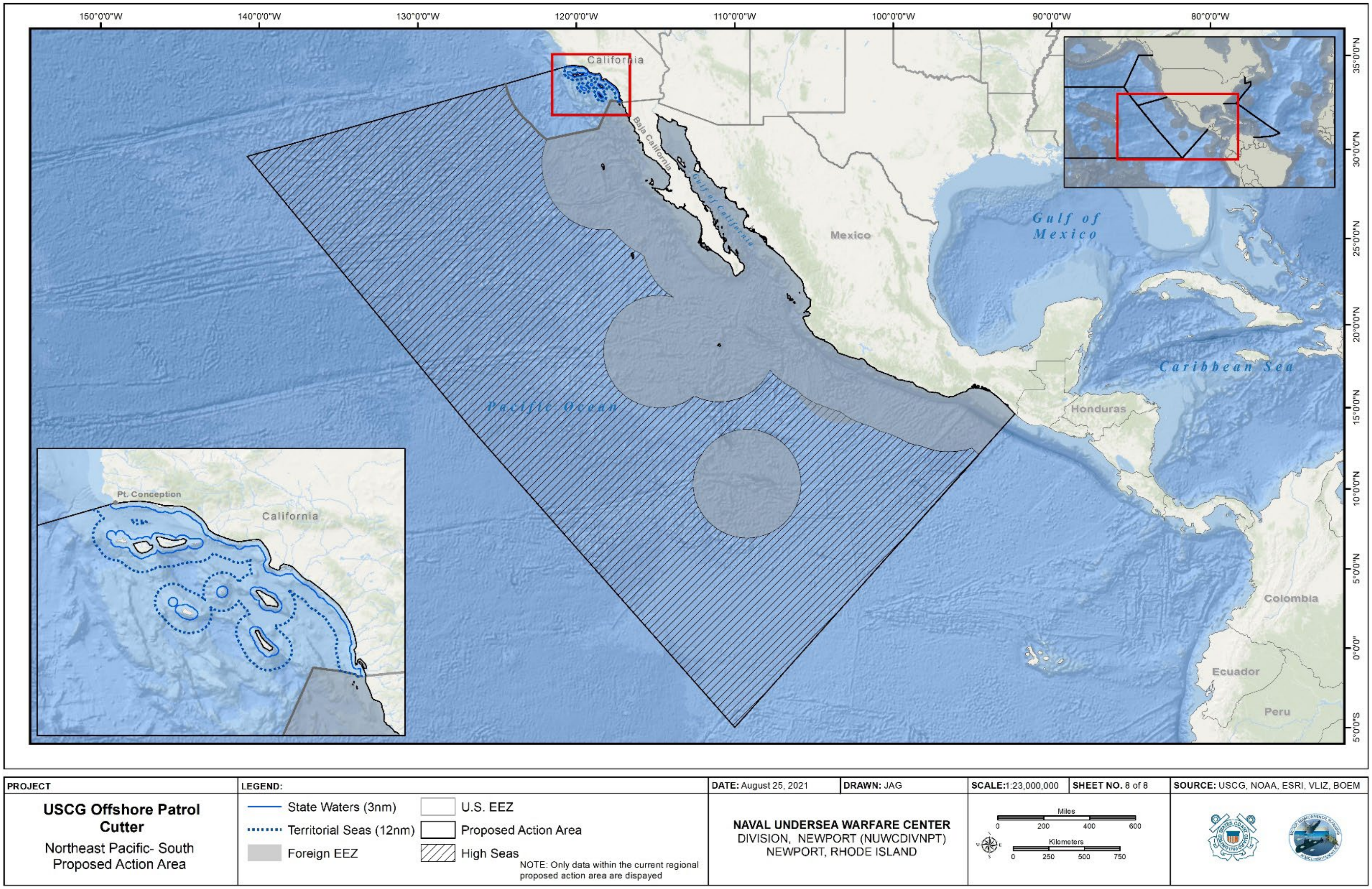


Figure 2-5. Northeast Pacific-South Proposed Action Area

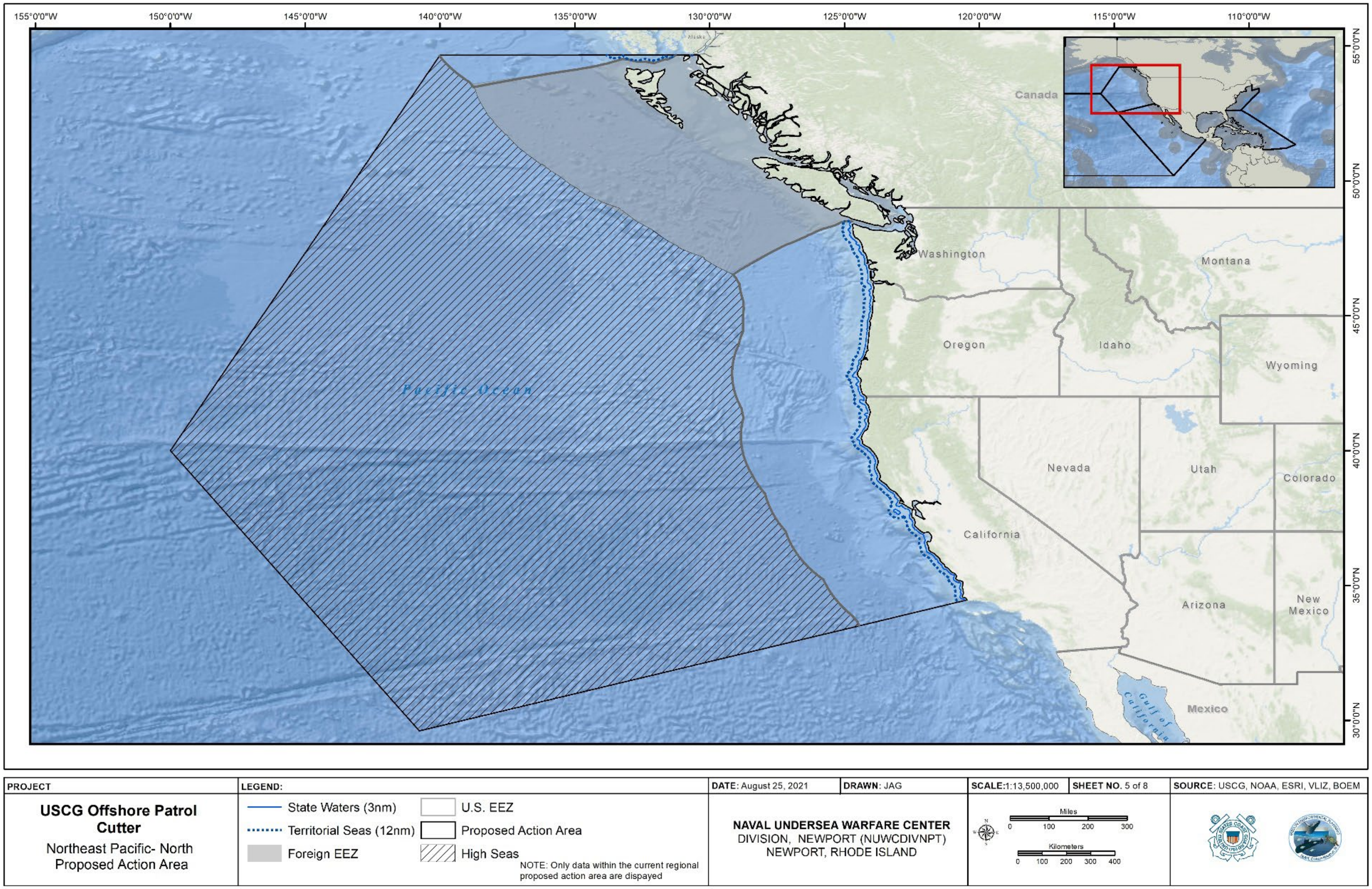
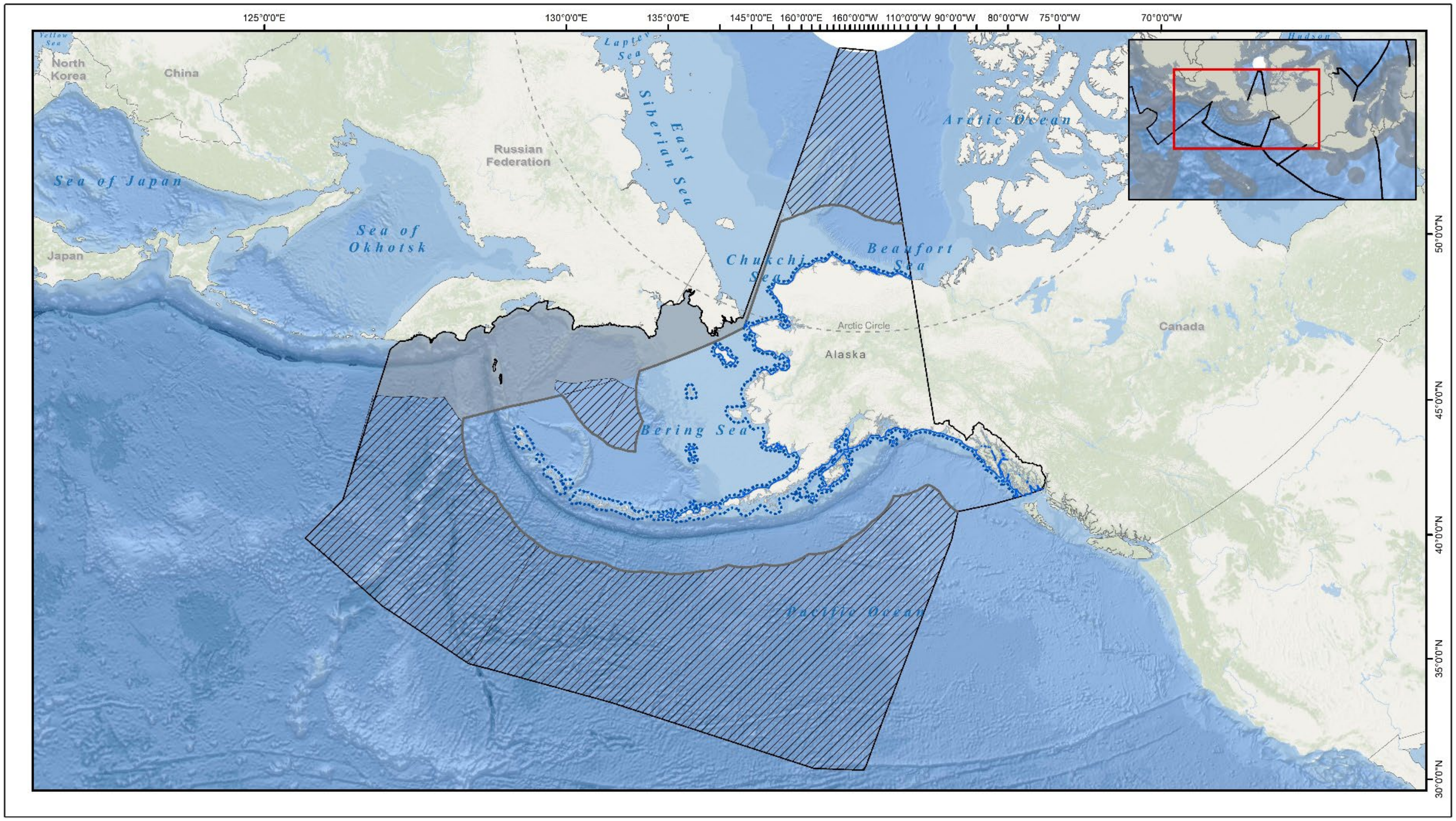


Figure 2-6. Northeast Pacific-North Proposed Action Area



PROJECT	LEGEND:	DATE: August 25, 2021 DRAWN: JAG	SCALE:1:26,000,000 SHEET NO. 7 of 8	SOURCE: USCG, NOAA, ESRI, VLIZ, BOEM
USCG Offshore Patrol Cutter Alaska Proposed Action Area	State Waters (3nm) Territorial Seas (12nm) Foreign EEZ U.S. EEZ Proposed Action Area High Seas NOTE: Only data within the current regional proposed action area are dispayed	**NAVAL UNDERSEA WARFARE CENTER** DIVISION, NEWPORT (NUWCDIVNPT) NEWPORT, RHODE ISLAND	Miles 0 200 400 600 Kilometers 0 250 500 750	

Figure 2-7. Alaska Proposed Action Area

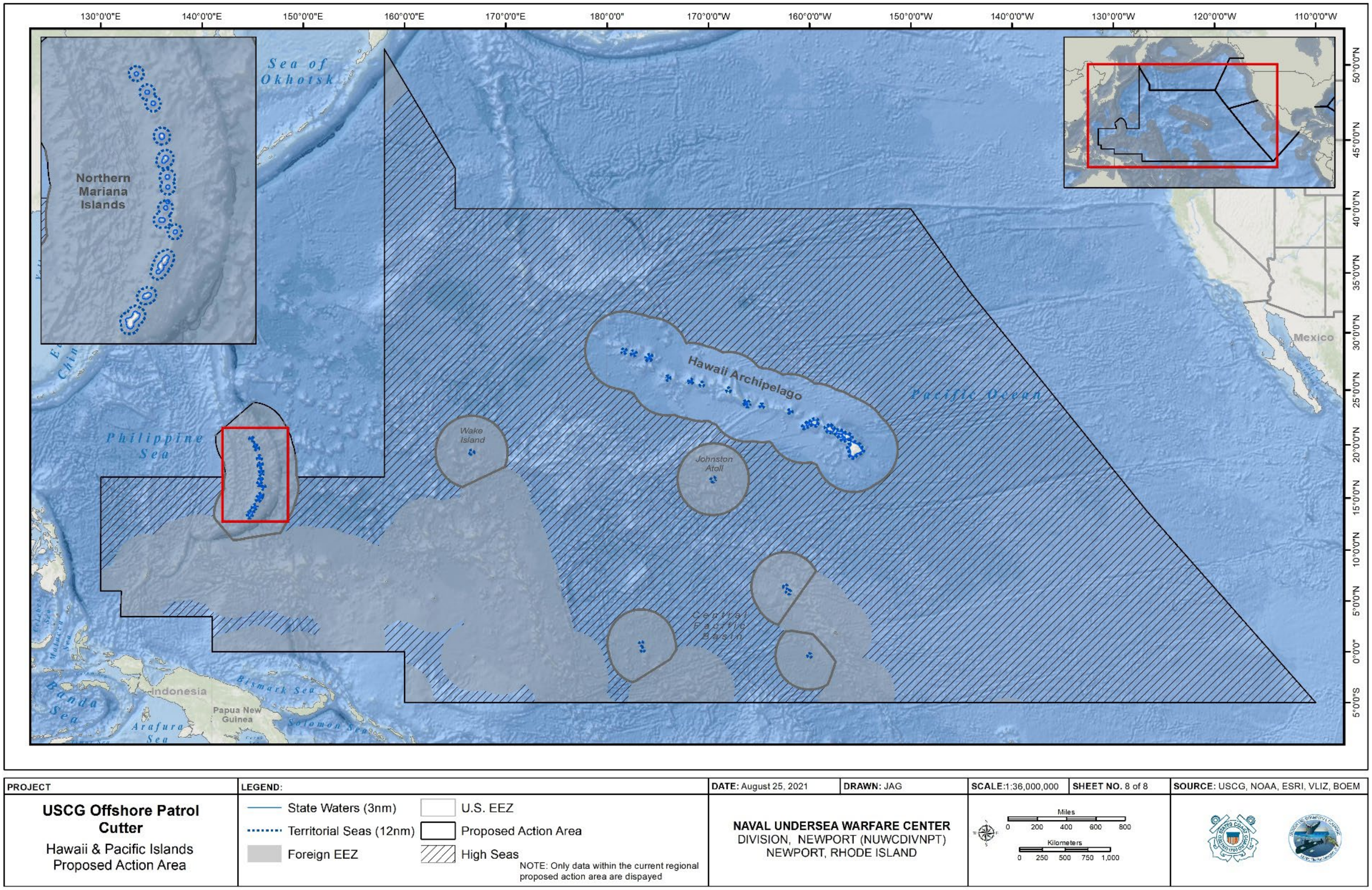


Figure 2-8. Hawaii and Pacific Islands Proposed Action Area

2.2 Alternative 1, Preferred Alternative: Proposed Action

The Proposed Action supports the operations and training activities of up to 25 OPCs with service design lives of 30 years each. This would provide consistent and reliable Coast Guard presence in the proposed action areas. The OPCs would provide the majority of offshore presence for the Coast Guard's cutter fleet, bridging the capabilities of the 418 ft (774 m) NSCs, which patrol the open ocean, and the 154 ft (285 m) FRCs, which serve closer to shore. Similar to the current fleet's operations, the Proposed Action would include vessel and aircraft operations as well as training exercises to meet the Coast Guard's mission responsibilities in the Atlantic and Pacific Oceans (including Alaska), as described in the proposed action areas (Section 2.1). The OPC program is considered the Coast Guard's top acquisition priority and these cutters would provide the majority of the Coast Guard's offshore presence (USCG Acquisition Directorate 2019).

The completion of the first OPC is expected in 2023 and operational in 2024. Completed construction of one new OPC is scheduled annually through 2028. Beginning in 2029, completion of two new OPCs is scheduled annually until all 25 have been constructed. OPCs would be operationally ready one year after delivery to the Coast Guard from the shipbuilder. The projected construction completion date of all 25 new OPCs is 2037.

While the Coast Guard must work toward environmental compliance prior to the design and build of an OPC, the vessel is not expected to impact the environment or biological resources until it is operational. Vessel construction is also not expected to impact any physical or biological resources. OPC operations and training would occur after delivery of each OPC to the Coast Guard. OPC-1 delivery is expected to occur in 2023. OPC-1 would undergo approximately one year of assessments to become "Ready for Operations" in 2024. Full operational capability would be achieved when all planned OPCs are operational. Coast Guard OPC operations and training would commence upon delivery of each OPC from the shipbuilder to the Coast Guard. For example, the first OPC delivery to the Coast Guard is expected in 2023 and the cutter would then be operational in 2024. The last OPC is expected to be delivered and operational in 2038.

This PEIS/POEIS documents the acquisition of OPC-5 through OPC-25, as well as the operations and training of OPC-1 through OPC-25. Therefore, the sequence and future planning for the Proposed Action may have a more specific NEPA analysis as more information becomes available. Because there are no anticipated significant changes to Coast Guard missions in the proposed action areas, this PEIS/POEIS analyzes expected vessel operations and training activities based on the MECs' operations and training activities.

2.2.1 OPC Design and Capabilities

The OPCs (Figure 2-9), also referred to as cutters in the "*Heritage*-class," would be 360 ft (109 m) in length, 54 ft (16 m) wide, and have a draft of 17 ft (5 m). All OPCs would have two 16-Volt marine diesel engines and two five-blade, controllable pitch propellers. Each OPC would have the ability to carry and launch up to three rigid-hull inflatable small support boats, known as Over the Horizon (OTH) cutter boats (Section 2.2.3.1). Additionally, all OPCs would be flight deck-equipped with the ability to launch, recover, hangar, and maintain manned (i.e., helicopter) and Unmanned Aircraft Systems (UAS). The flight deck of the OPC would be capable of launching and recovering helicopters such as the MH-60 and MH-65 (Section 2.2.3.2) and UAS (Section 2.2.3.3).

The OPC's vast operations and multi-mission responsibilities in the proposed action areas (Section 2.1) would require extended transits and sustained on-scene presence. To meet these requirements, OPCs would be equipped for longer transits and improved transit and intercept speed, allowing for rapid responses and a reduction in overall transit time and an increase in on-scene availability (when compared to the current MEC fleet). During any patrol (Section 2.2.1), an OPC would be able to sustain operations at sea for a minimum of 14 days in between fuel stops and 21 days in between food (chilled, frozen, and dry) and stores replenishment.

Figure 2-9. Notional OPC Vessel Design

The OPC would operate at a broad range of speeds to support Coast Guard missions. MECs generally operate at speeds between 12–16 knots, which are the most economical speeds for fuel consumption (speed to fuel consumption ratio) for this type of vessel. Each OPC would have a typical idle speed of 2 knots, tow speed of 5 knots, transit speed of 7–19 knots, and a maximum speed of 22 knots and, similar to MECs, would generally operate at speeds between 12–16 knots. For fuel-efficient patrolling and transiting, the OPC would have a minimum range of 8,500 nm (15,557 km) and threshold range of 9,500 nm (17,594 km) at a sustained speed of approximately 14 knots. Higher speeds would only be used to intercept another vessel (e.g., during search and rescue or drug interdiction missions) and for a short period of time, and then the OPC would resume fuel-efficient speeds. Although the OPC would operate in waters where ice may be present at certain times of the year (e.g., Alaska), the OPC would not have icebreaking capabilities.

OPCs would transit to and from ports and homeports to operational areas. For the purposes of analysis in this PEIS/POEIS, the transit area is defined as: from the coastline to 12 nm (22 km) from shore and the operational area is defined as: waters beyond 12 nm (22 km) from shore. During transit, OPCs would mainly be travelling out to areas where OPC missions and training (Table 2-1) would be conducted. Navigational systems would be used as the OPC would be underway (Section 2.2.1.1).

2.2.1.1 Navigational System

All Coast Guard vessels, including OPCs, would be equipped with standard navigational technologies, including fathometers, radar, and a Doppler speed log. A single beam echosounder (fathometer), part of the vessel's navigation system, would be on at all times while a vessel is underway (potentially up to 24 hours per day). The fathometer frequencies can range from 3.5–1,000 kHz (kilohertz); however, most navigational systems operate from 50–200 kHz, which is the assumed operating frequency for the Proposed Action.

Transmitted pulses from the fathometer are of short duration, typically milliseconds, but are operational for the entire time a vessel is underway. The maximum transmit powers may be as high as 227 decibels (dB) referenced at 1 micropascal at 1 meter (re 1 µPa @ 1 m), depending on frequency (the highest levels are used in low-frequency deep depth water applications), but during the Proposed Action the source level is not expected to be higher than 200 dB re 1 µPa @ 1 m. The most common geometry is one conical vertical beam, with sidelobes that may generate unwanted energy outside of the main lobe, but are typically 20 to 30 dB below the main lobe's level. The pulse durations are normally about 0.1 percent to 1 percent of the echo reception delay, hence typically between 0.1 and 10 milliseconds, with longer pulses corresponding to lower frequencies and deep depth waters.

The Doppler speed log is an instrument used on ships to measure the ship's relative speed through the water (in which it is traveling) by the use of Doppler Effect on transmitted/reflected sound waves and the principles of the Doppler shift to calculate the speed of the vessel through water. The instrument consists of at least one transducer mounted on the hull of the vessel, which emits a high frequency sound pulse to measure the vessel's speed and distance through water, and a display unit on the bridge of the vessel. However, there may be additional transducers on the bow or stern to provide more precise measurements, such as when docking or anchoring the vessel. Typically, a transducer emits a continuous high frequency sound pulse ranging from 270–284 kHz in the forward direction at an angle of 60° from the keel. The beam would be expected to bounce back from the seafloor and thus, the frequency of the bottom echo would be higher when the ship is moving ahead or lower if the ship is moving astern.

2.2.2 OPC Patrols

An OPC would support Coast Guard missions that primarily occur between 12 nm (22 km) from shore and inside 200 nm (370 km) and require long transit time to reach the farthest extent of the proposed action areas, forward deployment of forces (e.g., national defense) with the Navy, and an extended on-scene vessel presence. OPCs are expected to be deployed for up to four patrols per year, which would typically last 45–60 days with a 2–3 day logistical break, or port of call, approximately every 14 days of operations (the range of time between port calls would be between 13 and 18 days due to fuel needs). Thus, throughout a continuous cycle during the year, the OPC would spend 60 days at sea and 60 days in a port. An OPC could spend 90–120 continuous days at sea with no ports of call, while on patrol supporting Department of Defense (DoD) mission needs, but this would be rare. In the event that such a deployment does occur, a fuel barge, a replenishment supply ship that is underway, or helicopter vertical replenishment would conduct provisioning. The primary purpose of a port call for the OPC would be to conduct necessary repairs and to re-provision (e.g., fuel, food, supplies). In total, an OPC would spend at least 185 days and up to 230 days on patrol, away from its homeport, each year. During all missions, navigation systems (Section 2.2.1.1) would be used for all vessels underway.

2.2.3 OPC Support Assets

2.2.3.1 Over the Horizon Boats

OPCs would carry up to three small, rigid-hull inflatable OTH boats (26 ft [8m] long, 5 ft [1.5 m] wide, and have a draft of 3 ft [1 m]). Only one to two OTH boats would be regularly launched in support of OPC operations. For example, during living marine resource (LMR) missions, the OPC may deploy one OTH boat to board a fishing vessel, but during drug interdiction operations, two OTH boats may be deployed. The third OTH boat provides additional support in the event of a maintenance issue for one of the other two OTH boats.

OTH boats would operate at an average speed of 15 knots and a maximum speed of 40 knots. OTH boats are not authorized to launch above a sea state five. For routine operations in less than a sea state five, OTH boats would operate at 10–20 knots. OTH boats would enhance OPC operational effectiveness by allowing for simultaneous boarding, inspecting, seizing, and neutralizing of surface targets of interest (i.e., civilian suspected of breaking a law or requiring assistance). The OTH boats would also perform in situations and areas where it is either physically impossible or dangerous for the OPC to navigate. OTH boats would support activities such as vessel boardings, passenger transfers, and rescuing persons in the water. The OPC would launch and recover OTH boats using davits (a small crane-like device on board the OPC to support, raise and lower equipment) in all proposed action areas.

The mission and weather conditions would be the primary factors used to determine the distance OTH boats would safely operate away from the OPC. However, the commanding officer of the OPC and the coxswain of the OTH boat (the crewmember in charge and driving) would approve the exact distance and route for the OTH prior to OTH deployment from the OPC. OTH boats would typically operate within 10 nm (19 km) from the OPC. However, during a LMR mission, for example, an OTH boat may operate within 1 nm (2 km) of the OPC when conducting a fishery boarding. During a drug or migrant interdiction mission, the OTH boat may operate at a 10–25 nm (19–46 km) distance from the OPC. While an OTH boat could travel a maximum operating range (total distance) of 150 nm (278 km), the general practice is that the Coast Guard would only allow a maximum distance of 30–60 nm (56–111 km) between the OTH boat and the OPC. Factors limiting small boat operations are the range of very high frequency (VHF) radio communications (24 nm [44 km]) and fuel (OTH boats have an average 4.5 hours of fuel, depending on cruising speeds and weather conditions).

2.2.3.2 Helicopters

All OPCs would be flight deck-equipped with the ability to launch, recover, hangar, and maintain manned (i.e., helicopter) aircraft. The flight deck of the OPC would be capable of launching and recovering helicopters including all variants up to equivalent weight of a Sikorsky S-92. The hangar would be able to store one helicopter up to the size of a Coast Guard MH-65 and MH-60[5], and USN-H-60. Storage of aircraft would occur if, for example, the deployment required aircraft support, but was

[5] The MH-60 was formerly known as the HH-60, the first H defined it as a rescue and medical evacuation helicopter, the second H means helicopter, and the number 60 is the model. When the Coast Guard upgraded this model, the designation was changed to MH-60, the M meaning multi-mission, to more accurately describe the full scope of operations and capabilities.

farther offshore than could be safely accessed by a helicopter leaving from land. In general, helicopters supporting an OPC would fly from an established airstrip on shore either to the OPC or from the OPC to shore, though some flights would be expected to depart and then return to an OPC without heading to shore. The OPC would conduct aircraft operations during both day and night as well as in sea conditions up to and including sea state five. However, if there were not a direct threat to life, helicopters would not take off in wind in excess of 35 knots or in seas higher than a sea state of five. The OPC would deploy, maintain, support, protect, control/direct, launch/recover, and pressure fuel (on-deck or in-flight) aircraft.

The larger MH-60 Jayhawk is an all-weather, medium-range helicopter, specialized for search and rescue. A MH-60 helicopter could fly a maximum speed of 193 knots, with a cruising speed of 159 knots, and up to 648 nm (1,200 km). A MH-65 helicopter is a smaller short-range helicopter when compared to the MH-60 and could fly a maximum range of 290 nm (537 km), at a cruising speed of 148 knots and a maximum speed of 172 knots, but would then need to land to replenish fuel. Helicopters can carry a maximum of eight passengers, two of whom would be pilots.

All aircraft would follow the Coast Guard’s Air Operations Manual (COMDTINST M3710.1 (series)). Per the Coast Guard’s Air Operations Manual (COMDTINST M3710.1 (series)), aircraft would not operate at an altitude lower than 2,000 ft (610 m) within 0.5 miles (mi) (805 m) of marine mammals observed on ice or land. Helicopters would also not hover or circle above such areas. Per COMDTINST M3710.1 (series), aircraft (helicopters and UAS) would avoid any identified environmentally sensitive areas, to include, but not be limited to, critical habitat designated under the ESA, migratory bird sanctuaries, and marine mammal haul outs and rookeries, but if deemed necessary (e.g., personnel safety) to pass over such areas, aircraft would stay above 2,000 ft (610 m).

Aircraft conducting a SAR mission for persons in the water or a vessel in distress may require that the helicopter fly at an altitude below 500 ft (152 m). Emergency recovery of persons in the water and transfer of rescue equipment would also require that the helicopter hover below 500 ft (152 m). Any Coast Guard response during a SAR mission is considered an emergency and is not a part of the Proposed Action (Section 2.3.4). However, SAR training is part of the Proposed Action. As stated previously, environmentally sensitive areas would be avoided and flights would be expected to stay above 2,000 ft (610 m). Any SAR training that may require helicopters to fly below 2,000 ft (610 m) would avoid environmentally sensitive areas, critical habitat, migratory bird sanctuaries, marine mammal haul outs and rookeries, and areas where ESA-listed species are known to occur, and would follow the Coast Guard’s Standard Operating Procedures (SOPs; Appendix C).

During a typical OPC patrol (a duration of 45–60 days), approximately 30–40 flight hours would occur. However, several factors are considered when determining the range and endurance of an aircraft, which depends on the rate of fuel consumption. For example, under normal conditions for an MH-65, fuel availability typically limits total flight time per sortie to two hours, but for maximum endurance (fuel consumption per unit time), three and a half hours of flight time is possible. No more than six total flight hours are authorized per day. Helicopter flights associated with the Proposed Action would occur in all proposed action areas, and would be used for transport of personnel and equipment (Section 2.3.7.1) and to conduct training (e.g., landing qualifications [Section 2.3.7.2]), in addition to supporting all OPC missions. Per the Coast Guard’s Air Operations Manual (COMDTINST M3710.1 (series)), aircraft would not operate at an altitude lower than 2,000 ft (610 m) unless there is a navigational safety concern, such as a low ceiling. In this case, the low flight altitude would be temporary.

2.2.3.3 Unmanned Aircraft Systems

All OPCs would be flight deck-equipped with the ability to launch, recover, hangar, and maintain short-ranged UAS. The number of UAS that may be on an OPC at any given time depends on available space as the UAS would be deployed and recovered from the OPC. An OPC would have the capability to operate video-equipped UAS that would extend the visual capability of the OPC when conducting operations. At this time, the specific type of UAS that would be deployed from the OPC is not known because the Coast Guard would acquire the most current UAS technology after OPCs are operational.

Coast Guard UAS Division sets policies and SOPs specific to UAS operations, including regulations[6] that differ from those governing manned flight operations (e.g., Coast Guard's Air Operations Manual, COMDTINST M3710.1 (series)). UAS would follow either the Federal Aviation Administration (FAA) regulations, when within 12 nm (22 km) of the United States, or the International Civil Aviation Organization regulations, when beyond 12 nm (22 km) from U.S shores. In all cases, SOPs would apply (Appendix C). Similar to the helicopters, UAS would avoid any identified environmentally sensitive areas to include, but not limited to, critical habitat designated under the ESA, migratory bird sanctuaries, and marine mammal haul outs and rookeries.

2.3 OPC Operations, Mission Support, and Training

Since the 1970s, the Coast Guard has rigorously protected the U.S. EEZ by maintaining awareness of vessels and aircraft, especially at the Maritime Boundary line (generally the U.S. EEZ, 200 nm [370 km]). The OPC would be capable of performing a range of missions including maritime patrol, fisheries protection, port security, disaster response, and drug and migrant interdiction.

An OPC's typical deployment schedule would be based on law enforcement activities, which include interdicting any vessel suspected of illegal or unsafe activity in U.S. waters (e.g., fishing without appropriate permits, carrying excessive passengers, or transporting contraband). However, the OPC would be expected to perform other federally-mandated emergent[7] (e.g., hurricane disaster response) or non-emergent (e.g., enforcement of U.S. laws and treaties) missions, typically without sufficient time to return to port for additional provisions or reconfiguration. These missions include: Ports, Waterways, and Coastal Security (PWCS); SAR; Drug Interdiction (DI); Migrant Interdiction (MI); LMR; Other Law Enforcement (OLE); and Defense Readiness (DR). Coast Guard mandated missions are covered under Title 14 U.S.C. and 6 U.S.C. § 468. Law enforcement for all missions is discussed in Section 2.3.1.

The OPCs would perform the following activities in compliance with their assigned missions:

1. Searching for and rescuing passengers and/or crew that fall overboard from recreational, commercial, or government vessels or for victims of crashed aircraft in the water, sometimes requiring a Coast Guard rescue swimmer to enter the water to place the person in a harness or rescue basket to be winched into a hovering helicopter;
2. Rescuing persons on vessels in medical scenarios requiring evacuation by Coast Guard helicopter or Coast Guard rescue vessel;
3. Enforcing federal law in the U.S. territorial sea and the High Seas;
4. Maintaining awareness of vessel and aircraft activities within the U.S. EEZ;

[6] Note, due to the emerging nature of UAS operations, any policies and procedures for the operations of UAS would be updated, when necessary, by Coast Guard (CG-7114) UAS Division. Specific information regarding the most current doctrine for UAS operations would refer to Coast Guard UAS Division.

[7] Emergent responses are considered emergencies and are not part of the Proposed Action.

5. Towing or escorting crippled vessels to safety;
6. Conducting homeland security missions aimed at preventing catastrophic events, such as port security patrols, escort and defense of vessels of high national security importance (High-Value Units, such as newly commissioned submarines) or interception of vessel suspected of housing illegal cargo (High Interest Vessels, such as a “go-fast” drug smuggling boat), escort and defense of strategic sealift vessels, security boardings, and surveillance of port approaches;
7. Supporting military defense missions around the world; and
8. Conducting maritime security operations, before, during and after a threat (i.e., terrorist incident) occurs against the U.S. Maritime Domain.

Every 18–24 months, the OPC crew would undergo 3–4 weeks of training and evaluation, including over 100 drills and exercises in different scenarios (e.g., flooding, combat, fires, refueling at sea, towing, engineering casualties) to demonstrate the crew’s abilities to safely and effectively run the ship. During this training evaluation, a significant administrative portion is dedicated to ensure the ship’s compliance with applicable laws, regulations, and policies. Some of the activities listed above are integral to Coast Guard emergency response. Although emergency response is not a part of the Proposed Action, training is required. Therefore, training on an OPC for an emergency response is considered part of the Proposed Action. Training would entail practicing response to a simulated emergency while continuing the safe operation and navigation of the OPC.

Ports located along OPC transit routes may be used for activities such as passenger/crew transfer, and refueling or resupplying of the OPC. Anchoring may occur in a port where docking a vessel of this size is not supported. Anchoring would not occur during vessel transit.

Table 2-1 provides a summary of activities associated with the Proposed Action and the proposed action areas where these activities are expected to occur. Activities may involve the OPC, OTH boats, a helicopter, or a UAS. The activities in Table 2-1 are not expected to occur during transit. Sections 2.3.1 through 2.3.7 provide further details for each activity performed by the OPC (with associated assets).

Table 2-1. Summary of Proposed Action Activities and Applicable Proposed Action Areas

Activity[1]	***Proposed Action Area***						
	NW-ATL	***NW-ATL Florida and the Caribbean***	***GoMEX***	***NEPAC-South***	***NEPAC-North***	***AK***	***HI-PAC***
All Assets							
Law Enforcement	x	x	x	x	x	x	x
Defense Readiness Training		x[3]		x[4]			x[5]
Search and Rescue Training[2]	x	x	x	x	x	x	x
Vessels							
Crew and Passenger Transfer (via OTH boat)	x	x	x	x	x	x	x
Gunnery Training[6]	x	x	x	x	x	x	x
Functionality & Maneuverability Testing and Propulsion Test	x	x	x	x	x	x	x
Vessel Escort[2]	x	x	x	x	x	x	x
Vessel Tow[2]	x	x	x	x	x	x	x
Fueling Underway		x		x			x
Foreign Port of Call Visit		x	x				x
Aircraft							
Vertical Replenishments (Helicopter)	x	x	x	x	x	x	x
Helicopter Landing Qualifications	x	x	x	x	x	x	x
Reconnaissance (Helicopter or UAS)	x	x	x	x	x	x	x
Crew and Passenger Transfer (via Helicopter)	x	x	x	x	x	x	x
UAS deployment	x	x	x	x	x	x	x

[1] Patrols would encompass all activities listed in table.
[2] Excluding the emergency response associated with these activities.
[3] The Navy's Jacksonville Operating Area, off Florida and Georgia.
[4] The Navy's Fleet Training Area Hot range located within the Southern California Offshore range.
[5] In Hawaii, Coast Guard participates in large-scale naval exercises bi-annually, such as Rim of the Pacific Exercise.
[6] Every district has authorized locations for minor caliber gunnery exercises (0.50 caliber/7.62mm). Locations are reviewed and agreed upon by Coast Guard, FAA, and NOAA.

2.3.1 Law Enforcement

OPC support of law enforcement activities is considered part of the Proposed Action. Law enforcement includes a broad range of activities aimed at enforcing U.S. law on the High Seas and waters over which the United States has jurisdiction, including enforcement of international laws. All vessels (including the OPC and OTH boats) and aircraft (including helicopters and UAS) supporting an OPC patrol could participate in law enforcement activities. The following elements fall under statutory OPC missions and the specific mission is in parentheses:

- Project a continuous enforcement presence throughout the U.S. EEZ (LMR, MI, DI);
- Operate in international waters when directed to provide an extended on-scene vessel presence or forward deployment of forces (LMR, DR);
- Prevent over-fishing, reduce mortality of protected species, and protect marine habitats by enforcing domestic fishing laws and regulations (LMR);
- Enforce the Marine Mammal Protection Act (MMPA) and ESA (LMR);
- Enforce foreign fishing vessel laws (OLE);
- Patrol the U.S. EEZ boundary areas to reduce the threat of foreign poaching of U.S. fish stocks (OLE);
- Monitor compliance with international living marine resource regimes and international agreements OLE);
- Deter and enforce efforts to eliminate fishing using large drift-nets (OLE, LMR);
- Conduct port security patrols and surveillance of port approaches (PWCS);
- Escort and defense of high-value units and interception of high-interest vessels (PWCS); and
- Conduct surveillance and seize/detain and transport vessels, contraband, and suspects ashore (DI, MI).

Boarding operations are an integral part of OPC activities. These vessel boardings ensure compliance with all U.S. and international laws and with Coast Guard law enforcement authority. Fisheries enforcement would occur anywhere within the U.S. EEZ, but particularly in areas where fishing is concentrated in the open ocean within the proposed action areas. Fishery boardings typically take an average of three hours. For example, in the AK proposed action area, where fishing activity is concentrated, an OPC on an LMR mission would likely enforce U.S. fishing regulations. Other law enforcement activities, such as drug or migrant interdiction would occur anywhere within the U.S. EEZ, but would occur more often in certain proposed action areas. For example, an OPC on the High Seas in the NW-ATL-Florida and the Caribbean proposed action area would likely interdict potential drug smuggling vessels alongside U.S Custom and Border Protection assets. OLE activities include those conducted under international law, as established by the United Nations Convention on the Law of the Sea, treaties, or bilateral agreements. During a 60-day patrol, there would be approximately 20–30 law enforcement activities. OPCs may also participate with foreign naval ships in regional maritime law enforcement training exercises.

All Coast Guard bridge watchstanders have qualification standards, including those stationed on OPCs. In some proposed action areas (e.g., AK) the watchstanders would complete region specific LMR training, in addition to standard watchstander training. This one to two day training includes species awareness, identification, and reporting requirements. Special focus is given to no-fly zones and laws protecting biological resources, particularly distances required to minimize or avoid potential impacts to species. For all patrols where Coast Guard conducts LMR enforcement missions, every OPC would have 10–15 crew trained on law and enforcement issues specific to that region. These trainings take 1–2 weeks, must be retaken every two years, and many are conducted in a classroom-based setting (e.g., not on the vessel in waters of the proposed action areas). An OPC without fully trained personnel cannot conduct LMR enforcement missions.

2.3.2 Defense Readiness

The Coast Guard operates as a branch of the Navy in times of war or when directed by the President of the United States. In peacetime, Coast Guard promotes U.S. national initiatives through various humanitarian and maritime security and safety engagement with other nations. The Coast Guard would participate jointly with other U.S. Armed Services to defend the Nation and would perform the following essential military tasks: maritime intercept operations, deployed port operations, security and defense, threat engagement, coastal sea control, and environmental defense. If the United States were called to war, the Coast Guard maintains proficiency (including equipment) for limited DR operations that would include the OPC and its assets.

An OPC would typically be assigned as a task unit within a surface action group or would operate independently under a naval component commander. Activities would include performing humanitarian assistance projects (including on-load and offload of donated supplies), conducting professional exchanges, coordinating and participating in military exercises and conducting military exercises with allied and coalition partners. General defense readiness mission activities include the surveillance, detection, classification, identification, and prosecution process of air and surface targets; launching, recovering and servicing Coast Guard and DoD aircraft; providing escort protection and defense; and sharing simultaneous secure and clear data, voice, and intelligence information with multiple air and surface entities including DoD, Coast Guard, and allied partners. Aircraft operations in support of this mission include air reconnaissance and air interdiction of targets of interest (i.e., vessels suspected of illegal activities). While the Coast Guard participates in DR training events (including large-scale military exercises with the U.S. Pacific Fleet in the western Pacific Ocean, such as the Rim of the Pacific Exercise or Cooperative Afloat Readiness and Training, with several member nations of the Association of Southeast Asian Nations), these trainings are not part of the Proposed Action and are therefore not analyzed in this PEIS/POEIS. In general, this type of training would require 1–2 OPCs per training event. Helicopters deployed on an OPC would also train for DR missions with the OPC.

2.3.3 Crew and Passenger Transfer

As a part of general operations, civilians or crewmembers may require transit to port from the OPC, from port to the OPC, or from another vessel (e.g., an intercepted vessel, a vessel involved in a SAR mission, or another Coast Guard or allied vessel) to the OPC. The safest way to conduct passenger transfers is via helicopter, if one is available. This is especially true in heavy seas and high winds. However, OTH boats are also commonly used. The decision to conduct a passenger transfer is at the discretion of the captain of the OPC and the helicopter pilot or coxswain of the OTH boat. Transfers would typically take three hours with 30 minutes spent on the helicopter or two to three hours with one hour spent on an OTH boat. Although there may be up to three OTH boats on an OPC, transfers may not always use all three boats. Transfers of crew or passengers from the OPC would typically occur in a sea state less than five, and transfers could occur anywhere in the proposed action areas.

Helicopters deployed with an OPC could also be used to transport civilians and crewmembers to and from the OPC to ports or to other U.S. and allied vessels. Vertical insertion, when a boarding team is deployed from the OPC via helicopter, would occur when it is unsafe to deploy the team via an OTH boat. Medical evacuations of passengers (e.g., during a SAR mission) or crewmembers would also occur via helicopter, but are considered emergencies and are not part of the Proposed Action.

2.3.4 Search and Rescue Training

SAR missions are those that have the goal of preventing the loss of life and property and typically include a combination of Coast Guard vessels and aircraft. SAR takes precedence over all other missions except national defense and homeland security operations; however, actual SAR missions are considered emergencies, which are not part of the Proposed Action. However, crews must be trained for such a response. Crew aboard the OPC would undergo 3–4 weeks of training and evaluation every 18–24 months.

The SAR mission involves numerous means of rendering aid to distressed persons, vessels, and aircraft on (and under) the High Seas and the waters over which the United States has jurisdiction (Section 2.1). OTH boats may be deployed during SAR training to simulate rescue of persons in the water or delivery of damage control gear to a distressed vessel. Although aircraft operations would not be a primary functional capability in SAR missions, helicopters dispatched from the OPC or from an air station could support an OPC on an SAR mission. Pilots would have received all associated training in SAR at their home-base/air station prior to arrival for a shipboard deployment. Therefore, this training is not considered a part of the Proposed Action. For more information on the type of helicopter training that would support the OPC, see Section 2.3.7.

2.3.5 Gunnery Training

Gunnery training may occur 3–4 times per year on each OPC vessel. Gunnery training events last 2–3 hours each. Gunnery training would only occur in ranges authorized by the Coast Guard and when possible, would occur in established Navy ranges, particularly when live ammunition is used. Examples of DoD ranges where the Coast Guard would conduct gunnery training include the Fleet Training Area Hot range located within the Southern California Offshore range and the Kapu Hot range located within the Hawaii Range Complex. In Alaska, the Coast Guard, NOAA and the FAA have identified specific areas where ships may conduct live ammunitions training. Areas with sensitive marine resources are not used for gunnery training. The Coast Guard would also follow the Navy’s gunnery training protocols. During peacetime activities, actual weapon systems onboard the OPC would only be used for training. The Mk 48 Gun Weapons System (GWS) with Mk 110 57 mm gun mount, Mk 38 25 mm Machine Guns System (MGS), and the M2 0.50 cal. Browning Machine Gun (BMG) are tested biannually to conduct required proficiency drills.

Each OPC will also be equipped with the Mk 53 Mod 10 Decoy Launching System (DLS) including two Mk 137 Mod 10 decoy launchers, capable of carrying up to two decoy rounds commonly referred to as Nulka. The Nulka decoy round is a 78.7 inch (in) (200 centimeter [cm]) anti-ship missile decoy that can be launched from the vessel. Once launched, the Nulka uses its short duration rocket to hover out beyond the vessel and simulate the vessel’s radar return to lure anti-ship missiles away from the vessel. The Coast Guard plans to conduct only one propulsion testing of one inert Nulka decoy on only the lead OPC. This single, one-time test, will be conducted on an established Navy range and no additional testing of the Nulka is currently planned.

Several different types of targets may be used for gunnery training. Every 18–24 months, the Coast Guard conducts training with air sleeves (targets towed behind aircraft) to simulate incoming missiles. In rare circumstances, rounds may also be fired at robot go-fast boats and/or a “killer tomato” target, a 10 ft (3 m) diameter red balloon, which would be retrieved, when feasible. OTH boats may be used to deploy or retrieve targets in support of gunnery training.

2.3.6 Vessel Operations

2.3.6.1 Functionality and Maneuverability Testing and Propulsion Test

Functionality and maneuverability testing for an OPC would be similar to the testing conducted for the current fleet of MECs and would occur every year. Functionality and maneuverability testing would occur after scheduled maintenance periods, which would likely occur within close proximity to the OPC's homeport. It should be noted that the exact locations of all the homeports for all OPCs are not known at this time. At the time of publication of this PEIS/POEIS, the Coast Guard has determined that one to two OPCs will be homeported in Los Angeles/Long Beach, California and Kodiak, Alaska (USCG 2016, 2018).

2.3.6.2 Escorting and Towing Other Vessels

The OPC would be required to escort a variety of vessels at varied speeds, depending on mission requirements. For example, in order to effectively escort large military vessels (e.g., Military Sealift Command vessels), operate within a naval task force (e.g., an Expeditionary Strike Group), or intercept or escort commercial ships, the OPC would need to operate at high transit (19 knots) or intercept speed (22 knots). However, if an OPC is required to escort a fishing vessel that has been found with illegal catch on board or for safety violations, the OPC would escort the vessel at low transit speed (5 knots) to the nearest port.

The OPC would be capable of towing vessels in a range of sizes, from small go-fast smuggling vessels (approximately 1 ton) to a small cruise ship (approximately 10,000 tons). The OPC would be able to launch and recover its OTH boats while engaged in towing operations. While towing, the OPC would operate at a speed of approximately 5 knots.

2.3.7 Helicopter Operations and Training

Some OPC missions require more support from aircraft than others, and therefore is reflected in the OPC Concept of Operations (USCG 2008). For example, DI missions in the NEPAC-South proposed action area may attempt 50 flight hours per month during an OPC patrol. However, if four OPCs are deployed in that proposed action area, only two aircrews may be available for support due to limited resources and thus prevent hitting that target. Weather, operational constraints, and mechanical issues may also impede executing such a high number of flight operations. In contrast, an LMR mission in the AK proposed action area may target significantly less flight hours. For example, an OPC on a 90-day patrol may only be expected to employ a minimum of 67 flight hours during the entire patrol. These examples of ratio of underway days to flight hours provide an oversimplified baseline for helicopter operations.

2.3.7.1 Vertical Replenishment

Vertical replenishment of munitions and provisions would occur if an OPC were deployed on a patrol that would extend beyond a typical timeframe for a logistic break or port-call (beyond 18 days). This type of extended patrol would occur when an OPC is deployed on a DR mission, for example. Helicopters embarked with the OPC for this mission or shore-based helicopters could conduct vertical replenishments, per the Coast Guard's Air Operations Manual (COMDTINST M3710.1 (series)).

2.3.7.2 Deck Landing Qualifications-Training

Semi-annual drills would take place for pilots and deck crew for each OPC, once the vessel is operational. Deck landing qualifications (DLQ) drills include hovering, flight refueling, and simulating a helicopter crash on deck. To maintain proficiency, up to 30 "touch and go" landings, during the day or night, may occur over a 6-hour period and may include other special circumstance evolutions. DLQs would occur every 21 days, at minimum, during OPC patrols.

For every new class of ship, a series of dynamic tests are conducted to determine the roll, pitch, and wind safe flight envelope (the region within which an aircraft can operate safely) for each type of aircraft that would land or take off from that vessel. Dynamic testing would only be conducted with the first operational vessel of the new class of ship (e.g., *Heritage* class), not the entire fleet, and in conjunction with the Navy. For the *Heritage* class, these dynamic tests would only occur with OPC-1 after it becomes operational and would most likely occur near the homeport of OPC-1—Los Angeles/Long Beach, California.

2.4 Acoustic Sources Associated with the Proposed Action

The Proposed Action would include the introduction of sound into the water and air. In-water sources of sound include the noise created by the navigation system (consisting of the fathometer and Doppler speed log), vessel noise (engine and other operational equipment noises made by the vessel), and aircraft noise (both in-air and the in-air to water transfer) from aircraft operations. Table 2-2 provides a list of sources associated with the Proposed Action and their sound characteristics.

Table 2-2. Characteristics of Sound Sources Associated with the Proposed Action

Source Type	*Frequency Range (in Hz or kHz)*	*Source Level (1 µPa= in-water 20 µPa= in-air)*	*Associated Action*
Small vessel (OTH boats)	1–7 kHz	175 dB re 1 µPa at 1 m	Law enforcement, SAR training, crew and passenger transfer
Large vessel (OPC)	20–300 Hz	190 dB re 1 µPa at 1 m	OPC operations and training
Single-beam echosounder (i.e., fathometer)	3.5–1,000 kHz (50–200 kHz)[a]	205[b] dB re 1 µPa at 1 m	OPC operations, training, and testing
Doppler speed log	270–284 kHz	-	OPC operations, training, and testing
Helicopter (low flying; 100 ft above sea surface)	20 Hz–5 kHz	136 dB re 20 µPa 138 dB re 1 µPa	Law enforcement, SAR training, crew and passenger transfer, reconnaissance
UAS	60–150 Hz	80 dB re 20 µPa	Reconnaissance, UAS deployment
Gunnery	Ranging from 150 Hz–2.5 kHz (with a peak from 900 Hz–1.5 kHz)	139–161 dB re 20 µPa at 50 ft (15 m)	Gunnery training

[a] Typical frequency range for most devices that are commercially available.
[b] Maximum source level is 227 decibels root mean square at 1 meter, but the maximum source level is not expected during operations.
References: (Hood et al. 2012; Luz 1983; NMFS 2012; Richardson et al. 1995; U.S. Coast Guard 2013; Ylikoski et al. 1995).

Sound levels are normally expressed in dB. The dB value is given with reference to ("re") the value and unit of the reference pressure. The standard reference pressures are 1 µPa for water and 20 µPa for air. It is important to note that because of the difference in reference units between air and water, the same absolute pressure would result in different decibel values for each medium. In air, sound levels are frequently "A-weighted" (in units of dBA) because the sound levels are most frequently used to determine the potential noise effect to humans. A more detailed description of sound and sound propagation is discussed in Appendix D.

2.5 Alternatives

As required by NEPA, the Coast Guard evaluated alternatives to the OPC acquisition program to determine whether an alternative would be environmentally preferable and/or technically and economically feasible to the Proposed Action while still meeting the program's objectives. The Coast Guard evaluated the no action alternative and three action alternatives with respect to replacing the aging MECs. Each alternative is evaluated in Chapter 3.

2.5.1 Alternative 1: Preferred Alternative

Based on all the alternatives analyzed, the acquisition of OPC-5 through OPC-25 and operation of OPC-1 through OPC-25 is the preferred alternative. Under Alternative 1, the Coast Guard would acquire and operate up to 25 OPCs to fulfill mission requirements in the Atlantic Ocean, Gulf of Mexico, and Pacific Ocean, including Alaska, and Hawaii and Pacific Islands. Completed construction of one new OPC is scheduled annually through 2028; therefore, construction of OPC-1-4 would be completed by FY2027. Beginning in 2029, two new OPCs would be constructed annually with a projected construction completion date for all 25 OPCs by 2037. OPCs would be operationally ready one year after delivery to the Coast Guard from the shipbuilder. This notional construction schedule would allow for MECs to be decommissioned and the Coast Guard to remain present with no delay in service to complete the Coast Guard's missions.

Before the Coast Guard would take ownership of an OPC, the shipbuilder would conduct the first vessel performance test at a location near their facility. For example, the Eastern Shipbuilding Group, Inc., located in Panama City, Florida, would be responsible for conducting initial performance tests for OPC-1 through OPC-4 before the Coast Guard takes possession of the vessels. Similar sea trials would be conducted by the shipbuilder for OPC-5 through OPC-25. Initial performance tests may include tests while the vessel is attached to the pier and some maneuverability tests into and out of the port and at sea. These vessel performance tests are not a part of the Proposed Action because they are performed before ownership of the vessel is transferred to the Coast Guard.

Once the Coast Guard takes possession from the shipbuilder of each OPC, the ship would be made ready for sea, and would be commissioned at a time appointed by the Coast Guard either prior to or after arriving at its homeport. In the following example scenario, OPC-1 would be built in Panama City, Florida and could then transit from Panama City to Baltimore, Maryland to be commissioned, before transiting to its homeport in Los Angeles/Long Beach, California. An instrumented structural test firing of the guns could also be conducted on a Navy instrumented test range off Wallops Island, Virginia for the first ship built by any shipbuilder[8]. Once the vessel reaches its homeport, additional training evolutions would take place near their respective homeport, and combat system testing would occur on a Navy test range. Combat System Ship Qualification Trials would entail Identification Friend or Foe certification in port and Shipboard Electronic System Evaluation Facility tests at sea. While at sea, simulated firing and live firing events would be conducted. Only the homeports for OPCs 1 through 4 are known at this time. They are as follows: OPC-1 and OPC-2 homeport in Los Angeles/Long Beach, California and OPC-3 and OPC-4 homeport in Kodiak, Alaska. The Coast Guard is conducting a feasibility study for all potential homeports.

[8] For OPC-1 to - 4, the structural test would only be conducted on OPC-1 and would occur after the Coast Guard has taken possession. Any subsequent ship built by that shipbuilder would not undergo this additional structural testing. It is unknown who will receive the contract award for OPC-5 up to -25 and if it would be only one shipbuilder or multiple shipbuilders. If another shipbuilder is awarded the contract (e.g., not the Eastern Shipbuilding Group, Inc.), only the first ship that is built by the shipbuilder would require the structural test. If the Eastern Shipbuilding Group, Inc. were awarded a contract for OPC-5 up to 25, then the structural test conducted on OPC-1 would satisfy the structural test requirement.

Because the construction completion date for all OPCs is not expected until 2037, the Coast Guard anticipates that supplemental NEPA documentation may be prepared. New information would be tiered to this PEIS/POEIS and may include, but is not limited to, changes to any applicable laws and directives (Appendix A) or to a species listing status. Additionally, more detailed NEPA analyses would be required as more information becomes available regarding OPC homeporting, maintenance, and decommissioning.

2.5.2 Alternative 2: Reduced Acquisition

Under Alternative 2: Reduced Acquisition, the Coast Guard would explore the acquisition of fewer OPCs after the completion of OPC-1 through OPC-4 (which are still under contract). Five, ten, or fifteen OPCs would be considered via a re-competition of the original OPC contract as replacements for a corresponding number of in-service MECs. The Coast Guard would then replace the remaining MECs on a one-for-one basis, using whatever replacement hulls the Coast Guard could obtain when deterioration or obsolescence requires decommissioning. The life cycle training and logistical costs of maintaining several unique hulls would exceed the corresponding costs of maintaining a class of 25 cutters that would be built specifically to conduct missions in proposed action areas. Costs and challenges are similar to what is described under Alternative 3.

2.5.3 Alternative 3: Purchase, Lease, or Inherit

Under Alternative 3: Purchase, Lease, or Inherit, the Coast Guard would explore various forms of cutter purchase or lease, or inherit vessels from the Navy, as the need arises. This would mean that as a MEC reaches or surpasses the end of its economic service life, that cutter would not necessarily be replaced with the same type of asset or by an asset with similar capabilities.

The challenges involved with one-for-one MEC replacements are best demonstrated by the 1999 acquisition of the U.S. Navy's USS EDENTON, a salvage and rescue ship. The Coast Guard recommissioned the ship as the USCGC ALEX HALEY. The ship was designed in the early 1970s and, except for replacing her aged diesel engines, no significant environmental improvements were made. This is typical of a one-off ship acquisition because there is little justification for the extensive or expensive non-recurring design engineering costs for specifications that would make the vessel capable of conducting missions assigned to MECs. Maintenance records maintained by the Surface Forces Logistics Center confirm the maintenance costs per operating hour for USCGC ALEX HALEY ($2,345) are 62 percent higher than the equivalent costs for maintaining the average 270 ft (82 m) cutter ($1,445), as is typical for a one-of-a-kind ship. One-for-one MEC replacement would cost far more per replacement hull because it eliminates any workforce savings associated with a ship with capabilities designed specifically to conduct Coast Guard missions in areas primarily between 12 nm (22 km) from shore and inside 200 nm (370 km).

The purchase, lease, or inherit alternative includes the lack of an existing domestic commercial vessel capable of meeting available options to Purchase and Build-to-Lease. The previous conditions that were analyzed in the Integrated Deepwater System Project Final Environmental Impact Statement (USCG 2002) have not changed for the same principal reasons listed below:

- There are no existing vessels available for lease that substantially meet the Operational Requirements Document.
- Office of Management and Budget guidance (A-11, A-94) mandates that a Capital Lease would be required for a purpose such as this alternative. As a Capital Lease, both Office of Management and Budget guidance and U.S. Code would require that the lease be a demise (i.e., bareboat) charter due to the missions the Coast Guard must execute with the vessel, including planned operations in

support of defense readiness and mission tasks involving law enforcement and port, waterways, and coastal security.

- In addition, under international law and U.S. Code, the vessel would need to be on a demise charter to the Coast Guard in order for a leased vessel to be authorized to conduct National Defense and Freedom of Navigation operations, which require the vessel to be internationally recognized as a warship.

One of the major challenges with this approach is that the Coast Guard would not have an integrated system of systems, thus assets would not be able to communicate in real time, they would operate at differing levels of efficiency (resulting in decreased efficiency throughout the system), and maintenance costs would be higher. Examples are as follows:

- Replacement cutters with slower speeds would mean longer response times for search and rescue, drug interdiction, oil spills, and alien interdiction operations than are possible with newer assets.
- Replacement cutters acquired at various times would require different maintenance schedules and a larger parts inventory, thereby increasing overall maintenance costs.

2.5.4 No Action Alternative

The evaluation of a No Action Alternative is required by the regulations implementing NEPA (40 CFR 1502.14(d)). Under the No Action Alternative, the Coast Guard would acquire OPC-1 through OPC-4, then would fulfill its missions in the Atlantic Ocean, Gulf of Mexico, and Pacific Ocean (including Alaska and Hawaii and Pacific Islands) using existing assets, which are reaching the end of their service lives. The existing assets would continue to age, causing a decrease in efficiency of machinery as well as an increased risk of equipment failure or damage, and would not be considered reliable for immediate emergency response. In addition, it would become more difficult for an aging fleet to remain in compliance with environmental laws and regulations and standards for safe operation. Further Service Life Extensions become more challenging as significant systems and parts are no longer available, which requires contracting for systems or parts to be made specifically for the vessel.

The No Action Alternative would also not meet the Coast Guard's statutory mission requirements in the Atlantic and Pacific Oceans and Gulf of Mexico by providing air, surface, and shore-side presence in those areas. The Coast Guard also enforces the MMPA and ESA, and without reliable Coast Guard presence, enforcement of these laws would be significantly reduced. As such, the No Action Alternative does not meet the purpose and need, but is included here for comparison of environmental impacts with the Preferred Alternative.

2.5.5 Alternatives Considered Then Eliminated from Analysis

In developing the Proposed Action and Alternatives, the Coast Guard assessed the viability of transferring Coast Guard's missions in the proposed action areas to the Navy. Under this Alternative, the Coast Guard would only be responsible for missions occurring in coastal and inland waters. This alternative does not meet the purpose and need of this project for several reasons. First, the Coast Guard is mandated to carry out missions in areas primarily between 12 nm (22 km) from shore and inside 200 nm (370 km). Secondly, the Navy does not have the law enforcement authority nor the resources to carry out such missions. Lastly, the Interagency Task Force on Coast Guard Roles and Missions specifically recommended that the Coast Guard retain the responsibility for missions occurring in offshore waters.

CHAPTER 3 Affected Environment and Environmental Consequences

This chapter describes the Coast Guard's approach to analysis, environmental resources, and baseline conditions that could be affected from implementing any of the alternatives, and an analysis of the potential effects of each alternative. Since Alternatives 2–3 are similar and generally differ in the number and how vessels may be acquired by the Proposed Action, the analysis of potential effects to each resource is combined under one subheading. This chapter is organized by resource topic, specifically defined for each proposed action area, with a detailed description of individual resources in the applicable proposed action areas. The discussion also includes an overview of related existing environmental conditions. All potentially relevant environmental resource areas were initially considered for analysis in this PEIS/POEIS. In compliance with NEPA, CEQ, and Coast Guard guidelines, the discussion of the affected environment (i.e., existing conditions) focuses only on those resource areas potentially subject to impacts. Additionally, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact. Per CEQ regulations (40 CFR § 1502.15), a review was conducted in this PEIS/POEIS of relevant reasonably foreseeable environmental trends and activities in the affected environment in each proposed action area and under each resource section.

Potential impacts to ESA-listed species and critical habitat are also evaluated in this PEIS/POEIS. Although the Coast Guard offers a "may affect" determination (Table 3-27) under the ESA, this determination should be considered preliminary, since the consultation process under Section 7 of the ESA with NMFS and the USFWS has not been completed. The Coast Guard intends to complete consultation under Section 7 before publication of the Final PEIS/POEIS. Similarly, any effects analysis of critical habitat should also be considered preliminary until consultation is completed.

This chapter identifies stressors associated with the Proposed Action and analyzes potential impacts to air quality, ambient sound, biological resources and critical habitat, and socioeconomic resources; evaluates the likelihood that a resource would be exposed to or encounter a stressor; and identifies the impact or harm associated with that exposure or encounter. The likelihood of an exposure or encounter is based on the stressor, location, and timing relative to the spatial and temporal distribution of each biological resource or critical habitat.

Each OPC would not be expected to potentially impact or harm the physical, biological, or socioeconomic environment until it is built, deployed, and operational. The first new OPC may be operational as soon as 2024 and the last by 2038; as such, the Coast Guard acknowledges that new information about the existing environment may become available before 2024, but after the publication of this PEIS/POEIS. Therefore, the Coast Guard presents the best available information on the existing environment and potential consequences in this PEIS/POEIS, but anticipates that as new information is obtained, particularly before the last OPC becomes operational by 2038, there may be supplemental environmental assessments prepared in support of individual proposed actions and tiered to this PEIS/POEIS. Any potential impacts from vessel homeporting, maintenance, and decommissioning could be analyzed in a supplemental document once more information becomes known.

3.1 Resources Not Carried Forward for More Detailed Discussion

As part of the process to determine the potential impacts from the Proposed Action, the Coast Guard identified potential resources and stressors to analyze. The potential impact or harm to the resource areas listed in Table 3-1 are considered to be negligible or nonexistent, and were therefore eliminated from further consideration in this PEIS/POEIS. Table 3-1 includes the justification for their removal from further analysis.

Table 3-1. Resources Eliminated from Analysis

Resource	***Justification for Removal From Further Consideration***
Physical Environment	
Airspace	Low flying aircraft may be used for a portion of training and operations, but would not interfere with regular public airspace usage, given that the offshore locations are within an infrequently used flight corridor. Therefore, the Proposed Action would not impact or harm use of airspace.
Floodplains and wetlands	The Proposed Action would occur in open water and would not overlap with any floodplains or wetlands. Therefore, the Proposed Action would not impact or harm floodplains or wetlands.
Geology	The disruption of sediments during the Proposed Action would be limited to anchor use, but only in areas designated for this purpose. As a result, these designated soft-bottom anchorages are routinely disturbed by anchored vessels (not just OPCs). As such, the Proposed Action would not cause additional disruption to these anchorage areas. Therefore, the Proposed Action would not impact or harm geological resources.
Land use	The Proposed Action would primarily occur offshore and would not result in any changes to existing land use. Therefore, the Proposed Action would not impact or harm land use.
Terrestrial environment	The Proposed Action would primarily occur offshore and would not overlap with any terrestrial environments, with the exception of existing locations designated for aircraft use. Therefore, the Proposed Action would not impact or harm the terrestrial environment including parks, forests, and prime and unique farmland.
Wild and scenic rivers	The Proposed Action would occur on or in oceanic waters. Therefore, the Proposed Action would not impact or harm wild and scenic rivers.
Biological Environment	
Terrestrial wildlife	The Proposed Action would not be expected to overlap with terrestrial wildlife nor would there be any expected indirect effects to terrestrial wildlife (e.g., via habitat loss, prey loss, etc.). Therefore, the Proposed Action would not impact or harm terrestrial wildlife.
Socioeconomic Environment	
Aesthetic resources	Aircraft would arrive and depart from existing airstrips and would be consistent with the typical flights coming in and out of these areas. Vessels would arrive and depart from established ports and would be consistent with other vessels moving in and out of these areas. Vessel movement would primarily be offshore and would be consistent with other vessels operating within the proposed action areas. Therefore, the Proposed Action would not impact or harm aesthetic resources.
Archaeological/historical resources	The only archaeological or historical resources located within the proposed action areas would be shipwrecks or historical aids to navigation, which are typically located near shore. OPC training and operations conducted at the water's surface would not disturb submerged resources. Any nearshore vessel movement (i.e., transit) would consist of arrival and departure from established ports and would not disturb any historical aids to navigation. Aircraft would operate at an altitude of 2,000 ft (610 m) or more, in a manner consistent with the Coast Guard's Air Operations Manual (COMDTINST M3710.1 (series)), and would not disturb these resources. Therefore, the Proposed Action would not impact or harm archaeological and historical resources.

Resource	***Justification for Removal From Further Consideration***
Cultural resources	Coast Guard would avoid cultural resources in the proposed action areas. Therefore, the Proposed Action would not impact or harm cultural resources. Any resources related to subsistence use are discussed in Section 3.5.9.
Environmental justice	Federally recognized tribes in the proposed action areas would be invited to consult on the Proposed Action for those activities that may concern Indian Tribal self-government, trust resources, and Indian Tribal treaty and other rights. The Proposed Action would occur on the water. While some minority, low-income, or underserved populations may rely on fishing within the proposed action areas for sustenance, they would not be disproportionately displaced by the Proposed Action when compared to commercial, recreational, or subsistence fisheries. All communities would be informed in advance of potential activity via issuance of a Notice to Mariners in order to ensure those who use the proposed action areas for sustenance may avoid the proposed action area(s) and any areas that fish or other resources may have temporarily abandoned due to the Proposed Action. Socioeconomic impacts, including impacts to employment, are discussed in Section 3.5. There would be no disproportionately high or adverse human health or environmental impacts on minority populations or low-income populations, as any limits to accessibility would be short-term, temporary, and in maritime transit areas near ports with existing vessel traffic. Therefore, the Proposed Action would not impact or harm environmental justice communities.
Infrastructure	No modification of infrastructure would occur as a result of the Proposed Action. Therefore, the Proposed Action would not impact or harm infrastructure.
Utilities	The Proposed Action would not occur near any utilities. Therefore, the Proposed Action would not impact or harm utilities.

3.2 Identification of Potential Stressors Associated with the Proposed Action

Stressors associated with the Proposed Action that may potentially impact or harm the environment include: acoustic stressors, such as the fathometer and Doppler speed log noise, vessel noise, aircraft noise, and gunnery noise; and physical stressors, such as vessel and aircraft movement, and military expended materials (MEM). Proposed Action activities and associated stressors are detailed in Table 3-2. Stressors that were evaluated, but not analyzed further in this PEIS/POEIS are listed in Table 3-3. Stressors that were analyzed in this PEIS/POEIS are listed in Table 3-4.

Table 3-2. Proposed Action Activities

Activity[1]	*Proposed Action Area(s)*	*Includes*	*Frequency*	*Estimated Hours per Activity*	*Source(s) of Acoustic Stressors*	*Source(s) of Physical Stressors*
All Assets						
Law Enforcement	All	A broad range of activities aimed at enforcing U.S. law on the High Seas and waters over which the United States has jurisdiction, including fisheries enforcement, drug interdiction, and migrant interdiction	20–30 events per patrol	1–6	Fathometer and Doppler speed log noise; Vessel noise; Aircraft noise; Gunnery noise	Vessel movement; Aircraft movement; MEM
Defense Readiness Training[2]	NW-ATL-Florida and the Caribbean; NEPAC-South; HI-PAC	Performing humanitarian assistance projects, conducting professional exchanges, coordinating and participating in military exercises, and conducting military exercises with allied and coalition partners	1–2 events per year; up to 2–3 months	NA	Fathometer and Doppler speed log noise; Vessel noise; Aircraft noise; Gunnery noise	Vessel movement; Aircraft movement; MEM
Search and Rescue Training and Evaluation[3]	All	The simulation of numerous means of rendering aid to distressed persons, vessels, and aircraft	Over a 3–4 week period, every 18–24 months	NA	Fathometer and Doppler speed log noise; Vessel noise; Aircraft noise	Vessel movement; Aircraft movement
Vessels						
Crew and Passenger Transfer (by OTH Boat)	All	Transit by OTH boat to port from the OPC, from port to the OPC, or from another vessel to the OPC for civilians or crewmembers	15–20 events per patrol	2–3	Fathometer and Doppler speed log noise; Vessel noise	Vessel movement
Gunnery Training[4]	All	Firing of the 57 mm main deck gun, smaller mounted 25 mm MK38, and M2HB Browning machine gun, typically at targets, to complete required proficiency drills; Firing of MK 137 Mod 10 of Nulka decoy round	3–4 trainings per year; [Nulka is a single, one-time test event]	2–3	Vessel noise; Gunnery noise	Vessel movement; MEM
Functionality & Maneuverability	All	Ensuring properly working systems after vessel maintenance	Once per year	2–6, depending on activity and	Vessel noise	Vessel movement

Activity[1]	*Proposed Action Area(s)*	*Includes*	*Frequency*	*Estimated Hours per Activity*	*Source(s) of Acoustic Stressors*	*Source(s) of Physical Stressors*
Testing and Propulsion Test				may occur on 2 consecutive days		
Vessel Escort[3]	All	Escort of large military vessels, fishing vessels, or commercial ships as well as operating within a naval task force	1–2 per patrol	1–30	Fathometer and Doppler speed log noise; Vessel noise	Vessel movement
Vessel Tow[3]	All	Towing another vessel from the stern	1–2 per patrol	1–24	Fathometer and Doppler speed log noise; Vessel noise	Vessel movement
Fueling Underway	NW-ATL-Florida and the Caribbean; NEPAC-South; HI-PAC	Fueling the OPC vessel from another vessel, typically an oil tanker	1 event per 2 years	3–4	Fathometer and Doppler speed log noise; Vessel noise	Vessel movement
Foreign Port of Call Visit	NW-ATL; NW-ATL-Florida and the Caribbean; GoMEX; HI-PAC	A 2–3 day logistical break to conduct necessary repairs and to re-provision (e.g., fuel, food, supplies)	Every 13–18 days per 60 day patrol	48–72	Fathometer and Doppler speed log noise; Vessel noise	Vessel movement
Aircraft						
Vertical Replenishments[5] (by Helicopter Only)	All	Delivery of munitions and/or provisions by helicopter because an OPC has been deployed on a patrol that extended beyond a typical timeframe for a port of call	Twice per year (most common during DR missions)	1–2	Aircraft noise; Vessel noise	Aircraft movement; Vessel movement
Helicopter Landing Qualifications[6] (by Helicopter Only)	All	Hovering, flight refueling, and simulating a helicopter crash on deck used to train the flight crew and deck crew on the OPC	Once per patrol	30 “touch and go” landings per 6-hour period	Aircraft noise; Vessel noise	Aircraft movement; Vessel movement

Activity[1]	*Proposed Action Area(s)*	*Includes*	*Frequency*	*Estimated Hours per Activity*	*Source(s) of Acoustic Stressors*	*Source(s) of Physical Stressors*
Reconnaissance[6] (by Helicopter or UAS)	All	Support of law enforcement and defense readiness missions may include the observation of targets of interest (i.e., vessels suspected of illegal activities) from the air	15–20 helicopter sorties per patrol	2–4	Aircraft noise; Vessel noise	Aircraft movement; Vessel movement
Crew and Passenger Transfer (by Helicopter Only)	All	Transit by helicopter to port from the OPC, from port to the OPC, or from another vessel to the OPC for civilians or crewmembers	5	2–4	Aircraft noise	Aircraft movement
UAS Deployment (UAS Only)	All	Support of law enforcement and defense readiness missions may include the observation of targets of interest (i.e., vessels suspected of illegal activities) from the air using video-equipped UAS	UAS technology would be acquired in the future once a program of record is established	UAS technology would be acquired in the future once a program of record is established	Aircraft noise	Aircraft movement

[1] Patrols would encompass all activities listed in table. The duration of a typical OPC patrol would be 45–60 days.
[2] Could occur on the Navy range in Mayport, Florida; the Navy Fleet Training Area Hot (FLETA Hot) range located within the Southern California Offshore Range (SCORE) in San Diego, California; or the Navy range in Oahu, Hawaii.
[3] The Proposed Action excludes the emergency response associated with these activities.
[4] Every Coast Guard District has authorized locations for minor caliber gunnery training exercises (0.50 cal/7.62 mm). Locations are reviewed and agreed upon by the Coast Guard, FAA, and NOAA.
[5] Conducted during OPC operations.
[6] Conducted during OPC training and operations.

Table 3-3. Stressors Considered but Eliminated from Further Analysis

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Rationale for Elimination from Analysis*
Physical Resources			
Air Quality	n/a	Fathometer and Doppler speed log noise; vessel noise; aircraft noise; gunnery noise	There would be no impacts to air quality from any acoustic stressors.
		MEM associated with gunnery training	There would be no impacts to air quality from MEM associated with gunnery training as the MEM does not create any emissions.
Ambient Sound	n/a	Vessel movement; aircraft movement; MEM associated with gunnery training	There would be no impacts to ambient sound from any physical stressors.
Water quality	n/a	Fathometer and Doppler speed log noise; vessel noise; aircraft noise; gunnery noise	There would be no impacts to water quality from any acoustic stressors.
	Discharge of ballast or bilge water and wastewater	Vessel movement	Coast Guard SOPs (Appendix C) would ensure no impact to the at-sea environment. All vessel discharges would occur in compliance with state and federal regulations and policies.
	Suspension of sediments	Vessel movement	OPCs would operate in designated channels and shipping lanes. OPCs would rarely and only temporarily transit through shallow water environments where disruption of sediments could occur and would not be expected to impact water quality.
	Degradation of MEM[1]	MEM associated with gunnery training	Chemicals leaching from the degradation of MEM would be undetectable because chemicals would likely be heavily diluted from the offshore environment of gunnery training locations.
Bottom habitat and sediments	n/a	Fathometer and Doppler speed log noise; vessel noise; aircraft noise; gunnery noise	There would be no impacts to bottom habitats and sediments from any acoustic stressors.
	Bottom Disturbance	Vessel movement	If OPCs are required to anchor, excluding an emergency, they would anchor in designated anchorages. Other vessels would also routinely use these designated areas and thus any soft-bottom habitat and sediments in designated anchorages would be expected to be regularly disturbed. Vessel movement would only impact bottom habitat and sediment if OPCs were operating in very shallow water, which is not expected.

Impacted Resources	Stressor(s)	Source(s) of Stressor	Rationale for Elimination from Analysis
	Degradation of MEM[1]	MEM associated with gunnery training	Any impacts from the degradation of MEM would be undetectable due to the offshore environment of gunnery training locations, which would be expected to disperse the low concentrations of fallen MEM over large areas of the seafloor.
	n/a	Tow lines	There would be no impacts to bottom habitats and sediment s from tow lines, which would only be used at the water's surface and would be retrieved (e.g., not left behind).
Biological Resources			
Marine vegetation	n/a	Fathometer and Doppler speed log noise; vessel noise, aircraft noise; gunnery noise	Sounds associated with OPC operations would not impact the growth or distribution of marine vegetation.
	Disturbance	Vessel movement	Marine plants could be disturbed by vessel movement at the surface of the water column, but this would be minimal and limited to the marine plants directly within the path of the vessel. However, this disturbance would not be measureable or cause population level impacts.
	Disturbance, entanglement	Tow lines	Disturbance as a result of tow lines would occur only at the water's surface and would only impact floating vegetation in the water column. The risk of entanglement is considered negligible, due to: 1) the unlikely overlap between marine vegetation at the surface and OPC operations; and, 2) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel. In addition, tow lines would not be left behind.
Marine invertebrates	TTS or PTS[2], masking, behavioral responses	Fathometer and Doppler speed log noise	High-frequency noise is outside the range of best hearing of marine invertebrates; therefore, the likelihood of fathometer and Doppler speed log noise disrupting normal behavioral patterns of marine invertebrates is negligible. In addition, the *de*

Impacted Resources	***Stressor(s)***	***Source(s) of Stressor***	***Rationale for Elimination from Analysis***
			minimis characteristics (Section 3.2.1.1) indicate that fathometer and Doppler speed log noise would not cause impacts to marine invertebrates.
	TTS or PTS[2], masking, behavioral responses	Gunnery noise	Noise from gunnery training would be concentrated at the surface and only potentially detected by some crustacean or cephalopod species if at the surface.
	TTS or PTS[2], masking, behavioral responses	Aircraft noise	Aircraft associated with OPC operations would avoid environmentally sensitive areas or fly at or above altitudes of 2,000 ft (610 m) in environmentally sensitive areas (COMDTINST M3710.1 (series)), unless in emergency situations (which are not part of the Proposed Action) or for navigational safety; therefore, the likelihood of aircraft noise disrupting normal behavioral patterns of marine invertebrates, such as cephalopods, at or beneath the surface is negligible. These low frequency sounds would be emitted in air and must propagate across the air-water interface in order to be detected by most marine invertebrates. As these sounds are not intense or of long duration, it is unlikely aircraft noise would impact or harm marine invertebrates that may detect low frequency sounds.
	Behavioral response, strike	Aircraft movement	Aircraft movement would not overlap the distribution of marine invertebrates at or below the water's surface.
	Disturbance	MEM associated with gunnery training	MEM that sinks to the bottom has the potential to cover or disturb benthic invertebrates. However, any suspension of sediment, bottom disturbance, or coverage would be temporary, localized, and minimal as MEM would be expected to sink to the bottom and likely become buried as sediment shifts. Over time, the MEM would be expected to degrade. Population level impacts to marine invertebrates as a result of MEM associated with the Proposed Action would not be expected.

Impacted Resources	***Stressor(s)***	***Source(s) of Stressor***	***Rationale for Elimination from Analysis***
Flying insects	Behavioral response	Aircraft noise Gunnery noise	Sounds associated with OPC operations are not likely to be detected by flying insects unless they are in close proximity to the source (Appendix F). Since the density of flying insects over marine waters, particularly offshore waters, is low, interactions with OPCs and their support assets are unlikely. Descriptions of flying insects, including ESA-listed species that may overlap the proposed action areas can be found in Appendix G. Future homeport analyses would be expected to assess any potential impacts on a case by case basis.
	Behavioral response	Vessel movement Aircraft movement	
	Strike		
Birds	TTS or PTS[2], masking, behavioral responses	Fathometer and Doppler speed log noise	Although the frequency of fathometer noise overlaps with the limited underwater hearing range of birds (Appendix F), due to the limited amount of time birds spend underwater and the limited overlap between feeding and diving birds expected beneath the hull of an OPC, impacts are considered negligible. Doppler speed log noise would be outside of the in-water hearing range for birds (Appendix F).
	TTS or PTS[2]	Aircraft noise	The use of a helicopter in the Proposed Action would only be expected to temporarily increase overall noise, as any increase would only be for short periods and geographically-limited to the helicopter as it travels along its route to and from the OPC. Helicopters would not hover for prolonged periods over one area. Helicopters associated with the Proposed Action typically fly at a cruising speed of 159 knots—much faster than a bird is capable of flying. Therefore, it would not be expected that a bird would travel along the same route as the helicopter for a long enough period to receive continuous exposure to helicopter noise within the downward-directed cone where the noise could be detected.
	Behavioral response	Gunnery training (excludes gunnery noise)	Weapons firing activities would only impact seabirds that forage or migrate over offshore waters greater than 3 nm (6 km) from shore. Seabirds would likely disperse away from the area and disturbance would be temporary and limited to the duration of the training. There would be no population level impacts.
Bats	n/a	Fathometer and Doppler speed log noise	Fathometer and Doppler speed log noise would not overlap with the distribution of bats.

Impacted Resources	***Stressor(s)***	***Source(s) of Stressor***	***Rationale for Elimination from Analysis***
	n/a	MEM associated with gunnery training	MEM associated with gunnery training would not overlap with the distribution of bats.
	Behavioral response	Vessel movement	Since the density of bats over marine waters is low, interactions with OPCs and their support assets are unlikely.
	Behavioral response, strike	Aircraft movement	Most documented incidents between bats and aircraft occur at take-off and/or landing (Appendix G). Impacts to bats from aircraft associated with OPCs is considered low, as aircraft operations would occur offshore and the likelihood of any overlap with bats is very low. The presence of an aircraft would likely result in the dispersal of bats away from the area, however, disturbance would be temporary and would resume normal activity once the aircraft has moved through the area. There would be no population level impacts.
	TTS or PTS[2], masking, behavioral response	Vessel noise Aircraft noise Gunnery noise	Bats may not be able to detect the low frequencies of the vessel or aircraft noise and would likely only overlap with the vessels and aircraft in the coastal regions of the proposed action areas. Therefore, the potential impact of vessel and aircraft noise would be minimal and limited to behavioral reactions while vessels and aircraft are transiting to operational areas offshore. Additionally, because bats can adjust the frequencies of their calls, auditory masking would not be expected (Appendix F). Bats would not be expected to overlap with the offshore training areas used for gunnery training, therefore, impacts to bats from gunnery noise would not be expected.
Marine fish	TTS or PTS[2], masking, behavioral response	Fathometer and Doppler speed log noise Vessel noise Aircraft noise	Due to transient OPC operations, marine fish would not be exposed to acoustic sources for durations that would cause hearing threshold shifts. Doppler speed log noise would be outside of the hearing range for fish (Appendix F).
		Aircraft noise Aircraft movement Gunnery noise	Aircraft associated with OPC operations would avoid or fly at or above altitudes of 2,000 ft (610 m) in environmentally sensitive areas and in other areas at altitudes not below 2,000 ft (610 m) (COMDTINST M3710.1 (series)), unless in emergency situations (which are not part of the Proposed Action) or for navigational safety; therefore, the likelihood of aircraft noise or movement disrupting normal behavioral patterns of marine fish at or beneath the surface is negligible.

Impacted Resources	***Stressor(s)***	***Source(s) of Stressor***	***Rationale for Elimination from Analysis***
	Entanglement (tow lines associated with towing vessels)	Vessel movement	The risk of entanglement is considered negligible, due to: 1) implementation of Coast Guard SOPs (Appendix C); 2) the unlikely overlap between marine fish at the water's surface and OPC operations; and 3) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel.
	Entanglement (targets)	MEM associated with gunnery training	The risk of entanglement is considered negligible, due to: 1) implementation of Coast Guard SOPs (Appendix C); 2) the unlikely overlap between marine fish at the water's surface and OPC operations; 3) the type of materials used for targets has not been documented as an entanglement risk for marine fish; and 4) the unlikely presence of looped or slack target retrievals lines, as the lines would be short.
Essential fish habitat	Reduction in the quality of EFH	Aircraft noise Gunnery noise	Sounds associated with OPC operations are not likely to be detected by fish in their habitat unless they are in close proximity to the source. Gunnery noise would occur in established Navy Ranges designated for this purpose or in specific areas identified with NOAA and the FAA to minimize impacts to species. Aircraft associated with OPC operations would avoid environmentally sensitive areas or fly at or above altitudes of 2,000 ft (610 m) in environmentally sensitive areas and in other areas at altitudes not below 2,000 ft (610 m) (COMDTINST M3710.1 (series)), unless in emergency situations (which are not part of the Proposed Action) or for navigational safety; therefore, the likelihood of aircraft noise disrupting normal behavioral patterns of fish at or beneath the surface is negligible. The quality of EFH would not be reduced by aircraft noise or gunnery noise.
Marine reptiles	TTS or PTS[2]	Fathometer and Doppler speed log noise Vessel noise Aircraft noise	Due to transient OPC operations, marine reptiles would not be exposed to acoustic sources for durations that would cause hearing threshold shifts. Doppler speed log noise would be outside of the in-water hearing range for marine reptiles (Appendix F).
	Behavioral Response Masking	Aircraft movement Aircraft Noise Fathometer and Doppler speed log noise	Aircraft associated with OPC operations would avoid environmentally sensitive areas or fly at or above altitudes of 2,000 ft (610 m) in environmentally sensitive areas and in other areas at altitudes not below 2,000 ft (610 m) (COMDTINST

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Rationale for Elimination from Analysis*
			M3710.1 (series)), unless in emergency situations (which are not part of the Proposed Action) or for navigational safety; therefore, the likelihood of aircraft movement disrupting normal behavioral patterns of marine reptiles at or beneath the surface is negligible. Aircraft noise would dissipate over the altitude distance; however, should a marine reptile at the water's surface detect the helicopter noise, any behavioral response to passing aircraft would be temporary and minimal and would not cause population level effects. Due to the *de minimis* characteristics (Section 3.2.1.1) and because high-frequency noise is outside the range of best hearing of marine reptiles, the likelihood of fathometer and Doppler speed log noise disrupting normal behavioral patterns of marine reptiles is negligible.
	Behavioral Response Masking	Gunnery Noise Gunnery Training	Gunnery noise overlaps with the hearing range of marine reptiles; however, sound generated by a muzzle blast is intense, but very brief. Disturbance would be temporary and limited to the duration of gunnery training and only detected at the surface. While there is a risk that a marine reptile at the surface could be struck, injured, or killed by small caliber rounds during gunnery training events, based on the infrequency of the training, the location of the training at established Navy Ranges, Coast Guard SOPs (Appendix C) (e.g., lookouts), and the coordinated timing and location of the events with NOAA and the FAA, these potential impacts to marine reptiles from gunnery training associated with the Proposed Action would be extremely unlikely. There would be no population level impacts to marine reptiles as a result of gunnery noise or training.
	Entanglement (tow lines associated with towing vessels)	Vessel movement	The risk of entanglement is considered negligible, due to: 1) implementation of Coast Guard SOPs (Appendix C); 2) the unlikely overlap of marine reptiles at the surface and OPC operations; and 3) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel.
	Entanglement (targets)	MEM associated with gunnery training	The risk of entanglement is considered negligible, due to: 1) implementation of Coast Guard SOPs (Appendix C); 2) the unlikely overlap of marine reptiles at the surface and OPC

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Rationale for Elimination from Analysis*
			operations; and 3) the unlikely presence of looped or slack target retrieval lines, as the lines would be short.
Marine mammals	TTS or PTS[2]	Fathometer and Doppler speed log noise Vessel noise Aircraft noise Gunnery noise	Due to transient OPC operations, marine mammals would not be exposed to acoustic sources for durations that would cause hearing threshold shifts. Doppler speed log noise would be outside of the hearing range for marine mammals (Appendix F).
	Behavioral Responses Masking	Aircraft Movement Gunnery Training Gunnery Noise	Aircraft would maintain an altitude above 2,000 ft (610 m) in environmentally sensitive areas (pinniped haul outs, polar bear pens, ice sea lairs), and in other areas at altitudes not below 2,000 ft (610 m) (COMDTINST M3710.1 (series)), unless in emergency situations (which are not part of the Proposed Action) or for navigational safety; therefore the likelihood of aircraft movement disrupting normal behavioral patterns of marine mammals at or beneath the surface is negligible. Gunnery training would not take place near any known haul outs or near land or ice, thus gunnery training associated with the Proposed Action would only briefly disturb marine mammals at the water's surface. Most weapons firing activities would occur far from shore (Section 2.3.5), therefore only those marine mammals that forage or migrate greater than 3 nm (6 km) offshore are likely to detect and potentially respond to gunnery noise. Gunnery noise (Table 2-2) does overlap with the hearing of some marine mammal species. Sound generated by a muzzle blast is intense, but very brief. Marine mammals may exhibit an avoidance response around the vessel and the path of projectiles. Any disturbance would be temporary and limited to the duration of gunnery training. While there is a risk that a marine mammal at the surface could be struck, injured, or killed by small caliber rounds during gunnery training events, based on the infrequency of the training, the location of the training at established Navy Ranges, Coast Guard SOPs (Appendix C) (e.g., lookouts), and the coordinated timing and location of the events with NOAA and the FAA, these potential impacts to marine mammals from gunnery training associated with the Proposed Action would be extremely unlikely. There would be no

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Rationale for Elimination from Analysis*
			population level impacts to marine mammals as a result of aircraft movement, gunnery training, and gunnery noise.
	Entanglement (tow lines associated with towing vessels)	Vessel movement	The risk of entanglement is considered negligible, due to: 1) implementation of Coast Guard SOPs (Appendix C); 2) the unlikely overlap of marine reptiles at the surface and OPC operations; and 3) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel.
	Entanglement (targets)	MEM associated with gunnery training	The risk of entanglement is considered negligible, due to: 1) implementation of Coast Guard SOPs (Appendix C) and 2) the unlikely presence of looped or slack target retrieval lines, as the lines would be short.
Socioeconomic and Human Resources			
Public health and safety	Physical interactions	Vessel movement MEM associated with gunnery training	Coast Guard would issue a "Notice to Mariners," which would mitigate interactions between OPC operations and the public.
Accessibility to marine resources	Restrictions due to operations	Vessel movement Aircraft movement	Due to the offshore locations of OPC operations, the public would not be restricted from use of marine resources.

[1] Military Expended Materials include expended shells and targets that would not be recovered after gunnery training (Section 2.3.5).
[2] Temporary Threshold Shift and Permanent Threshold Shifts are not anticipated.

Table 3-4. Identification of Stressors for Analysis and Corresponding Section in the PEIS/POEIS

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Section*
Physical Resources			
Air quality	Criteria pollutants	Vessel movement (vessel emissions) Aircraft movement Gunnery training (weapon emissions)	Section 3.3.1.2
	Hazardous air pollutants		
Ambient sound	In-air noise	Vessel noise Aircraft noise Gunnery noise	Section 3.3.2.2
	In-water noise	Fathometer and Doppler speed log noise Vessel noise Aircraft noise Gunnery noise	
Biological Resources			
Marine vegetation	Anchoring	Vessel movement	Section 3.4.1.2
Marine invertebrates	Disturbance	Vessel movement	Section 3.4.2.2
	Strike		
	Masking	Vessel noise	
	Short-term behavioral or physiological responses		
Birds	Short-term behavioral or physiological responses	Vessel noise Aircraft noise Gunnery noise	Section 3.4.3.2
	Behavioral response	Vessel Movement Aircraft movement	
	Strike		
	Ingestion of MEM	MEM associated with gunnery training	
Marine fish	Behavioral response	Fathometer and Doppler speed log noise Vessel noise	Section 3.4.4.2
	Masking		
	Behavioral response	Vessel movement	
	Strike		
	Ingestion of MEM	MEM associated with gunnery training	
Essential fish habitat	Reduction of quality of acoustic habitat of water column	Fathometer and Doppler speed log noise Vessel noise	Section 3.4.5.2

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Section*
	Reduction of water quality of water column	Vessel movement	
	Reduction of benthic habitat from MEM	MEM associated with gunnery training	
Marine reptiles	Masking	Vessel noise	Section 3.4.6.2
	Behavioral response		
	Behavioral response	Vessel movement	
	Strike		
	Ingestion of MEM	MEM associated with gunnery training	
Marine mammals	Masking	Fathometer and Doppler speed log noise Vessel noise Aircraft noise	Section 3.4.7.2
	Behavioral response		
	Behavioral response	Vessel movement	
	Strike		
	Ingestion of MEM	MEM associated with gunnery training	
Socioeconomic Resources			
Commercial and recreational fishing	Behavioral response of biological resources (e.g., catch)	Vessel movement Aircraft movement Vessel noise Aircraft noise	Section 3.5.1.2
	Behavioral response of a biological resources' prey species (e.g., catch)		
Marine Construction, Mineral Extraction, Oil and Gas Extraction; Tourism (e.g., Cruise Industry); Renewable Energy, Research; Transportation and Shipping	Increased Coast Guard presence (e.g., coastal security, marine safety, SAR)	Vessel movement Aircraft movement	Sections 3.5.2.2, 3.5.3.2, 3.5.4.2, 3.5.5.2, 3.5.6.2, 3.5.7.2, and 3.5.8.2
Subsistence Hunting and Fishing	Behavioral response of biological resources (targeted for subsistence)	Vessel movement Aircraft movement Vessel noise Aircraft noise	Section 3.5.9.2
	Behavioral response of a biological resources' prey species (targeted for subsistence)		

3.2.1 Acoustic Stressors

This section describes the characteristics of sounds produced during the Proposed Action and provides the basis for analysis of acoustic impacts on resources in Chapter 3. An explanation of sound propagation and terminology used when describing sound in this PEIS/POEIS is in Appendix D.

Acoustic stressors associated with the Proposed Action include the noise from the fathometer and Doppler speed log (i.e., navigational system), vessel noise, aircraft noise, and gunnery noise. Acoustic sources associated with the Proposed Action are provided in Table 2-2. Characteristics of these sound sources are described in the following sections. Acoustic stressors may be analyzed for both in-water and in-air impacts, depending on the ability of the sound to cross the air-water interface and the species presence (underwater or in-air) when able to detect the sound.

The potential impacts to species from acoustic stressors include a hearing threshold shift (Section 3.2.1.5.2), masking (Section 3.2.1.5.3), and behavioral reactions (Section 3.2.1.5.5). Each is discussed in detail below.

3.2.1.1 Fathometer and Doppler Speed Log Noise

Similar to commercial and private vessels, the OPCs and any supporting vessels would employ navigation systems including a fathometer (echosounder) and a Doppler speed log. Both may be in use at any time for safe vessel operation. These sources are typically highly directional to obtain specific navigational data. The specifications for these systems are discussed in detail in Section 2.2.1.1 and summarized in Table 2-2. The frequency range for the Doppler speed log is 270-284 kHz. The other navigational source that would produce underwater acoustic noise is the single beam echosounder. The echosounder frequencies can range from 3.5–1,000 kHz; however, most navigational systems operate from 50–200 kHz, which is the assumed operating frequency for the OPC and any supporting vessels. As described in Section 2.2.1.1, this analysis only evaluates impact or harm from the echosounder's main lobe, since that would represent the highest energy output. For the purposes of this PEIS/POEIS, the navigation system noise discussed here excludes the noise produced by the vessel (Section 3.2.1.2).

In-water active acoustic sources with narrow beam widths, downward directed transmissions, short pulse lengths, frequencies above known hearing ranges, low source levels, or combinations of these factors, would not be anticipated to result in takes of protected species. The Navy categorizes these sources as *de minimis* (Navy 2013). For the purpose of analysis in this PEIS/POEIS, the Coast Guard proposes to adopt the Navy's *de minimis* definition. The sources in Table 3-5 are qualitatively analyzed to determine the appropriate determinations under NEPA in the appropriate resource impact analyses, as well as under the MMPA and the ESA.

When used during routine activities and in a typical environment, *de minimis* sources fall into one or more of the following categories:

- Transmit primarily above 200 kHz: Sources above 200 kHz are above the hearing range of the most sensitive marine mammals and far above the hearing range of any other animals in the proposed action areas.
- Source levels of 160 dB re 1 µPa or less: Low-powered sources with source levels less than 160 dB re 1 µPa are typically hand-held sonars, range pingers, transponders, and acoustic communication devices. Assuming spherical spreading for a 160 dB re 1 µPa source, the sound would attenuate to less than 140 dB within 33 ft (10 m) and less than 120 dB within 328 ft (100 m) of the source. Ranges would be even shorter for a source less than 160 dB re 1 µPa source level.

- Sources in Table 3-5 have operational characteristics (such as short pulse length, narrow beam width, downward-directed beam, and low energy release, or manner of system operation), which exclude the possibility of any significant impact to a protected species. Even if there is a possibility that some species may be exposed to and detect some of these sources, any response is expected to be short-term and inconsequential.

Table 3-5. Fathometer and Doppler Speed Log Noise Characteristics for Qualitative Analysis

Source Class Category	***Characteristics***
Doppler Speed Log	
Very high frequency navigation transducers	Required for safe navigation Downward-focused Narrow beam width Very short pulse lengths
Fathometer (echosounder)	
High-frequency sources used to determine water depth	Required for safe navigation Downward-focused directly beneath the vessel Narrow beam width (typically much less than 30°) Short pulse lengths (less than 10 milliseconds)

The Coast Guard evaluated the *de minimis* criteria, analyzed available information, and conducted an analysis of species distribution, and potential acoustic impacts (Section 3.2.1.5). Based on the short pulse length, narrow beam width, downward-focused beam, and manner of system operation, as well as the *de minimis* criteria, the navigational system (i.e., fathometer/single beam echosounder) could be considered *de minimis*. In addition, based on the manner of system operation and *de minimis* criteria, the Doppler speed log could be considered *de minimis* since it operates above the hearing range of most sensitive marine mammals and far above the hearing range of any other animals in the proposed action areas. Underwater acoustic sources associated with vessel operations and training, specific to vessel type, are listed in Table 2-2. However, for some biological resources, the frequency range of the echosounder (50–200 kHz) does overlap with the hearing range of certain species, and the potential impact of that overlap with hearing is discussed in detail by species group in the appropriate sections below.

Potential acoustic impacts to a species from fathometer noise would occur only if that species' hearing range overlaps with the frequency range of the echosounder (50–200 kHz) and/or if the presence of the resource overlaps with the use of the navigational equipment. The Coast Guard has determined that either the following meet the *de minimis* criteria or that the species' hearing range or resource's distribution do not overlap with the navigational equipment and are not evaluated further in this PEIS/POEIS: marine vegetation, marine invertebrates, certain birds (non-diving), marine reptiles, and socioeconomic resources (Table 3-3). Flying insects, air quality, and bats are not expected to overlap with navigational systems and were not evaluated for potential impacts from fathometer and Doppler speed log noise.

However, based on an analysis of species distribution, species' hearing ranges, and acoustic environment, the Coast Guard has determined that fathometer noise would be expected to potentially impact ambient sound (Section 3.3.2), certain bird species (Section 3.4.3), fish (Section 3.4.4), and certain marine mammal species (Section 3.4.7). Section 3.2.1.5.2 provides a general description of temporary and permanent hearing threshold shifts and an evaluation of hearing thresholds for biological resources in the proposed action areas. Based on the Coast Guard's analysis, fathometer and Doppler speed log noise would not be expected to cause a hearing threshold shift per the *de minimis* criteria and transitory vessel movement. The analysis in this PEIS/POEIS evaluates likely responses to acoustic stressors, such as masking (Section 3.2.1.5.3) and behavioral responses (Section 3.2.1.5.5), based on available scientific literature.

3.2.1.2 Vessel Noise

Vessel noise is a combination of narrowband "tonal" sounds at specific frequencies and "broadband" sounds with energy spread over a range of frequencies. Levels and frequencies of tonal and broadband sounds tend to be related to vessel size. Large ships tend to be noisier than small vessels, and ships that are underway with a full load (or towing a load) produce more noise than unladen vessels. Noise also increases with ship speed. Table 2-2 lists the expected noise associated with the OPC (categorized as a large vessel) as well as the OTH boat (small vessel). For the purposes of this PEIS/POEIS, vessel noise excludes the noise produced by the navigational system (Section 3.2.1.1).

Low frequency ship noise sources include propeller noise (cavitation, cavitation modulation at blade passage frequency and harmonics, unsteady propeller blade passage forces), propulsion machinery such as diesel engines, gears, and major auxiliaries such as diesel generators (Ross 1976). Commercial ships radiate noise underwater with peak spectral power at 20–200 Hz (Ross 1976). The dominant noise source is usually propeller cavitation which has peak power near 50–150 Hertz ([Hz] at blade rates and their harmonics), but also radiates broadband power at higher frequencies, at least up to 100,000 Hz (Arveson and Vendittis 2000; Gray and Greeley 1980; Ross 1976). While propeller singing is caused by blades resonating at vortex shedding frequencies and emits strong tones between 100 and 1,000 Hz, propulsion noise is caused by shafts, gears, engines, and other machinery and has peak power below 50 Hz (Richardson et al. 1995). Overall, larger vessels generate more noise at low frequencies (<1,000 Hz) because of their relatively high power, deep draft, and slower-turning (<250 rotations per minute) engines and propellers (Richardson et al. 1995). OPC propellers are expected to consist of two, 5-blade PROMAS propellers measuring 11.5 ft (3.5 m) in diameter, turning at approximately 240 rotations per minute.

Descriptions of OPCs and OTH boats are provided in Section 2.2.3 and 2.2.3.1 and sound source characteristics are provided in Table 2-2. In general, small vessels like the OTH boats would emit vessel noise with a frequency range of 1–7 kHz with a source level of 175 dB re 1 µPa at 1 m. Large vessels, like the OPC, would be expected to emit vessel noise with a frequency range of 20–300 Hz with a source level of 190 dB re 1 µPa at 1 m. OPC vessels and OTH boats may be in the proposed action areas at any given time for any duration and could overlap spatially and temporally with other vessels within the proposed action areas.

Most information on in-air vessel noise focuses on noise produced by moored ships as they load and unload (Badino et al. 2012a; Badino et al. 2012b; Borelli et al. 2015a; Borelli et al. 2015b) or on the effects of noise on the ship's crew and passengers while underway (U.S. Coast Guard 1982). Ambient, environmental noise from the vessels while underway would consist of localized engine sounds, grinding and humming noises from the operation of winches and other machinery, and use of the ship's horn.

Vessel noise has the potential to impact the physical and biological environment; however, the Coast Guard has determined that vessel noise would not impact or harm the following resources: air quality, flying insects, bats, and certain bird species (non-diving birds). The impacts to these resources from vessel noise are not evaluated further in this PEIS/POEIS (Table 3-3). Section 3.2.1.5.2 provides a general description of a temporary and permanent hearing threshold shifts and an evaluation of hearing thresholds for biological resources in the proposed action areas. Based on the Coast Guard's analysis, vessel noise would not be expected to cause a hearing threshold shift because the sound created by vessels is not typically very intense or of a very long duration (Section 3.2.1.5.2) due to transient vessel movement and the ability of some species to move away from vessels, if disturbed. The potential impacts of vessel noise to biological resources include masking or behavioral responses, which are discussed in Sections 3.2.1.5.3 and 3.2.1.5.5, respectively.

3.2.1.3 Aircraft Noise

The Proposed Action would include the introduction of in-air and in-water sound from aircraft operations, including the use of helicopters and UAS. The primary aircraft expected to be used during the Proposed Action are the MH-60 Jayhawk helicopter and the MH-65 Dolphin; however, the Coast Guard may also use UAS. The use of these assets are described in Sections 2.2.3.2 and 2.2.3.3 and sound source characteristics are provided in Table 2-2.

Helicopters produce low-frequency sound and vibration (Pepper et al. 2003; Richardson et al. 1995). Noise generated from helicopters is transient and variable in intensity. Helicopter sounds contain dominant tones from the rotors that are generally below 500 Hz. MH-60 and MH-65 helicopter noise levels at the source average approximately 136 dB re 20 µPa in air, with frequencies between 20 Hz and 5 kHz. Due to rotor noise, more low frequency components (<1 kHz) are contained in this broadband signal. Helicopters often radiate more sound forward than aft. In general, the higher the aircraft, the less sound reaches the sea surface (Eller and Cavanagh 2000; Richardson et al. 1995). At the water's surface, the received level would be estimated at 106 dB re 20 µPa if the helicopter were at an altitude of 100 ft (31 m). This source level would significantly decrease if the helicopter were at an altitude of 2,000 ft (610 m), like those in the Proposed Action. As discussed in Section 2.2.3.2, helicopter flights would primarily maintain altitudes of 2,000 ft (610 m) as long as navigationally safe to do so. Per the Coast Guard's Air Operations Manual (COMDTINST M3710.1 (series)), aircraft would fly at or above 2,000 ft (610 m) in environmentally sensitive areas and in other areas at altitudes not below 2,000 ft (610 m), when possible. Appendix D provides more detail on aircraft noise propagation at the air-water interface and underwater transmission of aircraft noise.

Sound levels generated by UAS have not been well-documented and due to emerging technology, it is not known at this time what type of UAS would be deployed as part of the Proposed Action. A general synopsis of UAS noise levels are provided for reference; however, any sound produced by the UAS is expected to be less than those produced by the helicopter. Fixed wing and multi-rotor are the two main types of UAS. Christiansen et al. (2016a) measured two multi-rotor UAS that were found to produce broadband in-air source levels of 80 dB re 20 µPa with frequencies centered at 60 to 150 Hz. When flying at altitudes of 16 to 33 ft (5 to 10 m) above the water's surface, the received levels of the multi-rotor UAS were considered to be close to ambient noise levels in many shallow water habitats (<300 ft [91 m]) and below the hearing thresholds of most marine species (Christiansen et al. 2016a). Senzig et al. (2018) measured the noise created by a TigerShark fixed wing UAS at an altitude of 200 ft (61 m) during a level overflight, and the maximum noise measurements on the ground ranged from 90–96 dBA. At 400 ft (122 m), the maximum noise level on the ground dropped to 83–89 dBA (Senzig et al. 2018).

The Coast Guard considered aircraft noise in multiple ways: in-air, at the sea surface, and underwater. Based on this evaluation, the Coast Guard has determined that aircraft noise would not overlap with the following resources: marine vegetation, marine invertebrates, flying insects, bats, marine fish, essential fish habitat, marine reptiles, and socioeconomic resources Table 3-3. As such, the impacts to these resources from aircraft noise (helicopter and UAS) are not evaluated further in this PEIS/POEIS.

Potential impact or harm to biological resources from aircraft could involve acoustic and non-acoustic effects and responses may be due to sound or the physical presence of the aircraft flying overhead. Aircraft generate noise in flight, which propagates through the air and may be detected by species above water or by species that dive or forage below the water's surface. For some species the amount of time spent exposed to aircraft noise, either in air or underwater, may be extremely limited, which decreases the potential for impact or harm to these species. Additionally, due to the impedance of aircraft noise across the air/water interface, only low flying aircraft could cause species underwater and directly beneath the aircraft to be temporarily exposed to aircraft noise as the helicopter flies through the proposed action areas. The potential impacts of aircraft noise to biological resources include masking or behavioral reactions, which are discussed in Sections 3.2.1.5.3 and 3.2.1.5.5, respectively.

Section 3.2.1.5.2 provides a general description of temporary and permanent hearing threshold shifts and an evaluation of hearing thresholds for biological resources in the proposed action areas. Based on the Coast Guard's analysis, aircraft noise would not be expected to cause a hearing threshold shift because the sound created by aircraft is not typically very intense or of a very long duration due to transient aircraft movement, and if disturbed, the ability of species to move away from aircraft.

3.2.1.4 Gunnery Noise

Gunnery training aboard the OPC would include the firing of inert (i.e., non-explosive) small caliber (0.50 caliber or MK-38 standard [25 mm]) and large caliber (57 mm) gun rounds, and the Nulka decoy round as described in Section 2.3.5. Noise associated with gunnery training is discussed in detail in Section 2.4 and summarized in Table 2-2. Noise associated with weapons firing and the impact of non-explosive practice munitions would be localized to training areas which are within designated offshore areas that the Coast Guard has coordinated with NOAA and the FAA, or within an established Navy range. The firing of a weapon may be detected in-air or underwater. Any underwater sounds from firing activities would be strongest just below the surface and directly under the firing point. Any sound that enters the water only does so within a narrow cone below the firing point or path of the projectile.

Gunnery noise would range in frequency from 150 Hz to 2.5 kHz (with a peak from 0.90–1.5 kHz) and a source level of 139–161 dB re 20 µPa at 50 ft (15 m) (Hood et al. 2012; Luz 1983; Ylikoski et al. 1995). Multiple, rapid gun firings would occur from a single firing point toward a target area. Acoustic information on the Nulka decoy round was not available. To analyze the acoustic effects of the Nulka, data from the Navy's BQM-34, BQM-74, and the BQM-177 aerial targets were used as a surrogate. These Navy aerial targets are small (no longer than 22 ft [7 m]), unmanned aircraft that are launched using jet-assisted take-off rocket bottles and continue their flight using a small turbojet engine and launched similarly to the Nulka. Burgess and Greene (1998) reported that noise from the Navy aerial targets' launch measured 145 dB re 20 µPa at 50 ft (15 m). However, the Nulka decoy round is smaller than the BQM targets and would employ a smaller rocket motor. It would be expected that noise from the Nulka decoy would be less than what was measured for the BQM. In addition, the Nulka would be deployed during a single testing event on an established Navy range and only on the lead OPC. Therefore the likelihood that the single test event of the Nulka decoy on the lead OPC would overlap with any ESA-listed species or critical habitat is extremely low.

The Coast Guard considered gunnery noise in multiple ways: in-air, at the sea surface, and underwater. Based on this evaluation, the Coast Guard has determined that gunnery noise would not overlap with the following resources: marine vegetation, marine invertebrates, flying insects, bats, marine fish, essential fish habitat, marine reptiles, marine mammals, and socioeconomic resources. The impacts to these resources from gunnery noise are not evaluated further in this PEIS/POEIS.

Section 3.2.1.5.2 provides a general description of temporary and permanent hearing threshold shifts and an evaluation of hearing thresholds for biological resources in the proposed action areas. The mitigation zone established as part of the Coast Guard SOPs (Appendix C) would extend beyond the distance to which species would likely experience a permanent threshold shift (PTS) or temporary threshold shift (TTS) from weapons firing; therefore, mitigation would be expected to reduce or avoid the potential for exposure to PTS or TTS. The potential impacts of gunnery noise to biological resources include masking or behavioral responses, which are discussed in Sections 3.2.1.5.3 and 3.2.1.5.5, respectively.

3.2.1.5 Conceptual Framework for Assessing Potential Impacts to Biological Resources from Proposed Action Activities and Associated Acoustic Stressors

This conceptual framework describes the potential impacts from exposure to activities and the potential accompanying short-term response by the biological resource (e.g., expended energy or missed feeding opportunity). It then outlines the conditions that may lead to long-term consequences for the individual if the animal cannot fully recover from the short-term costs and how these may affect the population. The methods to predict potential effects on each specific biological resource are derived from this conceptual framework.

An animal is considered "exposed" to a sound if the received sound level at the animal's location is above the background ambient noise level and within an animal's hearing sensitivity range. A variety of effects may result from exposure to acoustic activities.

The categories of potential acoustic effects are:

- Injury: Injury to organs or tissues of an animal (Section 3.2.1.5.1).
- Hearing loss or hearing threshold shift: A noise-induced decrease in hearing sensitivity that can be either temporary or permanent and may be limited to a narrow frequency range of hearing (Section 3.2.1.5.3).
- Masking: When the perception of a biologically important sound (i.e., signal) is interfered with by a second sound (i.e., noise) (Section 3.2.1.5.3).
- Physiological stress: An adaptive process that helps an animal cope with changing conditions; although too much stress can result in physiological problems (Section 3.2.1.5.4).
- Behavioral response: A reaction ranging from very minor and brief changes in attentional focus to changes in biologically important behaviors and avoidance of a sound source or area, to aggression or prolonged flight (Section 3.2.1.5.5).

Sounds emitted from a sound-producing activity travel through the environment to create a spatially variable sound field. The sound received by the animal determines the range of possible effects. The received sound can be evaluated in several ways, including examining the number of times the sound is experienced (repetitive exposures), total received energy, or highest sound pressure level (SPL) experienced. Noises that are higher than the ambient sound level and within an animal's hearing sensitivity range have the potential to cause effects. There can be any number of individual sound sources in a given activity, each with its own unique characteristics. Environmental factors such as temperature and bottom type impact how sound spreads and attenuates through the environment. Additionally, independent of the sounds, the overall level of activity and the number and movement of sound sources are important to help predict the probable reactions.

The magnitude of the response is based on the characteristics of the acoustic stimuli and the characteristics of the animal (species, susceptibility, life history stage, size, hearing range, duration of exposure, and past experiences). Very high exposure levels close to explosives have the potential to cause injury. High-level, long-duration, or repetitive exposures may potentially cause some hearing loss. All perceived sounds may lead to behavioral responses, physiological stress, and masking. Many sounds, including sounds that are not detectable by the animal, could have no effect. Section 3.2.1.5.2 provides a summary of hearing thresholds for biological resources likely found in the proposed action areas.

3.2.1.5.1 Injury

Injury refers to the direct injury of tissues and organs by shock or pressure waves impinging upon or traveling through an animal's body. Injury can be mild and fully recoverable or, in some cases, lead to mortality. Injury includes both auditory and non-auditory injury. Injury may occur as a result of physical impact, such as a collision or entanglement (Section 3.2.2), or may occur as the result of an auditory injury. Marine animals are well adapted to large, but relatively slow, hydrostatic pressure changes that occur with changing depth. However, injury may result from exposure to rapid pressure changes, such that the tissues do not have time to adequately adjust. Therefore, injury is normally limited to relatively close ranges from explosions. Since explosions are not part of the Proposed Action, non-auditory injuries including hemorrhaging of small blood vessels and the rupture of gas-containing tissues (such as the lung, swim bladder, or gastrointestinal tract) are not expected.

Auditory injury is the direct mechanical injury to hearing-related structures, including tympanic membrane rupture, disarticulation of the middle ear ossicles, and injury to the inner ear structures such as the organ of Corti and the associated hair cells. Auditory injury differs from auditory fatigue in that the latter involves the overstimulation of the auditory system at levels below those capable of causing direct mechanical damage. Auditory injury is always injurious but can be temporary. One of the most common consequences of auditory injury is hearing loss (Section 3.2.1.5.2).

Injury could increase the animal's physiological stress (Section 3.2.1.5.4) and also increases the likelihood or severity of a behavioral response (Section 3.2.1.5.5). Severe injury can lead to the death of the individual. Damaged tissues from mild to moderate injury may heal over time. The predicted recovery of direct injury is based on the severity of the injury, availability of resources, and characteristics of the animal. The animal may also need to recover from any potential costs due to a decrease in resource gathering efficiency and any secondary effects from predators or disease. Severe injuries can lead to reduced survivorship (longevity), elevated stress levels, and prolonged alterations in behavior that can reduce an animal's lifetime reproductive success. An animal with decreased energy stores or a lingering injury may be less successful at mating for one or more breeding seasons, thereby decreasing the number of offspring produced over its lifetime.

3.2.1.5.2 Hearing Loss-Hearing Threshold Shift

The most severe effect of exposure to high intensity sound is hearing loss. PTS can occur when sound intensity is very high or of such long duration that the result is a permanent hearing loss on the part of the listener. The intensity and duration of a sound that will cause PTS varies across species and even between individual animals. PTS is a consequence of the death of sensory hair cells in the ear, which results in a loss of hearing ability in the general vicinity of the frequencies (Myrberg Jr 1990; Richardson et al. 1995). TTS is a temporary condition caused by sounds of sufficient loudness that can impair an animal's hearing in a particular band for a period of time. After termination of the sound, normal hearing ability may return over a timeframe ranging from minutes to days. The precise physiological mechanism for TTS is not well understood. It may result from fatigue of the sensory hair cells as a result of over stimulation, or from some small damage to the cells that is able to be repaired over time. Hair cells may be temporarily affected by exposure to the sound, but they are not permanently damaged. Animals may be at a disadvantage during TTS, in terms of detecting prey or predators; however, TTS is not considered to be an injury. The distinction between PTS and TTS is based on whether there is complete recovery of a threshold shift following a sound exposure. If the threshold shift eventually returns to zero (the threshold returns to the pre-exposure value), the threshold shift is considered a TTS. The recovery to pre-exposure threshold from studies of marine mammals is usually minutes to hours, for the small amounts of TTS induced (Finneran et al. 2005; Nachtigall et al. 2004). The recovery time is related to the exposure duration, sound exposure level, and the magnitude of the threshold shift, with larger threshold shifts and longer exposure durations requiring longer recovery times (Finneran et al. 2005; Mooney et al. 2009). If the threshold shift does not return to zero but leaves some finite amount of threshold shift, then that remaining threshold shift is a PTS.

A bird may experience PTS if exposed to a continuous SPL over 110 dBA re 20 µPa in air (Dooling and Therrien 2012). In addition, continuous noise exposure at levels above 90– 95 dBA re 20 µPa can cause TTS (Dooling and Therrien 2012) in bird species.

In fish, available evidence does not suggest that low-frequency noise, such as ship noise, can injure or kill a fish (Popper 2014). The TTS effect has been demonstrated in several fish species, mainly in response to low-frequency sources, where investigators used exposure to either long-term increased background levels (Smith et al. 2004) or short-term, intense sounds (Popper et al. 2005).

Popper et al. (2014) established broad applicable sound exposure guidelines for sea turtles which were revised by Halvorsen et al. (2017) based on the best available scientific information, but do not include numeric sound exposure thresholds for auditory effects on sea turtles due to insufficient data. Sea turtle hearing is most sensitive around 100 to 400 Hz in-water, is limited over 1 kHz, and is much less sensitive than that of any marine mammal. Sea turtles are likely only susceptible to auditory impacts when exposed to very high levels of sound within their limited hearing range.

In 2016, the National Marine Fisheries Service (NMFS) published technical guidance, updated in 2018, that identifies the received levels, or acoustic thresholds, at which individual marine mammals are predicted to experience a hearing threshold shift for acute, incidental exposure to underwater anthropogenic sound sources (Table 3-6). The guidance included a protocol for estimating PTS onset acoustic thresholds for impulsive (e.g., airguns, impact pile drivers) and non-impulsive (e.g., tactical sonar, vibratory pile drivers) sound sources for the following marine mammal hearing groups: low- (LF), mid- (MF), and high- (HF) frequency cetaceans, and otariid and non-phocid marine carnivores (OW) and phocid (PW) pinnipeds. NMFS' acoustic guidelines only address effects of noise on marine mammal hearing and do not provide guidance on behavioral disturbance. Thus, the guidance does not represent the entirety of the comprehensive analysis included in this PEIS/POEIS, but serves as a tool to help evaluate the effect during the Proposed Action on marine mammals and to make findings required by the NMFS' various statutes, such as the MMPA. Table 3-6 provides the resultant TTS onset auditory acoustic thresholds for non-impulsive sounds[9] from NMFS' technical guidance (National Marine Fisheries Service 2016; NMFS 2018a). Impulsive sources are not listed, since no impulsive sources would be produced by the Proposed Action. In addition, Table 3-6 provides PTS onset auditory thresholds derived from TTS for non-impulsive sounds, utilizing NMFS' technical guidance (National Marine Fisheries Service 2016; NMFS 2018a).

Based on the Coast Guard's analysis of the Proposed Action, acoustics stressors would not be expected to cause a hearing threshold shift as none of the sound levels of acoustic stressors associated with the Proposed Action (fathometer and Doppler speed log noise, vessel noise, aircraft noise, or gunnery noise) should reach PTS or TTS thresholds.

[9] Definition of non-impulsive sound: sources that produce sounds that can be broadband, narrowband or tonal, brief or prolonged, continuous or intermittent) and typically do not have a high peak sound pressure with rapid rise/decay time that impulsive sounds do (American National Standards Institute (ANSI) 2001; National Institute for Occupational Safety and Health (NIOSH) 1998).

Table 3-6. Onset of PTS and TTS for Marine Mammals for Underwater Non-Impulsive Sounds

Group	***Species***	***Physiological Criteria (24 hours)***	
		Weighted Onset TTS[1]	***Onset PTS (received level)***
LF Cetaceans	All mysticetes	179 dB SEL_{cum}[2]	199 dB SEL_{cum}
MF Cetaceans	Most delphinids, beaked whales, medium and large toothed whales	178 dB SEL_{cum}	198 dB SEL_{cum}
HF Cetaceans	Porpoises, River dolphins, *Cephalorynchus* spp., some *Lagenorhynchus* species *Kogia* spp.	153 dB SEL_{cum}	173 dB SEL_{cum}
PW (in water)	Harbor, Bearded, Hooded, Common, Spotted, Ringed, Baikal, Caspian, Harp, Ribbon, Gray, Monk, Elephant, Ross, Crabeater, Leopard, and Weddell seals	181 dB SEL_{cum}	201 dB SEL_{cum}
OW (in water)	Guadalupe fur seal, Northern fur seal, California sea lion, Steller sea lion	199 dB SEL_{cum}	219 dB SEL_{cum}

SEL: Sound Exposure Level
[1] Determined from minimum value of exposure function and the weighting function at its peak
[2] The SEL_{cum} metric accounts for the accumulated exposure (i.e., SEL_{cum} cumulative exposure over the duration of the activity within a 24-hour period)
Reference: NMFS Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (National Marine Fisheries Service 2016; NMFS 2018a)

3.2.1.5.3 Masking

The zone of masking is the area in which noise may interfere with the detection of other sounds, including communication calls, prey sounds, and other environmental sounds. The potential effect from auditory masking (a sound that interferes with the audibility of another sound) is missing biologically relevant sounds (vocalizations or sounds of prey or predators) that organisms may rely on, as well as eliciting behavioral responses (NRC 2005; Williams et al. 2015), which are discussed below.

The impact or harm of masking can vary depending on the ambient noise level within the environment, the received level and frequency of the noise, and the received level and frequency of the sound of biological interest (Clark et al. 2009; Foote et al. 2004; Parks et al. 2011; Southall et al. 2000). In the open ocean, ambient noise levels are between about 60 and 80 dB re 1 µPa, especially at lower frequencies (below 100 Hz) (NRC 2003). When the noise level is above the sound of interest, and in a similar frequency band, auditory masking could occur (Clark et al. 2009). Any sound that is above ambient noise levels and within an animal’s hearing range needs to be considered in an analysis; however, the degree of masking increases with the increasing noise levels. A noise that is just detectable over ambient levels is unlikely to actually cause any substantial masking above that which is already caused by ambient noise levels (NRC 2003, 2005).

Based on the Coast Guard’s analysis, masking as a result of the Proposed Action is evaluated in this PEIS/POEIS for the following biological resources: marine invertebrates (Section 3.4.2), birds (Section 3.4.3), marine fish (Section 3.4.4), marine reptiles (Section 3.4.6), and marine mammals (Section 3.4.7).

3.2.1.5.4 Physiological Stress

Marine animals naturally experience physiological stress as part of their normal life histories. The physiological response to a stressor, often termed the stress response, is an adaptive process that helps an animal cope with changing external and internal environmental conditions. Sound-producing activities have the potential to cause additional stress. However, too much of a stress response can be harmful to an animal, resulting in physiological dysfunction.

If a sound is detected (i.e., heard or sensed) by an animal, a stress response can occur. The severity of the stress response depends on the sound level received by the animal, the details of the sound-producing activity, and the animal's life history stage and past experience with the stimuli. An animal's life history stage includes its level of physical maturity (i.e., larva, infant, juvenile, sexually mature adult) and the primary activity in which it is engaged (e.g., mating, feeding, or rearing/caring for young). An animal's life history stage is an important factor to consider when predicting whether a stress response is likely. Prior experience with a stressor may be of particular importance because repeated experience with a stressor may dull the stress response via acclimation (St. Aubin and Dierauf 2001) or increase the response via sensitization. If an animal suffers injury (Section 3.2.1.5.1) or hearing loss (Section 3.2.1.5.2), a physiological stress response would also occur.

An acute stress response is traditionally considered part of the startle response and is hormonally characterized by the release of the catecholamines. Annoyance type reactions may be characterized by the release of either or both catecholamines and glucocorticoid hormones. Regardless of the physiological changes that make up the stress response, the stress response may contribute to an animal's decision to alter its behavior.

Elevated stress levels may occur whether or not an animal exhibits a behavioral response. Even while undergoing a stress response, competing stimuli (e.g., food or mating opportunities) may overcome any behavioral response. Regardless of whether the animal displays a behavioral response, this tolerated stress could incur a cost to the animal (Berlett and Stadtman 1997; Sies 1997; Touyz 2004).

Frequent physiological stress responses may accumulate over time, increasing an animal's chronic stress level. Elevated chronic stress levels are usually a result of a prolonged or repeated disturbance. Chronic elevations in the stress levels (e.g., cortisol levels) may produce long-term health consequences (Section 3.2.1.5.6) that can reduce lifetime reproductive success.

Due to the large geographic range and intermittent frequency of OPC activities, neither prolonged nor frequent exposure would be anticipated as a result of acoustic stressors associated with the Proposed Action. Therefore, the likelihood that a physiological stress response to an acoustic stressor would lead to long-term consequences for an animal is extremely unlikely.

3.2.1.5.5 Behavioral Responses

The response of an animal to an anthropogenic sound would depend on the frequency, duration, temporal pattern, and amplitude of the sound as well as the animal's prior experience with the sound and the context in which the sound is encountered (i.e., what the animal is doing at the time of the exposure). Other variables such as the animal's gender, age, the distance from the sound source, and whether it is perceived as approaching or moving away can also affect the way an animal responds to a sound (Wartzok et al. 2003). Common behavioral responses include an alert, avoidance, or other behavioral reaction (NRC 2005; Williams et al. 2015). Most species groups could have a behavioral response to a sound, though they are better studied in some species groups than in others.

A review of marine mammal responses to anthropogenic sound was first conducted by Richardson et al. (1995). More recent reviews (Nowacek et al. 2007; Southall et al. 2007) address studies conducted since 1995 and focus on observations where the received sound level of the exposed marine mammal(s) was known or could be estimated. Southall et al. (2007) synthesized data from many past behavioral studies and observations to determine the likelihood of behavioral reactions at specific sound levels. While in general the louder the sound source, the more intense the behavioral response, it was clear that the proximity of a sound source and the animal's experience, motivation, and conditioning were also critical factors influencing the response (Southall et al. 2007). After examining all of the available data, the authors felt that the derivation of thresholds for behavioral response based solely on exposure level was not supported because context of the animal at the time of sound exposure was an important factor in estimating response.

Based on the Coast Guard's analysis, behavioral responses as a result of the Proposed Action are evaluated in this PEIS/POEIS for the following biological resources: marine invertebrates (Section 3.4.2), birds (Section 3.4.3), marine fish (Section 3.4.4), marine reptiles (Section 3.4.6), and marine mammals (Section 3.4.7).

3.2.1.5.6 Long-Term Consequences

The potential long-term consequences from behavioral responses are difficult to discern. Animals displaced from their normal habitat due to an avoidance reaction may return over time and resume their natural behaviors. This is likely to depend upon the severity of the reaction and how often the activity is repeated in the area. In areas of repeated and frequent acoustic disturbance, some animals may habituate to the new baseline; conversely, species that are more sensitive may not return, or return, but not resume use of the habitat in the same manner. The magnitude and type of effect and the speed and completeness of recovery (i.e., return to baseline conditions) must be considered in predicting long-term consequences to each individual animal.

The predicted recovery of an animal is based on the cost to the animal from any reactions—behavioral or physiological. Available resources fluctuate by season, location, and year and can play a role in an animal's rate of recovery. An animal's health, energy reserves, size, life history stage, and resource gathering strategy affect its speed and completeness of recovery. Animals that recover quickly and completely are unlikely to suffer reductions in their health or reproductive success, or experience changes in habitat utilization. Animals that do not recover quickly and fully could suffer reductions in their health and lifetime reproductive success—they could be permanently displaced or change how they use the environment or they could die. These long-term consequences to the individual animal can lead to consequences for the population. No population level effects would be expected if individual animals do not suffer reductions in their lifetime reproductive success or change their habitat utilization. Population dynamics and abundance play a role in determining how many individuals would need to suffer long-term consequences before there was an effect on the population.

Due to the large geographic range and intermittent frequency of OPC activities, neither prolonged nor frequent exposure would be anticipated as a result of acoustic stressors associated with the Proposed Action. Therefore, the likelihood that an individual would experience long-term consequences would be extremely unlikely. There would be no population level long-term consequences as a result of the Proposed Action.

3.2.2 Physical Stressors

Physical stressors associated with the Proposed Action that may impact or harm the environment include vessel movement, aircraft movement, and MEM. Each stressor is discussed in detail below.

3.2.2.1 Vessel Movement

Vessels associated with the Proposed Action are OPCs and OTH boats, which are discussed in Sections 2.2.1 through 2.2.3. OPCs would generally operate at speeds between 12–16 knots, depending on the activity. OTH boats would generally operate at speeds of 10–20 knots. OPCs and OTH boats may conduct specialized tasks, such as vessel tow or vessel escort. For safety, vessel tow speeds typically range from 5 knots. Depending on a variety of factors, escort speeds could range from 7–19 knots. However, OPCs and OTHs would not operate at their maximum speeds, unless involved in an emergency response. While Coast Guard trains and prepares to respond to emergency situations, the emergency response itself is not part of the Proposed Action; therefore, maximum speeds are not expected as part of the Proposed Action.

The potential impacts from vessel movement include disturbance, collision, injury, or death. It is difficult to differentiate between behavioral responses to vessel noise and visual cues associated with the presence of a vessel (Hazel et al. 2007); thus, it is assumed that both play a role in prompting reactions from animals. Vessels have the potential to impact or harm biological resources by altering their behavior patterns or causing injury or death from vessel collisions. A species response to a vessel may include changes in activity (e.g., from resting or feeding to active avoidance), changes in surface respiration or dive cycles (marine mammals), and changes in their speed and direction of movement. The severity and type of response exhibited by an individual may also include previous encounters with vessels. Some species have been noted to tolerate slow-moving vessels within several hundred meters, especially when the vessel is not directed toward the animal and when there are no sudden changes in direction or engine speed (Richardson et al. 1995).

Anchoring is included here under vessel movement, since anchoring would be the method to hold the vessel in position when docking a vessel the size of an OPC in a port is not supported. Anchoring the OPC would not occur during vessel transit. Anchoring would only occur in soft-bottom areas that are designated for this purpose. Anchorages typically used by Coast Guard vessels are commonly used by all types of vessels to set an anchor and, as a result, these areas are routinely disturbed by vessel anchoring. Vessel movement has the potential to impact the physical and biological environment; however, the Coast Guard has determined that vessel movement would not impact the following resources: ambient sound, water quality, bottom habitat and sediments, flying insects, and bats (Table 3-3). No socioeconomic resources would be impacted by vessel movement (Table 3-3).

3.2.2.2 Aircraft Movement

Aircraft associated with the Proposed Action are helicopters and UAS. The use of these aircraft is discussed in Sections 2.2.3.2 and 2.2.3.3 and summarized in Table 3-2. The normal cruising speeds of the MH-60 Jayhawk and MH-65 helicopter are 159 knots and 148 knots, respectively. Helicopter flights associated with the Proposed Action would be used for transport of personnel and equipment and for conducting training (e.g., qualifications). In general, as discussed in Section 2.2.3.2, helicopter flights would primarily maintain altitudes of 2,000 ft (610 m) as long as navigationally safe to do so. Typically, aircraft stay at or above 2,000 ft (610 m) in environmentally sensitive areas (COMDTINST M3710.1 (series)).

UAS would be expected to collect data for imaging purposes, and although specific information on UAS flight speeds is not known at this time, it is expected that flight speeds would be much slower (i.e., <50 miles per hour [mi/hr; 80 kilometers per hour (km/hr)]) than the expected helicopter flight speeds. Therefore, in the absence of any information on UAS, the Coast Guard assumed that any potential impacts from UAS movement would be less than helicopter movement, because UAS would travel at slower speeds when compared to helicopters.

All aircraft supporting OPC assets would conduct operations as indicated in the Coast Guard Air Operations Manual (COMDTINST M3710.1 (series)). The potential impacts from aircraft movement include disturbance, collision, injury, or death. Aircraft movement has the potential to impact the physical and biological environment; however, the Coast Guard has determined that aircraft movement would not impact the following resources: ambient sound, water quality, bottom habitat and sediments, marine vegetation, marine invertebrates, flying insects, marine fish, essential fish habitat, marine reptiles, and marine mammals (Table 3-3). No socioeconomic resources would be impacted by vessel movement (Table 3-3).

3.2.2.3 Military Expended Materials

MEM associated with gunnery training is discussed in Section 2.3.5 and summarized in Table 3-2. Gunnery training would only occur in authorized ranges[10] and when possible, would occur in established Navy ranges, particularly when live ammunition is used. Gunnery training would not be conducted in areas with sensitive marine resources. The Coast Guard would follow the Navy's approved gunnery training protocols. During peacetime activities, actual weapon systems onboard the OPC would only be used for training. High-explosives would not be used for training purposes.

During gunnery training, inert small caliber (0.50 caliber or MK-38 standard [25 mm]) and large caliber (57 mm) gun rounds would be fired at floating targets, which may have a line attached for retrieval purposes. MEM associated with gunnery training would include inert small and large caliber projectiles[11] that would not be recovered. These inert small caliber (0.50 caliber or MK-38 standard [25 mm]) and large caliber (57 mm) gun rounds used in gunnery training may also enter the water as MEM during the Proposed Action and would not be recovered. The Coast Guard also plans to conduct propulsion testing of one Nulka decoy round. The round would enter the water as MEM upon the conclusion of the propulsion testing and would not be recovered. This testing event would occur one time and only on the lead OPC. The potential impacts from MEM include disturbing the seafloor (including covering habitat or species) and ingestion (not the Nulka), which could lead to injury or death.

MEM that pose an ingestion risk include non-explosive practice munitions (inert small caliber [0.50 caliber], MK-38 standard [25 mm], and large caliber [57 mm]) used in gunnery training that are expended within the proposed action areas. To assess the ingestion risk from in-water devices, the analysis in this PEIS/POEIS considered the size of the object relative to the animal's ability to swallow it as well as the distribution and density of expended items, which play a central role in the likelihood of affecting a species. Some items are too large to be ingested (e.g., targets) and effects from these items are not discussed further. Fragments from these targets are discussed below. Non-explosive practice munitions, such as those used in Coast Guard gunnery training would be small enough for some marine animals to ingest. The solid metal material of the projectile would quickly move through the water column and settle to the seafloor. Ingestion of non-explosive practice munitions is not expected to occur in the water column because the munitions sink quickly. The round would also move quickly through the

[10] In Alaska, the Coast Guard, NOAA, and the FAA have identified specific areas where ships may conduct live ammunitions training.

[11] Military munitions, as they relate to solid waste and their intended use, would not be discarded, are not characterized as solid wastes under the Resource Conservation and Recovery Act (RCRA) Subtitle C regulations, and consequently are not regulated by the Environmental Protection Agency (EPA) as hazardous waste. The EPA under its authority seeks to avoid interference with DoD's national security mission regarding training and readiness. Therefore, EPA's practice is to exercise its enforcement discretion to except from RCRA regulation MEC used for its intended purpose and remaining on operational ranges. However, EPA has used the Agency's remedial cleanup enforcement authorities' environment at operational ranges when necessary to ensure protection of public health and the environment.

water column and settle to the seafloor. The Nulka is likely too large for any marine species to ingest, with the exception of a baleen whale; however, the likelihood that a whale would inadvertently ingest a Nulka while it travels through the water column as it sinks to the bottom is extremely low. Therefore, ingestion of the Nulka round is not expected to occur in the water column because the round would sink quickly and is not discussed further.

Targets used as part of the Proposed Action are reusable surface "killer tomato" units, air sleeves, and robot go-fast boats. However, retrieval of targets may not always be possible during the Proposed Action. Most likely, if targets are not collected, they would drift with currents until popping, then sink through the water column and settle on the seafloor. Marine microbes and fungi, such as polyhydroxyalkanoates (a bacterial carbon and energy source), are known to degrade biologically produced polyesters (Doi et al. 1992). Marine microbes also degrade other synthetic polymers, although at slower rates (Shah et al. 2008). Thus, these targets would be expected to degrade over time. In general, gunnery training would not be expected to produce target fragments; however, there is a remote possibility that fragments of material from the killer tomato could enter the marine system, but since this is considered negligible, target fragments are not considered to be a part of the Proposed Action and are not discussed further in this PEIS/POEIS.

MEM associated with gunnery training has the potential to impact the physical and biological environment; however, the Coast Guard has determined that MEM associated with gunnery training would not impact the following resources: air quality, ambient sound, water quality, bottom habitat and sediments, marine invertebrates, flying insects, and bats (Table 3-3). No socioeconomic resources would be impacted by vessel movement (Table 3-3).

3.3 Physical Environment

The Proposed Action would occur on the surface of the water, underwater, and in the airspace in the proposed action areas. Protocols and equipment incidental to the normal operation of a Coast Guard vessel would follow all regulations in order to comply with state and federal laws regarding pollution of air and water. With the exception of inert bullets and targets used as part of gunnery training (Section 3.2.2.3), no foreign substances or materials would be released into the air or water as part of the Proposed Action, nor would physical habitats be damaged or permanently altered by noise or vessel and aircraft movement within the proposed action areas. Air quality and the ambient sound in the proposed action areas, as well as potential impacts to these resources as a result of the Proposed Action and alternatives are discussed in Sections 3.3.1 through 3.3.2.2.

3.3.1 Air Quality

3.3.1.1 Affected Environment

3.3.1.1.1 National Ambient Air Quality Standards

Under the Clean Air Act (CAA), the Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS; 40 CFR part 50). The OPCs are exempt from emission requirements of the CAA under the EPA's National Security Exemption regulation at 40 CFR § 1068.225. The OPC is currently in initial design phase and construction with an Operational Requirement Document (ORD) outlining desired operational performance and parameters. The first OPC would not be operational until 2024 and design features, including the specific engine that would be installed, would be determined during the design phase of the vessel. Once these details have been determined, any new information would be included in a tiered NEPA analysis to this PEIS/POEIS if the engine or fuel used would require additional analysis. For a discussion of criteria pollutants and NAAQS, see Appendix A (under the CAA) and the full list of NAAQS in Appendix E.

The CAA regulates all new and in-use vessels flagged in the United States that contain marine diesel engines, as well as the emissions from these engines and the sulfur content of marine fuel used. The EPA's strategy to address emissions from all ships that affect U.S. air quality includes enforcement of CAA standards, as well as implementation and enforcement of the international standards for marine engines and their fuels contained in Annex VI of International Convention for the Prevention of Pollution from Ships (MARPOL) (Appendix A) under the authority of the Act to Prevent Pollution from Ships. While there are limited OPC coastal operations, any would be concentrated around the homeports of each vessel; therefore, a more detailed discussion of air quality in these areas is provided below by proposed action area and then by state.

Per the CAA, each state must have an EPA-approved State Implementation Plan (SIP). The SIP sets forth the regulations for maintaining compliance with the NAAQS. Coastal waters within 3 nm (6 km) of the coast are under the same air quality jurisdiction as the contiguous land area. Table 3-7 lists the states within each proposed action area with coastal counties that are not in attainment of the NAAQS for ozone (0_3), particulate matter (PM), lead (Pb), or sulfur dioxide (SO_2). As of 2010, all states are either unclassifiable or are in attainment of NAAQS for nitrogen dioxide (NO_2). In addition, as of 2010 all states are in attainment of NAAQS for carbon monoxide (CO).

The CAA applies to vessel emissions created in coastal waters within 3 nm (6 km) of shore. The proposed action areas for the OPCs include these coastal waters, which, may or may not be in attainment of NAAQS depending on the state in consideration (Table 3-7). Only OPC transit into and out of ports is expected to occur within 3 nm (6 km) from shore, so all other transit, operations, and training would take place in areas unclassified for air quality purposes under the CAA. OPC transit into and out of homeports would occur in this coastal area (within 3 nm [6 km] from shore), so it is assumed these homeports[12] would be areas with the most consistent OPC presence. OPC operations would not be equal amongst the states in the proposed action areas, so air emissions would not be equally distributed amongst those states.

[12] Coast Guard is conducting a separate NEPA analysis for homeporting.

Table 3-7. States Within the Proposed Action Areas in Nonattainment of the NAAQS

State	*Ozone Attainment?*	*PM Attainment?*	*Pb Attainment?*	*SO_2 Attainment?*
NW-ATL Proposed Action Area				
Maine	Y	Y	Y	Y
New Hampshire	Y	Y	Y	Y
Massachusetts	Y	Y	Y	Y
Rhode Island	Y	Y	Y	Y
Connecticut	N	Y	Y	Y
New York	N	Y	Y	Y
New Jersey	N	Y	Y	Y
Delaware	Y	Y	Y	Y
Maryland	N	Y	Y	N
Virginia	N	Y	Y	Y
Washington DC	N	Y	Y	Y
North Carolina	Y	Y	Y	Y
South Carolina	Y	Y	Y	Y
Georgia	N	Y	Y	Y
NW-ATL-Florida and the Caribbean Proposed Action Area				
Florida	Y	Y	Y	N
Puerto Rico	Y	Y	Y	N
U.S. Virgin Islands	Y	Y	Y	Y
GoMEX Proposed Action Area				
Florida	Y	Y	Y	N
Alabama	Y	Y	Y	Y
Mississippi	Y	Y	Y	Y
Louisiana	Y	Y	Y	N
Texas	N	Y	Y	Y
NEPAC-South Proposed Action Area				
California	N	N	N	Y
NEPAC-North Proposed Action Area				
California	N	Y	Y	Y
Oregon	Y	Y	Y	Y
Washington	Y	Y	Y	Y
AK Proposed Action Area				
Alaska	Y	Y	Y	Y
HI-PAC Proposed Action Area				
American Samoa[1]	Y	Y	Y	Y
Guam	Y	Y	Y	N
Hawaii	Y	Y	Y	Y
Commonwealth of the Northern Mariana Islands	Y	Y	Y	N

Y = yes, in attainment; N = No, not in attainment
[1] The EPA has designated American Samoa as unclassifiable/attainment.

3.3.1.2 Environmental Consequences to Air Quality

Impacts to air quality would potentially result from vessel, aircraft, and gunnery use associated with the Proposed Action. There would be no impacts to air quality from fathometer and Doppler speed log noise, vessel noise, aircraft noise, gunnery noise, or military expended materials associated with the Proposed Action. Therefore, as discussed in Table 3-3, these are not discussed further in this PEIS/POEIS.

Criteria air pollutants are generated by the combustion of fuel by surface vessels and aircraft. They also can be generated by the combustion of explosives and propellants in various types of munitions, such as those used in gunnery training. Nonexplosive practice munitions may contain spotting charges and propellants that generate criteria air pollutants during use.

Pollutants in the air are cumulative and the thresholds of these pollutants in the air are set by the EPA in the NAAQS (Appendix E). The vessels and aircraft, including OPCs and OTHs, are considered non-road mobile sources of emissions, which include CO, nitrogen oxide (NO_X), PM, SO_2, and volatile organic compounds (VOCs). In the offshore region, where OPCs and their support assets would operate, emissions would be emitted over a vast area of ocean and dispersed very widely over that area. Air quality in offshore ocean areas is generally less polluted than the air quality of adjacent onshore areas because there are few or no large sources of criteria air pollutants offshore. Although emissions from vessels transiting out of homeports in the proposed action areas may at times be carried ashore by winds, most OPC operations and training would occur more than 12 nm (22 km) offshore, and natural mixing would substantially disperse pollutants before they reach the coast.

OPC emissions within the proposed action areas would be unlikely to measurably add to existing pollutant concentrations on shore because of the distances these offshore pollutants would be transported and their substantial dispersion during transport. In addition, the total quantity of criteria pollutants would be very small in relation to the vastness of the proposed action areas. While the majority of OPC operations would occur beyond 12 nm (22 km), there would be OPCs transiting closer to shore, within 3 nm (6 km). Because emissions within 3 nm (6 km) of the coast are within the area of influence for onshore areas, they therefore have the potential to affect air quality onshore; however, there would not be a measurable increase in emissions from 25 OPC vessels transiting to offshore patrols within these coastal areas.

3.3.1.2.1.1 Climate Change

Emissions from aircraft and vessels, as well as trace amounts of explosives, would contribute to global emissions, greenhouse gases, and the concentration of particulate matter. The air pollutants suspected to be emitted (Hazardous Air Pollutants [HAPS], Greenhouse gases [GHGs], and criteria pollutants) would not have a measurable impact on ambient air quality in the proposed action areas because the Proposed Action would occur mainly offshore where the CAA does not apply. Within 3 nm (6 km) of shore, most counties are in designated attainment areas. The air pollutants suspected to be emitted (HAPs, Greenhouse gases [GHGs], and criteria pollutants) would not have a measurable impact on ambient air quality in the proposed action areas (within 3 nm (6 km)) due to the widespread and intermittent transit and operations of a small number of vessels (i.e., 25 OPCs and support assets).Because of the Proposed Action, estimated emissions (of criteria pollutants, carbon dioxide [CO_2], and HAPs) would be minor.

An increase in the atmospheric concentrations of greenhouse gases produces a positive climate forcing, or warming effect. Within the proposed action areas, global shipping contributes to climate change through the emissions of Black Carbon produced by combustion of marine fuels. Thus, CO_2 is the primary greenhouse gas emitted from marine shipping; however small amounts of methane and NO_X

are also emitted. Global aviation (including domestic and international; passenger and freight) accounts for 1.9% of greenhouse gas emissions, 2.5% of CO2 emissions, and 3.5 percent of "effective radiative forcing" (a closer measure of its impact on global warming) (Lee et al. 2021). According to the EPA, aggregate greenhouse gas emissions in 2019 were 12.1 percent above emissions in 1990 and from 1990 to 2019, the total warming effect from greenhouse gases by humans to the Earth's atmosphere increased by 45 percent (EPA 2021). In 2019, all U.S. military aviation jet fuel consumption, when compared to the total from U.S. and foreign carriers, was 3.7 percent. In addition, all U.S. military fuels (e.g., Navy) consumption, when compared to total marine fuels for international transport, was 6.8 percent in 2019. However, while all of the Coast Guard's vessels and aircraft are included in the EPA's 2019 data presented above (EPA 2021), the Coast Guard only accounts for a portion of the total contribution to greenhouse gas emissions. Although, vessels, aircraft, and gunnery are emission sources associated with the Proposed Action, their contribution to climate change is considered negligible.

3.3.1.2.2 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, the majority of the states within the proposed action areas are in attainment of the criteria pollutants; therefore, the General Conformity Rule does not apply. In those states which are not in attainment of the NAAQS (i.e., California, Connecticut, Florida, Georgia, Louisiana, Maryland, New Jersey, New York, Texas, and Virginia), air pollutant emissions under Alternative 1 would not result in violations of state or federal air quality standards because they would not have a measurable impact on air quality in land areas. Because MECs would be replaced with new, more efficient OPC vessels (overall fewer OPCs than MECs in the current fleet), there would be no change to baseline air quality conditions as a result of the Proposed Action. Therefore, there would be no significant impact or harm to air quality as a result of Alternative 1.

3.3.1.2.3 Impacts Under Alternatives 2–3

Under Alternatives 2–3, the majority of the states within the proposed action areas are in attainment of the criteria pollutants; therefore, the General Conformity Rule does not apply. In those states which are not in attainment of the NAAQS (i.e., California, Connecticut, Florida, Georgia, Louisiana, Maryland, New Jersey, New York, Texas, and Virginia), air pollutant emissions under Alternatives 2–3 would not result in violations of state or federal air quality standards because they would not have a measurable impact on air quality in land areas. Because MECs would be replaced with newer and more efficient vessels (when compared to MECs in the current fleet), there would be no change to baseline air quality conditions as a result of the Proposed Action. Therefore, there would be no significant impact or harm to air quality as a result of Alternatives 2–3.

3.3.1.2.4 Impacts Under the No Action Alternative

Any change to air emissions under the No Action Alternative would be immeasurable. However, as the MECs age, emissions from the mechanical systems may increase or may require mitigation to meet emission standards. Over time, each MEC would need to be removed from service, decreasing emissions.

Under the No Action Alternative there would be no measurable change to baseline conditions that may impact air quality. Therefore, no significant impact or harm to air quality would occur with implementation of the No Action Alternative.

3.3.2 Ambient Sound

3.3.2.1 Affected Environment

Biological, abiotic, and anthropogenic (manmade) sounds make up the existing ambient sound environment. Each of the proposed action areas includes different combinations of sources that create the in-air and in-water ambient sound environments. Different sources of sound produce varying noise levels and frequency ranges throughout the proposed action areas. In the open ocean, ambient noise levels under water are between about 60 and 80 dB re 1 µPa, especially at lower frequencies (below 100 Hz) (National Research Council 2003).

Anthropogenic sound sources in the open ocean generally consist of noise from ships and wind or wave related noise generated at the surface (Eller and Cavanagh 2000). Vessel presence, particularly for activities such as shipping, is diffuse and spread throughout the world's oceans (Hildebrand 2009). Long-term observations show the ambient noise levels at low frequencies have increased over time, primarily as the result of an increase in commercial shipping actives (Zhang et al. 2020). Additionally, the frequency distribution of shipping noise covers the entire sound spectrum (Lin et al. 2019). Other anthropogenic sounds in the open ocean include non-impulsive sound sources such as sonar and seismic airguns (Hildebrand 2009).

Biological sound sources offshore may include snapping shrimp noise, fish choruses, or marine mammal communications. Fish "choruses" were generally recorded at frequencies of 6–8 kHz, while snapping shrimp sounds were relatively broadband, with most of the energy distributed in the ultrasonic range (Lin et al. 2019). Types of marine mammal communication include whistles, echolocation click production, songs, and calls (vocal behavior often used during breeding season, but also during non-breeding). Mysticetes typically emit signals with fundamental frequencies well below 1,000 Hz (Au et al. 2006; Cerchio et al. 2001; Munger et al. 2008); however, non-song humpback signals have peak power between 800 Hz and 1.7 kHz (Stimpert 2010) and humpback song harmonics extend up to 24 kHz (Au et al. 2006). While biological noise lasted for several hours, shipping noise lasted on the order of minutes (Lin et al. 2019).

3.3.2.2 Environmental Consequences to Ambient Sound

Impacts to ambient sound would potentially result from fathometer and Doppler speed log noise, vessel noise, aircraft noise, and gunnery noise associated with the Proposed Action. These stressors are discussed in detail below. There would be no impact to ambient sound from vessel movement, aircraft movement, or military expended materials associated with the Proposed Action (Table 3-3). Therefore, as discussed in Table 3-3 these stressors have been eliminated from further analysis in this PEIS/POEIS.

Typically, in the open ocean, ambient noise levels are between about 60 and 80 dB re 1 µPa, especially at lower frequencies (below 100 Hz) (NRC 2003). Vessel activities in offshore areas are diffuse and spread throughout the world's oceans. Though high levels of vessel traffic are known to elevate background levels of noise in the marine environment (Andrew et al. 2011; Chapman and Price 2011; Frisk 2012; Miksis-Olds et al. 2013; Redfern et al. 2017; Southall 2005), these sources have not been found to contribute meaningfully to ambient sound levels in areas of higher vessel traffic (Hildebrand 2009). Other vessels may be found widely distributed outside of ports and shipping lanes, similar to OPC assets, and therefore may overlap with the presence of OPC assets. It would be expected that the operations of vessels and aircraft (and their resulting noise) associated with the Proposed Action would be similar to the noise from other ships and aircraft in the proposed action areas.

Fathometer and Doppler speed log noise, vessel noise, aircraft noise, and gunnery noise (sources described in Table 2-2) may temporarily increase ambient sounds levels in the ocean and the airspace of the proposed action areas. However, an increase in ambient noise levels resulting from vessels and aircraft in a given proposed action area is not likely because of the transient and temporary duration of the Proposed Action. OPC assets, including OPC vessels, OTH boats, helicopters, and UAS, would move throughout a large area during operations and training. An increase in ambient sound resulting from these assets would occur intermittently and only for the duration that the sound is active. OPC assets would not be expected to alter current levels of ambient sound, particularly as the new OPC fleet would replace the aging MEC fleet. Therefore, ambient sound would be similar to what is currently present.

3.3.2.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, ambient sound within the proposed action areas would be similar to what is currently present because the new OPC fleet would replace the aging MEC fleet. In addition, OPC assets would not be expected to alter current levels of ambient sound because noise created by the Proposed Action would occur intermittently (occur for the duration that the sound is active) in any given location and would be spread over a very large area. Because vessels would be replaced with new, more efficient vessels (overall fewer OPCs than MECs in the current fleet) that have been built to modern stringent noise and vibration standards, there would be no change to baseline ambient sound conditions as a result of the Proposed Action. Therefore, there would be no significant impact or harm to ambient sound as a result of Alternative 1.

3.3.2.2.2 Impacts Under Alternatives 2–3

Under Alternatives 2–3, ambient sound within the proposed action areas would be similar to what is currently present because the vessels would replace the aging MEC fleet. In addition, new assets would not be expected to alter current levels of ambient sound because noise created by the Proposed Action would occur intermittently (occur for the duration that the sound is active) in any given location and would be spread over a very large area. Because vessels would be replaced with new, more efficient vessels (compared to MECs in the current fleet) that have been built to modern stringent noise and vibration standards, there would be no change to baseline ambient sound conditions as a result of the Proposed Action. Therefore, there would be no significant impact or harm to ambient sound as a result of Alternatives 2–3.

3.3.2.2.3 Impacts Under the No Action Alternative

Any change to ambient sound under the No Action Alternative would be immeasurable. However, as the MECs age, noise from the mechanical systems may increase or may require mitigation to meet operational noise standards. Over time, each MEC would need to be removed from service, decreasing the overall noise contribution of the vessel systems.

Under the No Action Alternative, there would be no measurable change to baseline conditions that may impact ambient sound. Therefore, no significant impacts to ambient sound would occur with implementation of the No Action Alternative.

3.3.3 Summary of Impacts to the Physical Environment

Impacts to the physical environment would be from fathometer and Doppler speed log noise, vessel noise, aircraft noise, gunnery noise, and vessel, aircraft use associated with the Proposed Action. OPCs, OTH boats, and aircraft would move through large geographic areas during operations and training supporting Coast Guard missions in the proposed action areas. Their presence could potentially impact ambient sound and increase emissions, which have the potential to impact air quality. However, OPCs and their assets would occur intermittently across very large areas.

3.3.3.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, increases in emissions and ambient sound levels in the proposed action areas would not be measurable as a result of the Proposed Action. Therefore, there would be no significant impact or harm to the physical environment.

3.3.3.2 Impacts Under Alternatives 2–3

Under Alternatives 2–3, increases in emissions and ambient sound levels in the proposed action areas would not be measurable as a result of the Proposed Action. Therefore, there would be no significant impact or harm to the physical environment.

3.3.3.3 Impacts Under No Action Alternative

Under the No Action Alternative, there would be no measurable change to baseline conditions that may impact the physical environment. Therefore, under the No Action Alternative, there would be no significant impact or harm to the physical environment.

3.4 Biological Environment

The Proposed Action would occur on the surface of the water, underwater, and in the airspace above the proposed action areas. Protocols and equipment incidental to the normal operation of a Coast Guard vessel would follow all regulations in order to comply with state and federal laws regarding the protection of species and critical habitat. Included in the biological environment of the proposed action areas are marine vegetation, marine invertebrates, birds, marine fish, EFH, marine reptiles, and marine mammals. ESA-listed species and federally-designated critical habitat are also discussed. All biological resources in the proposed action areas, as well as potential impacts to these resources as a result of the Proposed Action and alternatives, are discussed Sections 3.4.1 through 3.4.7.

3.4.1 Marine Vegetation

3.4.1.1 Affected Environment

Marine vegetation in the proposed action areas includes plants in marine or estuarine waters. These may include mangroves, algae, and various grasses. Vegetation in the proposed action areas includes diverse taxonomic and ecological groups of marine algae. The basic taxonomic groupings of vegetation include microalgae (e.g., phytoplankton), macroalgae (e.g., seaweed), and submerged marine vegetation (e.g., seagrass and benthic macroalgae). Marine vegetation may consist of benthic species, which are attached to or rooted in the substrate, or pelagic species, which are primarily free-floating in the photic zone of the water column.

The following provides an overview of the predominant marine vegetation species and habitat types known to occur in the proposed action areas. Eight vegetation types are described: dinoflagellates, diatoms, blue-green algae, green algae, brown algae, red algae, haptophytes, and grasses. Major taxonomic groups potentially located within the proposed action areas are described in Table 3-8.

Table 3-8. Major Groups of Marine Vegetation Present in the Proposed Action Areas

Marine Vegetation Group		***Presence***	
Common Name (Taxonomic Group)	***Description***	***Pelagic***	***Benthic***
Blue-green algae (Phylum Cyanobacteria)	Photosynthetic bacteria that are abundant constituents of phytoplankton and benthic algal communities, accounting for the largest fraction of carbon and nitrogen fixation by marine vegetation; existing as single cells or filaments, the latter forming mats or crusts on sediments and reefs.	x	x
Brown algae (Phylum Phaeophyta [Ochrophyta])	Brown algae are large multi-celled seaweeds that can include pieces or floating mats (e.g., *Sargassum spp., Macrocystis pyrifera*).	x	x
Coccolithophores (Phylum Haptophyta [Chrysophyta, Prymnesiophyceae])	Single-celled marine phytoplankton that surround themselves with microscopic plates of calcite. They are abundant in the surface layer of the ocean.	x	
Diatoms (Phylum Ochrophyta [Heterokonta, Chrysophyta, Bacillariophyceae])	Single-celled algae with a cylindrical cell wall (frustule) composed of silica. Diatoms are a primary constituent of the phytoplankton group.	x	x
Dinoflagellates (Phylum Dinophyta [Pyrrophyta])	Most are single-celled, marine species of algae with two whip-like appendages (flagella). Some live inside other organisms, and some produce toxins.	x	x
Green algae (Phylum Chlorophyta)	May occur as single-celled algae, filaments, and seaweeds.	x	x
Red algae (Phylum Rhodophyta)	Single-celled algae and multi-celled large seaweeds; some form calcium deposits.	x	x
Vascular plants (Phylum Tracheophyta)	Includes seagrasses, cordgrass, mangroves, and other rooted aquatic and wetland plants in marine and estuarine environments providing food and habitat for many species.		x (in the intertidal zone)

Factors that influence the distribution and abundance of marine vegetation include the availability of light and nutrients, water quality, water clarity, salinity level, seafloor type (important for rooted or attached vegetation), currents, tidal schedule, and temperature (Green and Short 2003). Marine ecosystems depend almost entirely on the energy produced by photosynthesis of marine plants and algae, which serve as the base of the food web (Castro and Huber 2000; Horner and Schrader 1982). In both surface waters and the photic zone (the portion of the water column illuminated by sunlight), marine algae and flowering plants provide oxygen, food, and in some cases, habitat for many organisms (Dawes 1998). In contrast to deep waters that are dominated by plankton, intertidal and shallow subtidal waters often have large populations of anchored or rooted vegetation such as rockweeds, kelp, or seagrass, which provide both habitat and food for many marine species.

The greatest diversity of marine vegetation is found in the nearshore region. In the shallow waters near shore, light reaches all areas and substrate is available for algae attachment or the growth of vascular plants. Offshore, marine vegetation may be free floating or attached on the bottom. However, the photic zone in these regions is typically found from 0–656 ft (0–200 m). Diversity is limited to those types of marine vegetation that are able to survive these conditions. Below is a brief description of the marine vegetation in each proposed action area.

3.4.1.1.1 NW-ATL Proposed Action Area

The NW-ATL proposed action area is dominated by the presence of the Gulf Stream, which runs south to north along the U.S. East Coast. The Gulf Stream redistributes heat into the cold, nutrient rich waters of the northeast. Offshore, the North Atlantic gyre circulates water (clockwise) between the United States and Europe. Within the gyre lies the Sargasso Sea, entirely within the Atlantic Ocean—it is a sea with no land boundaries. As the name implies, the Sargasso Sea is dominated by the presence of *Sargassum* spp., which is a free-floating species of brown algae. *Sargassum* spp. is able to reproduce from a single parent plant without the production of seeds or spores, which allows reproduction on the High Seas. The Sargasso Sea contains two main species of Sargassum—*S. natans* and *S. fluitans*. These form dense mats that are habitat for a wide variety of species in the offshore region, many of whom have adapted to reside specifically in the free-floating *Sargassum*. The Sargasso Sea is a spawning site for some types of fish, as well as a source of prey for larger species (South Atlantic Fishery Management Council 2002).

3.4.1.1.2 NW-ATL-Florida and the Caribbean Proposed Action Area

The NW-ATL-Florida and the Caribbean proposed action area includes the East Coast of Florida, as well as the Caribbean Sea, which lies to the southeast of the Gulf of Mexico. This proposed action area is characterized by the island arc of the Greater and Lesser Antilles. The nearshore region is dominated by mangroves, seagrasses, and zooxanthellae (the symbiotic algae present in coral). Along the Atlantic Coast of Florida, many species of seagrasses are present, including shoal grass (*Halodule wrightii*), manatee grass (*Syringodium filiforme*), and widgeon grass (*Ruppia maritima*) (Florida Department of Environmental Protection 2019). In southern Florida and the Caribbean there are three species of mangroves that dominate the coasts—red mangroves (*Rhizophora mangle*), black mangroves (*Avicennia germinant*), and white mangroves (*Laguncularia racemosa*) (Florida Department of Environmental Protection 2020). Due to the warmer waters in this proposed action area, algal blooms (typically of dinoflagellate or blue-green algae species) are common, particularly in coastal areas where nutrient levels are high. Offshore, *Sargassum* is the dominant species of seaweed present.

3.4.1.1.3 GoMEX Proposed Action Area

The GoMEX proposed action area includes the West Coast of Florida. Water flows from the Loop Current out around Florida (where the Gulf Stream builds momentum) and is dominated by freshwater input from the Mississippi River. Nearshore, along the Gulf Coast of Florida, there are extensive beds of turtle grass (*Thalassia testudinum*) (Florida Department of Environmental Protection 2019). Similar to the NW-ATL-Florida and the Caribbean proposed action area, diversity is high nearshore and dominated by mangroves, grasses, and the symbiotic algae present in coral reefs, coastal algal blooms are common, and *Sargassum* is the dominant species of seaweed present offshore. The Gulf of Mexico has extensive cover of floating mats of *Sargassum* that are an important source of primary production and constitute a type of Essential Fish Habitat (EFH), especially for juvenile fish (U.S. Bureau of Ocean Energy Management Gulf of Mexico OCS Region 2017). However, in recent years, the *Sargassum* populations have been so extensive that they have led to eutrophication and fish die-offs (Doyle and Franks 2015).

3.4.1.1.4 NEPAC-South Proposed Action Area

In the NEPAC-South proposed action area, the nearshore area is dominated by kelp forests. These grow predominantly on the Pacific Coast, from Alaska and Canada to the waters of Baja California. The kelp forest is tiered like a terrestrial rainforest with a canopy and several layers below. In general, kelp forests are present along rocky coastlines in depths of water ranging from about 6–90 ft (2–30 m). On the Pacific Coast, the kelp forests are dominated by two canopy-forming, brown species—giant kelp (*Macrocystis pyrifera*) and bull kelp (*Nereocystis leutkeana*). Giant kelp is more common in the southern portion of California and Mexico as well as in the Channel Islands National Marine Sanctuary (National Ocean Service 2020). While not as common, elk kelp (*Pelagophycus porra*) may be present in waters that are too deep for giant kelp to grow (National Ocean Service 2020). While the distribution of many species of marine algae stretch along the entire Pacific Coast of North America, roughly 21 percent of these are endemic to (found only in) southern California (Silva 2004), roughly within the bounds of the NEPAC-South proposed action area.

3.4.1.1.5 NEPAC-North Proposed Action Area

Marine vegetation along the West Coast of the United States is represented by more than 700 varieties of seaweeds, seagrasses (Leet et al. 2001; Wyllie-Echeverria and Ackerman 2003), and canopy-forming kelp species (Wilson 2014). In the NEPAC-North proposed action area, giant kelp can outcompete bull kelp for light in areas that both species overlap. In northern California and off the Oregon Coast, bull kelp is the dominant species present (National Ocean Service 2020). Extensive mats of red algae provide habitat in areas of exposed sediment along the coast (Adams et al. 2004). Areas within the influence of the California Current are considered moderately productive (Hogan 2011). The phytoplankton community is seasonally and annually variable, dominated by chain forming diatoms such as *Skeletonema*, *Thalassiosira*, and *Chaetocerous*, with occasionally large blooms of centric diatoms (e.g., *Coscinodiscus*) and dinoflagellates (Hannach and Swanson 2017). Primary productivity in nearshore communities is driven by a typical fall and winter/spring bloom frequency, while from March to July, upwelling along the coast increases primary productivity. Fluctuations in the year-to-year productivity of the ecosystem can be substantial, and are the result of the El Niño Southern Oscillation, Pacific Decadal Oscillation, and other changes in the rates of coastal upwelling.

3.4.1.1.6 AK Proposed Action Area

Seagrasses are also an important contributor in the shallow coastal regions of the AK proposed action area. Eelgrass (*Zostra marina*) is found as far north as the Chukchi Sea, and is abundant in many coastal portions of the Bering Sea, particularly in Bristol Bay and the coastal portions of the Togiak Wildlife Refuge (Winfree 2005). Although the contribution of eelgrass to overall system productivity is low, predominantly because it is found only in shallow (less than 30 ft [10 m]) subtidal habitats, seagrasses provide critical nearshore nursery habitat for many species of fish and invertebrates, including herring, which is a major regional fishery. Consequently, this habitat also provides important feeding grounds and migratory stopover habitat for many coastal and migratory bird species (Winfree 2005).

The Bering Sea is also critically dependent on the timing and magnitude of phytoplankton blooms, but generally experiences a spring and fall bloom cycle, as opposed to a single summer bloom. These blooms are typically comprised primarily of diatoms, but dinoflagellate blooms can also occur (Mordy et al. 2017; Sigler et al. 2014).

Offshore, in the Arctic region (i.e., north of Alaska) virtually all marine vegetation in the open ocean portions are phytoplankton, predominantly pelagic dinoflagellates and diatoms. Phytoplankton flourish in, under, and adjacent to thick layers of ice, referred to as the sympagic zone. They are about four times higher in abundance under the ice than in the open water, with ice algal production accounting for 3 to 25 percent of total system primary productivity, including more than half of primary productivity occurring in the high Arctic (Horner and Schrader 1982; Kohlbach et al. 2016). Dunton et al. (2005) collected chlorophyll-a concentrations during the ice-free period from late May to September between

1974 and 1995, noting levels between 10 and 15 milligrams per cubic meter (mg/m^3) in the Arctic portion of this area, which is high for this region. It should be noted that OPCs would not operate in areas where ice would persist.

3.4.1.1.7 HI-PAC Proposed Action Area

The HI-PAC proposed action area is dominated by the Hawaiian and Marianas archipelagos, as well as multiple isolated atolls and islands. Due to the isolation of these islands, many species found within this proposed action area are endemic to the islands. All of these landmasses are surrounded by coral reef systems in the shallow waters near shore. Coralline, encrusting, and filamentous turf-type algae are all common in coral reef systems. The coralline algae are an important group in coral reefs because of the roles they fill: providing food for many invertebrates and fish, consolidating the loose substrate (e.g., rubble), and acting as indicators of a healthy ecosystem. The green calcified *Halimeda* species is a major component of the atoll substratum in this proposed action area (Skelton 2003). In the coastal sites of American Samoa, the most widely abundant alga is *Dictyosphaeria versluysii*, a common green algae found on reef flats attached to rocks and rubble. *Gelidiopsis repens*, a red algae, was the next widely abundant alga in the sites near American Samoa (Skelton 2003).

3.4.1.2 Environmental Consequences to Marine Vegetation

Impacts to marine vegetation would potentially result from vessel movement and MEM associated with the Proposed Action. There would be no impact to marine vegetation from fathometer and Doppler speed log noise, vessel noise, aircraft noise, gunnery noise, and aircraft movement associated with the Proposed Action. Therefore, these are not discussed further in this PEIS/POEIS.

Vessel movement in the water column may disturb, strike, or kill phytoplankton directly in the path of the vessel. However, there would not be population level impacts to marine vegetation as a result of vessel movement associated with the Proposed Action. Vessels would not anchor in areas where marine vegetation is likely to occur in the proposed action areas, as anchoring would occur in designated soft-bottom areas that are routinely disturbed by all types of vessels that anchor (i.e., not just Coast Guard vessels). MEM, including small caliber projectiles and targets, would sink to the bottom during gunnery training and may impact marine vegetation on the bottom by covering individual plants or seaweeds. However, over time, the MEM from gunnery training would be expected to biodegrade. MEM from targets would not present a significant threat to marine vegetation populations because of the small numbers of these targets used and the large distance in which expended material would be dispersed across the proposed action areas.

3.4.1.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, any impacts to marine vegetation would be limited to individual plants or seaweeds. There would be no population level impacts to marine vegetation as a result of vessel movement or MEM associated with the Proposed Action. Therefore, there would be no significant impact or harm to marine vegetation under Alternative 1.

3.4.1.2.2 Impacts Under Alternatives 2–3

Under Alternatives 2–3, any impacts to marine vegetation would be limited to individual plants or seaweeds. There would be no population level impacts to marine vegetation as a result of vessel movement or MEM associated with the Proposed Action. Therefore, there would be no significant impact or harm to marine vegetation under Alternatives 2–3.

3.4.1.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, there would be no measurable change to baseline conditions that may impact marine vegetation. Therefore, there would be no significant impact or harm to marine vegetation with implementation of the No Action Alternative.

3.4.2 Marine Invertebrates

3.4.2.1 Affected Environment

Marine invertebrates are a large, diverse group containing tens of thousands of species distributed ubiquitously throughout the global marine environment (Brusca and Brusca 2003). Benthic and epibenthic (animals that live on the surface of the substrate) marine invertebrates may be sessile (immobile and attached to substrate), sedentary (limited in mobility), or highly mobile (Cairns and Bayer 2009; University of California Berkeley 2019c, 2019d). Pelagic organisms vary in their swimming abilities, ranging from weak (e.g., ctenophore) to substantial (e.g., squid) (Segura-Puertas et al. 2009; University of California Berkeley 2019d).

Marine invertebrate distribution is influenced by habitat (e.g., abiotic substrate, topography, biogenic [formed by living organisms] features), ocean currents, and physical and chemical water factors such as temperature, salinity, and nutrient content (Levinton 2009b). Distribution is also influenced by distance from the equator (latitude) and distance from shore. In general, the number of marine invertebrate species (i.e., species richness) increases toward the equator (Cheung et al. 2005; Macpherson 2002). Species richness and overall abundance are typically greater in coastal water habitats compared to the open ocean due to the increased availability of food and protection that coastal habitats provide (Levinton 2009b).

The pelagic zone includes areas of coastal, open ocean, and frontal zones, as well as upwelling and downwelling areas. Pelagic marine invertebrates include plankton (organisms that do not swim or generally cannot swim faster than water currents) and nekton (active swimmers that can generally swim faster than water currents). Planktonic animals commonly undergo diel migration—daily migrations to surface waters at dusk and a return to deeper waters at dawn. Within the pelagic zone, plankton are highly stratified by depth, with most of the biomass in the upper portions of the water column (U.S. Department of the Navy 2018). The benthic zone is the most diverse and species-rich habitat, where the majority of the species within the ocean can be found. The greatest densities of marine invertebrates are typically found in and on the seafloor (Sanders 1968)

Shallow water coral reefs are found on hard substrate within the euphotic zone and are present in largest quantities on the banks of the outer continental shelf and are an important habitat in tropical latitudes. In general, deep water coral species are considered to occur at depths below 164 ft (50 m) (National Oceanic and Atmospheric Administration and National Centers for Coastal Ocean Science 2016). Stony corals require calcium carbonate in the form of aragonite or calcite to build their supporting structures, which they obtain from seawater where carbonate is in solution, but the aragonite saturation boundary (ranging from about 656 to 9,843 ft (200 to 3,000 m)) imposes a depth limit for coral occurrence. Accordingly, deep water corals are found in the depth range of about 164 to 9,843 ft (50 to 3,000 m) (Bryan and Metaxas 2007; Lumsden 2007; Quattrini et al. 2015; Tittensor et al. 2009). Although coral species may exist below 3,281 ft (1,000 m), extensive reefs are rare at this depth (Ross et al. 2012). Until recently, most deep water corals were thought to form exclusively on hard bottom. However, Ross et al. (2017) reported deep water coral mounds in areas dominated by soft and intermediate bottom. Because deep water corals do not contain symbiotic algae, most species filter feed on plankton (Tsao and Morgan 2005).

Although, many invertebrate species occur in the sandy coastal shores and rocky intertidal zones in all proposed action areas; the Proposed Action would not intersect with these habitats and therefore those species are not analyzed further in this PEIS/POEIS. Invertebrates also inhabit sea ice in Polar Regions, referred to as the sympagic zone, which would be expected in the AK proposed action area; however, the OPCs would not operate in areas where sea ice is present, and therefore this habitat is not analyzed further in this PEIS/POEIS.

3.4.2.1.1 Major Groups of Marine Invertebrates

Major taxonomic groups of invertebrates potentially located within the proposed action areas are described along with the distinct water body zones they inhabit (benthic or pelagic) in Table 3-9. Section 3.4.2.1 provides an overview of the oceanographic conditions and predominant marine invertebrate species known to occur in each proposed action area. General information on invertebrate hearing is provided in Appendix F. ESA-listed marine invertebrate species that may occur within the proposed action areas are described in 3.4.2.1.2 and listed in Table 3-10. Section 3.5.1 provides additional information about commercially important invertebrate species by proposed action area.

Table 3-9. Major Groups of Marine Invertebrates Present in the Proposed Action Areas

Invertebrate Group		***Presence***	
Common Name (Taxonomic Group)[1]	***Description***	***Pelagic***	***Benthic***
Foraminifera, radiolarians, ciliates (Kingdom Protozoa)	Benthic and planktonic single-celled organisms. Shells typically made of calcium carbonate or silica (University of California Berkeley 2019b).	x	x
Flatworms (Phylum Platyhelminthes)	Simplest form of marine worm with a flattened body (Jensen 2009; Overstreet et al. 2009)		x
Ribbon worms (Phylum Nemertea)	Worms with a long extension from the mouth (proboscis) that helps capture food (Roe and Norenburg 1999)		x
Roundworms (Phylum Nematoda)	Small worms. Many live in close association with other animals (typically as parasites) (University of California Berkeley 2019c)	x	x
Sponges (Phylum Porifera)	Large species that have calcium carbonate or silica structures embedded in cells to provide structural support (Ross et al. 2012; Van Soest et al. 2012).		x
Corals, anemones, hydroids, jellyfish (Phylum Cnidaria)	Benthic and pelagic animals with stinging cells. Sessile corals are main builders of coral reef frameworks. Cnidarians may be solitary or may form colonies (Cairns and Bayer 2009; Cairns et al. 2009; Segura-Puertas et al. 2009).	x	x
Segmented worms (Phylum Annelida)	Highly mobile marine worms. Many tube-dwelling species (University of California Berkeley 2019a).		x
Bryozoans (Phylum Bryozoa)	Lace-like animals that exist as filter feeding colonies. Form either encrusting or bushy tuft-like lacy colonies (Gordon et al. 2016; U.S. Department of the Navy 2017).		x
Cephalopods, bivalves, sea snails, chitons (Phylum Mollusca)	Mollusks are a diverse group of soft-bodied invertebrates with a specialized layer of tissue called a mantle. Mollusks may be swimming active predators (squid), benthic predators or grazers (sea snails), or filter feeders (clams). Mollusks can be found at all water depths (Moretzsohn et al. 2009).	x	x
Shrimp, crab, barnacles, copepods (Phylum Arthropoda – Crustacea)	Diverse group of animals, some of which are immobile. Most have an external skeleton. Various feeding modes from predator to filter feeder (Perry and Larsen 2004).	x	x
Sea stars, sea urchins, sea cucumbers (Phylum Echinodermata)	Predators and filter feeders with tube feet. Occur at all depth ranges from intertidal to the abyssal plain, mostly benthic (Perry and Larsen 2004).		x

[1] Classification generally refers to the rank of phylum, although Protozoa is a traditionally recognized group of several phyla of single-celled organisms (e.g., historically referred to as Kingdom Protozoa, which is still retained in some references, such as in the Integrated Taxonomic Information System).
Table Sources: World Register of Marine Species (World Register of Marine Species Editorial Board 2015) and University of California Berkeley's Museum of Paleontology (University of California Museum of Paleontology 2019)

3.4.2.1.1.1 NW-ATL Proposed Action Area

The NW-ATL proposed action area is influenced by the Labrador Current, Gulf Stream, and North Atlantic Gyre (Brusca and Brusca 2003). Features such as Georges Bank and the New England Seamount Chain are highly productive and home to many marine invertebrates. Over 3,000 invertebrate species inhabit this ecosystem (Fautin et al. 2010).

Georges Bank is a shallow submarine plateau located between Cape Cod, Massachusetts and Cape Sable Island, Nova Scotia, Canada. It separates the Gulf of Maine from the Atlantic Ocean and contains areas that fall under the jurisdiction of the United States and Canada (Environment America 2020). It is characterized by high levels of year-round primary productivity because its shallow, sunlight-exposed water mixes with cold, nutrient-rich water from the surrounding deep ocean. As a result, it hosts robust pelagic and benthic invertebrate communities. Copepods (genus *Calanus*) and euphausiids from deep water are drawn to these highly productive waters, driving the pelagic food web of fish, marine mammals, and seabirds (Fogarty and Murawski 1998). Regions of gravel and sand substrate provide habitat for communities of sea urchins, bivalves, and brittle stars as well as tube-dwelling polychaetes and amphipods that provide biogenic habitat for commercially important invertebrates such as, American lobster (*Homarus americanus*) and Atlantic sea scallop (*Placopecten magellanicus*) (Fogarty and Murawski 1998; Hermsen et al. 2003). Additional commercially important invertebrates include Atlantic surfclam (*Spisula solidissima*), ocean quahog (*Arctica islandica*), Atlantic sea scallop (*Placopecten magellanicus*), and several squid species (Mid-Atlantic Fishery Management Council 2016; New England Fishery Management Council 2013; Voss and Brakoniecki 1985).

The New England Seamount Chain is the longest seamount chain the North Atlantic Ocean. At least four of its 800 seamounts fall within the U.S. EEZ. Thirty-nine species of corals have been identified on this chain, several of which were previously unknown and are presumably endemic (Auster et al. 2005). Two hundred and fourteen species of invertebrates, including sponges, crabs, and tubeworms were identified to be living on the Bear Seamount alone (Babb 2003).

In the NW-ATL proposed action area, the most ecologically significant invertebrate in this proposed action is the horseshoe crab (*Limulus polyphemus*). Their eggs are a particularly important food source for some migratory birds at spring stopover sites along the northeastern coast of the United States (U.S. Fish and Wildlife Service 2019). Habitat-forming bivalves are prevalent in this proposed action area, including mussels (*Mytilus* spp*.) and* oysters (*Crassostre*a spp.) (Mid-Atlantic Fishery Management Council 2016; New England Fishery Management Council 2013; Voss and Brakoniecki 1985).

3.4.2.1.1.2 NW-ATL-Florida and the Caribbean Proposed Action Area

The NW-ATL-Florida and the Caribbean proposed action area is influenced by the warm waters of the Gulf Stream and Caribbean Islands. In the NW-ATL-Florida and the Caribbean proposed action area, the South Florida continental shelf, Florida Keys, and Caribbean Sea support a high abundance of invertebrates. Almost 9,300 species of invertebrates are found in the Caribbean ecosystem alone (Miloslavich et al. 2010).

The South Florida shelf and slope are a broad, seafloor platform that supports a high abundance of tropical marine species and supports extensive shallow water coral reef systems. The Florida Keys contain the only system of shallow reef-building corals in the continental United States. This area has a lower coral diversity than the Caribbean Sea; however, Florida reefs do support a high diversity of other invertebrates (e.g., crabs, shrimp, sponges) (Fautin et al. 2010). Coral in the family Acroporidae, including those that are ESA-listed (Sections 3.4.2.1.2.8 through 3.4.2.1.2.11), are the dominant reef-building corals in this region.

The continental shelf in this area consists of sand/shell bottom, interspersed with rocky outcrops. Although these areas support less biomass and lower species diversity than coral reefs, they do support several important commercial species, which are discussed in further detail in Section 3.5.1.

3.4.2.1.1.3 GoMEX Proposed Action Area

The GoMEX proposed action area is influenced by the Loop Current and input from the Mississippi River. Over 9,000 species of invertebrates inhabit this ecosystem where the most diverse taxa are crustaceans (2,579 species) and mollusks (2,455 species) (Fautin et al. 2010). The Gulf of Mexico has unique communities of invertebrates that occupy a range of habitats, from shallow coral reef along the west Florida shelf to chemosynthetic communities that form around hydrocarbon seeps on the abyssal plain. The habitat also significantly differs between the north and south. The shallow continental shelf waters of the north are considered warm-temperate, whereas similar habitat in the south are considered tropical. Shallow coastal areas, such as oyster reefs and seagrass beds are known for their high biodiversity. These are discussed briefly in Section 3.4.1.1.3, but vessels would only overlap with these habitats while in transit. Little is known about the coastal and continental shelf areas of Mexico in the south (Fautin et al. 2010).

Two habitat types found offshore that have the greatest biomass and biodiversity of invertebrate species are coral reefs and cold seeps. Coral reefs are most common on the shallow continental shelf and slope of the west Florida shelf. Most reef-building corals contain photosynthetic algae, called zooxanthellae that live in their tissues. Zooxanthellae species are generally limited to the photic zone where their symbionts have access to light to undergo photosynthesis (Cairns et al. 2009). Four regions are recognized where the shelf extends farthest offshore, allowing for extensive offshore habitats: (1) the west Florida shelf off the Florida coast; (2) the shelf off of Mississippi, Alabama, and the Florida panhandle; (3) the shelf between Louisiana and Texas in the northwestern Gulf of Mexico; and (4) Campeche Bank off the Yucatán peninsula in Mexico (Androulidakis et al. 2014).

Deep water reefs and cold seep communities are most common between 984 and 1,969 ft (300 and 600 m) depth, and both Campeche Bank and the west Florida slope support extensive deep water reef communities. As part of the chemosynthetic process of the seep bacteria, the bacteria excrete calcium carbonate, which forms hardened surfaces that coral, sponges, and other invertebrates utilize for habitat (U.S. Bureau of Ocean Energy Management Gulf of Mexico OCS Region 2017). In many seep communities, crustaceans and polychaete annelids are most prevalent (Ross et al. 2012). Several invertebrate species may house chemosynthetic bacteria, including tubeworms, mussels, and clams (Ross et al. 2012; U.S. Department of the Navy 2017). Squat lobsters (e.g., *Munidopsis* spp. and *Munida* spp.) are common in seep communities, and they are often the top predator (Ross et al. 2012). Deep sea scleractinian corals (e.g., *Enallopsammia rostrata*), octocorals (e.g., *Acanthogorgia armata*), and black corals are also prevalent (Ross et al. 2012). The presence of corals within cold seep communities may provide a direct, physical link between deep water coral reefs and cold seep communities (Ross et al. 2012).

Commercially and recreationally important invertebrate species differ between northern and southern regions of the Gulf of Mexico. The American oyster (*C. virginica*) and blue crab (*Callinectes sapidus*) are commercially important in the north. In the south, particularly in Mexican waters, spiny lobsters, octopus (e.g., *Octopus maya*, *O. vulgaris*) and the queen conch (*Eustrombus gigas*) have historically been commercially important resources (Fautin et al. 2010; Nelson and Pattillo 1992).

3.4.2.1.1.4 NEPAC-South Proposed Action Area

The NEPAC-South proposed action area is influenced by the California Current, Davidson Current, and the North Pacific Gyre. The California Current begins off southern British Columbia and brings cool waters southward from the North Pacific Gyre, while the Davidson Current moves up the Pacific Coast, bringing warmer waters north. These two water currents converge at Point Conception, creating a transition zone that is characterized by high species diversity where many marine species, particularly invertebrates, overlap as they reach the extents of their northern and southern ranges (Fautin et al. 2010). The NEPAC-South proposed action area is the area south of Point Conception, characterized by warmer sea surface temperatures and known as the Southern California Bight (i.e., the area between Point Conception and San Diego, California).

As a result of such extensive upwelling events in the Southern California Bight, the zooplankton community is highly diverse, ranging in size from jellyfish (*Pelagia* spp.), which can exceed 6 ft (2 m) in length, to microscopic rotifers and heterotrophic protozoans (Perry 2003). Many zooplankton (e.g., copepods, euphausiids, and cladocerans) are holoplanktonic, meaning they spend their entire lives as plankton. They serve as a major prey item for fish and whales and recycle and export organic matter to the benthos through excretion and mortality (Linacre 2004).

Over 100 benthic invertebrate species, representing nine phyla, are found on the California continental shelf (Department of the Navy 2001). The shelf community is dominated by polychaete (capitellids, spionids, and syllids) and oligochaete worms. A total of 71 taxa of polychaete worms were identified in central California waters (Zabin et al. 2013). Crustaceans, specifically amphipods, are second in overall abundance, followed by mollusks (Department of the Navy 2001; Department of the Navy and San Diego Unified Port District 2000).

Kelp forests along the U.S. West Coast, which are discussed in more detail in Section 3.4.1.1.4, are some of the most productive and species-rich communities in marine temperate regions worldwide. Isopods (*Idotea resecata*) and bryozoans (*Membranipora tuberculate*) may reside in the kelp canopy, while kelp crabs (*Pugettia producta*) may reside on the kelp’s stipe. Over 100 invertebrate taxa have been known to occur within the holdfast alone (Ghelardi 1971). A variety of motile and invertebrates reside and graze within the benthic habitat of the kelp forest, including the wavy top turban snail (*Megastrae undosa)* and the California sea hare (*Aplysia californica*). Sea urchins (*Stronglyocentrotus franciscanus* and *S. purpuratus*) graze on kelp holdfasts and can be destructive to the kelp forest habitat if populations become too large. Urchin barrens are common along areas of the Channel Islands and California Coast (National Park Service 2019).

Deep water areas off the California coast support numerous corals such as sea fans (*Lophelia pertusa)* and cup coral (*Caryophyllia arnoldi)* (Etnoyer and Morgan 2005b; NOAA Southwest Fisheries Science Center 2018; Whitmire and Clarke 2007b). At least 26 taxa of deep sea corals were recorded within the Channel Islands National Marine Sanctuary (Caldow et al. 2015; Clarke et al. 2017) and large populations of hydrocorals occur at Tanner, Cortes, and Farnsworth Banks, in the offshore waters of Southern California (Southern California Marine Institute 2016).

There are seven species of abalone on the U.S. Pacific Coast: red abalone (*Haliotis rufescens);* green abalone (*H. fulgens*); pink abalone (*H. corrugata*); white abalone (*H. sorenseni*); pinto abalone (*H. kamtschatkana* [including *H.k. assimilis*]); black abalone (*H. cracherodii*); and flat abalone (*H. walallensis*). The distribution of abalone drastically differs based on its location, but all species are found in rock crevices, under rocks, and in other cryptic spaces.

3.4.2.1.1.5 NEPAC-North Proposed Action Area

The NEPAC-North proposed action area is mainly influenced by the California Current and the North Pacific Gyre. Productive areas include Puget Sound and the Juan de Fuca submarine canyon system.

The deeper waters of this proposed action area are somewhat removed from the nearby prominent coastal regions of Puget Sound and the Juan de Fuca submarine canyon system. High productivity from coastal sources, upwelling, and chemosynthetic vent communities contributes to abundant and diverse planktonic and benthic communities (e.g. Van Ark et al. 2007). Dominant euphausiid species, which are key prey species for mysticete whales, include multiple genera of krill—predominantly *Thysanoessa* spp. and North Pacific krill (*Euphausia pacifica*) (Gómez-Gutiérrez et al. 2005; Linacre 2004). In general, copepods are the dominant group of zooplankton in terms of biomass (Landry and Lorenzen 1989). Salps are more abundant in phytoplankton-rich surface waters but have been found at deeper depths as well (Hubbard Jr and Pearcy 1971).

The ecological composition of kelp forests, which are discussed in more detail in Section 3.4.1.1.5, are similar to those in the NEPAC-South proposed action area. While the composition of invertebrate taxa are similar between northern and southern kelp forests, a higher number of species have been documented in giant kelp forests (dominating the NEPAC-South proposed action area) than in bull kelp (Pearse and Lowry 1974) forests (dominating the NEPAC-North proposed action area).

The biological diversity of invertebrate communities along the continental shelf and abyssal plain is high and includes sponges, polychaetes, crustaceans, mollusks, echinoderms, and bryozoans (Freiwald et al. 2004; Roberts and Hirshfield 2003). These deep water benthic animals grow more slowly, live longer, and have smaller broods than similar species living in shallow waters (Airame et al. 2003). In many areas of the abyssal plain, brittle stars are so abundant that their feeding behavior and high activity levels alter the ecology of benthic, soft-bottom communities (Airame et al. 2003). Cold seep communities between 1,969 ft (600 m) and 3,281 ft (1000 m) are located in Monterey Bay, California are dominated by clams, worms, snails, and limpets (Barry et al. 1996).

Deep sea coral communities are found along the continental slope. Black corals are the most common, while the rare *Lophelia* sp. is found off the Washington Coast. Recent studies indicated that deep water corals are widespread on seamounts and continental shelves throughout the Northeast Pacific, occurring as deep as 15,420 ft (4,700 m) (Etnoyer and Morgan 2005a; Morgan et al. 2005). On the Juan de Fuca Ridge, ecosystems include tubeworms, giant white clams, mussels, gastropods, and sponges (Kojima 2002). These chemosynthetic communities are a significant source of biological productivity on the seafloor, and some of these communities occur in association with fields of hydrothermal vents (Lumsden et al. 2007; Smith et al. 2003).

3.4.2.1.1.6 AK Proposed Action Area

Alaska is surrounded by the Gulf of Alaska, Bering Sea, Chukchi Sea, and Beaufort Sea. Invertebrate distribution is strongly influenced by the Alaska Coastal Current and the Alaska Gyre. The Aleutian Island chain and Bering Sea, as well as the seasonal presence of ice, act as a naturally occurring boundary for many species in this region. Since OPCs would not be operating in sea ice, sympagic[13] communities of invertebrates are not discussed further in this PEIS/POEIS.

The Gulf of Alaska is characterized by a broad and deep continental shelf containing numerous troughs and ridges. There is high variability in the water over the continental shelf as it receives large inputs of

13 Sympagic organisms are those that complete their entire life cycle within the sea ice or spend at least part of their life cycle attached to the ice.

fresh water and experiences heavy storms (Whitney et al. 2005). As a result, it is a very productive ocean region for invertebrates. Over 580 benthic invertebrate taxa have been described. Over the entire shelf of the Gulf of Alaska, the mean diversity and species richness was highest on banks and at the shelf break (Feder and Jewett 1986). Offshore, the continental slope and abyssal plain are characterized as having substrata with large grain sizes (e.g., boulders, cobble) that provide habitats that support a diversity of organisms including groundfish and rich communities of coral, sponges, anemones, and bryozoans (NMFS 2005b). The benthic invertebrate fauna of the Gulf of Alaska differs markedly as a function of bottom type. Sponges, barnacles, anthozoans, soft corals, ascidians, sea whips, sea pens, mussels, and bryozoans are distributed throughout the continental shelf and provide important structure to the soft-bottom seafloor. Polychaetes, clams, nematodes, and amphipods burrow into sand and mud bottoms and stabilize the sediments. These benthic invertebrates serve as an important prey source for mobile invertebrates and demersal fishes. Common predatory invertebrates include sea stars (e.g., leather [*Dermasterias imbricata*] and sunflower star [*Pycnopodia helianthoides*]), and crabs (e.g., helmet, Dungeness, king, snow, and Tanner crabs), shrimp (*Carangon* spp. and *Pandalus* spp.).

Corals in Alaskan waters are found in the Gulf of Alaska, the Aleutian Islands, and the Bering Sea (Heifetz 2002). Alaska has about 141 species of corals. The species mix varies by region—gorgonians and black corals are most common in the Gulf of Alaska, and gorgonians and hydrocorals are most common in the Aleutian Islands. Soft corals are common on Bering Sea shelf habitats, but can be found as far north as the Beaufort Sea (Fautin et al. 2010). The known distribution of deep sea corals is within depths that are shallower than 2,953 ft (900 m); however, given the general distribution of deep sea corals in the northeast Pacific Ocean it is likely that deep sea corals may occur at greater depths and over a broader geographical extent that what is currently known. Therefore, in the Gulf of Alaska, the distribution of corals may extend beyond the 2,953-ft (900-m) isobath (Freiwald et al. 2004; Hoff and Stevens 2005).

The Gulf of Alaska continental shelf and slope is highly dissected by numerous submarine canyons. The organisms that live in submarine canyon habitats must be able to withstand extreme conditions—depths in excess of 1,640 ft (500 m), little or no light, cold water temperature, and tremendous pressure (up to 318 atmospheres) (Airame et al. 2003). Some pinnacles, such as the Albatross Pinnacle south of Kodiak Island, come close to the surface and provide a substrate for kelp that in turn provide essential rearing habitat for juvenile fish. These pinnacles are known to be covered with sponges, anemones, hydroids, tunicates, barnacles, crabs, worms, snails, chitons, and other invertebrates and algae (Alaska Marine Conservation Council and Alaska Sea Grant 2003).

The Bering Sea and Aleutian Islands have a highly productive continental shelf that supports many commercial fisheries, which are discussed in Section 3.5.1. Plankton species estimates for the Bering Sea exceed 320 species. Crustacean species make-up half of the plankton composition (Fautin et al. 2010). This region may harbor the highest diversity and abundance of cold-water corals in the world. Submersible observations have documented representatives of six major taxonomic groups and at least 50 species or subspecies of corals that may be endemic to the region (Heifetz et al. 2005).

3.4.2.1.1.7 HI-PAC Proposed Action Area

The Pacific Islands region is characterized by islands, atolls, and coral reefs. There are roughly 5,100 species of invertebrates (Fautin et al. 2010). The Hawaiian Archipelago is the most isolated group of islands on earth and as a result has low species diversity and high rates of endemism (condition in which a species is found only in one geographic area) compared to similar habitats in Indonesia and Australia. Hawaii has an estimated rate of endemism 25 percent or greater for coral reef species (Fautin et al. 2010). Approximately 300 species of corals are found in the Hawaiian Archipelago, including 99 scleractinian stony corals, 137 species of octocorals, 14 genera of black coral, 12 species of soft coral, and 4 species of stylasterid hydrocorals (Fautin et al. 2010; Maragos et al. 2004a). Dominant coral species in the Main Hawaiian Islands (MHI) include *Montipora capitata, M. flabellata, M. patula, Pocillorpora meandrina, P. compressa, P. lobata, and P. varians* (Franklin et al. 2013; Friedlander et al. 2005). Most coral species are restricted to shallow waters (less than 131 ft [40 m]). Coral coverage is generally highest in the southern portion of the archipelago (Friedlander et al. 2005). However, more species of stony corals have been documented in the Northwestern Hawaiian Islands (NWHI; 57 species) than in the MHI (50 species) (Friedlander et al. 2005). Hard coral species in the rest of the Pacific have been assessed as follows: America Samoa (279 species), CNMI (260 species), Guam (260 species) and of those species the International Union for Nature Conservations (IUCN) has “red listed” (considered the most threatened) 52 species in American Samoa and 47 species in CNMI, but none in Guam (Kinch et al. 2010).

The Hawaiian Islands also contain numerous deep sea coral reefs, which are distributed across seamounts and oceanic islands (Long and Baco 2014) and have been found at a maximum of about 5,906 ft (1,800 m) where suitable substrate exists (Etnoyer and Morgan 2003). Approximately 200 species of deep sea corals (octocorals, antipatharians, and zoanthids) have been found around the Hawaiian Archipelago (Hourigan et al. 2017; Parrish and Baco 2007). Stony corals are relatively rare at all depths and gorgonians (sea fans) are the most common group of deep sea corals. Precious corals, black corals, and various octocoral species appear to be the most numerous deep-water corals at depths less than about 1,969 ft (600 m), while octocorals dominate at deeper depths (Hourigan et al. 2017). In general, deep corals in Hawaii do not form the extensive three-dimensional reef structures observed in the Atlantic and South Pacific. Other ecologically and commercially important invertebrates (also discussed in Section 3.5.1) include: various species of squid, the endemic cuttlefish (*Euprymna scolopes*), bivalves, and limpets (*Cellana exarata* and *Cellana sandwicensis*) (Western Pacific Regional Fishery Managment Council 2001). Several lobster species from the families Palinuridae (spiny lobsters) and Scyllaridae (slipper lobsters) primarily occur within the subtidal zone, although their range can extend slightly deeper. The endemic Hawaiian spiny lobster (*Panulirus marginatus*) is found only in Hawaii and Johnston Atoll (Polovina 1999; Western Pacific Regional Fishery Managment Council 2009).

The Mariana Archipelago, including the islands, associated banks, and offshore reefs, represent a range of coral reef habitats (Brainard 2012) and host a rich diversity of invertebrate species: 280 species of hard corals (Randall 2003); 1,700 mollusks (Paulay 2003b); 200 echinoderms (Paulay 2003a); and 800 crustaceans. In general, the coral reefs of the Mariana Islands have a lower coral diversity compared to other reefs in the northwestern Pacific (e.g., Palau, Philippines, Australian Great Barrier Reef, southern Japan, and Marshall Islands), but a higher diversity than the reefs of Hawaii. Northern islands of the Marianas have lower coral diversity and colony surface area than southern islands; however, coral densities are similar between the groups (Abraham et al. 2004; Randall 2003). There is also a greater invertebrate species diversity in the southern islands than around the northern islands. Guam (in the southern islands) hosts a diverse invertebrate assemblages: 59 flatworms; 1,722 mollusks; 104 polychaetes; 840 arthropods; and 196 echinoderm species (Abraham et al. 2004). Corals in Guam are typically found at depths less than 245 ft (75 m) (Liske-Clark 2015b; Randall 2003).

3.4.2.1.2 ESA-Listed Marine Invertebrates

ESA-listed invertebrates in the proposed action areas include five species of mollusk and fourteen species of coral. There are no ESA-listed marine invertebrates in the NW-ATL or AK proposed action areas. Table 3-10 summarizes the presence of ESA-listed species and their critical habitat in each proposed action area. Black abalone, staghorn coral, and elkhorn coral have critical habitat that overlaps with the proposed action areas. Proposed critical habitat for *Acropora globiceps, A. jacquelineae, A.*

retusa, A. speciosa, Euphillia paradivisa, Isopora crateriformis, Seriatopora aculeate, pillar coral (*Dendrogyra cylindrus*), rough cactus coral (*Mycetophyllia ferox*), boulder star coral (*Orbicella franksi*), mountainous star coral (*Orbicella faveolata*), and lobed star coral (*Orbicella annularis*) may also overlap with the proposed action areas. Critical habitat is discussed in Section 3.4.8.1.2. Maps of these critical habitats can be viewed in Section 3.4.8.1.7.

Table 3-10. ESA-Listed Marine Invertebrates within the Proposed Action Areas

Common Name (Scientific Name)	*Listing Status*	*Proposed Action Area(s)*	*Critical Habitat within Proposed Action Area(s)*
Mollusca			
Black abalone (*Haliotis cracherodii*)	Endangered	NEPAC-South; NEPAC-North	76 FR 66805; October 27, 2011
White abalone (*Haliotis sorenseni*)	Endangered	NEPAC-South	None
Chambered Nautilus (*Nautilus pompilius*)	Threatened	HI-PAC	None
Giant Clam (*Tridacna* spp.; *Hippopus* spp.)	Candidate	HI-PAC	N/A[1]
Queen Conch (*Strombus gigas*)	Candidate	NW-ATL-Florida and the Caribbean; GoMEX	N/A[1]
Cnidaria (Corals)			
Staghorn coral (*Acropora cervicornis*)	Threatened	NW-ATL-Florida and the Caribbean; GoMEX	73 FR 72209; November 26, 2008
Acropora globiceps	Threated	HI-PAC	Proposed: 85 FR 76262; November 27, 2020
Acropora jacquelineae	Threatened	HI-PAC	Proposed: 85 FR 76262; November 27, 2020
Elkhorn coral (*Acropora palmata*)	Threatened	NW-ATL-Florida and the Caribbean; GoMEX	73 FR 72209; November 26, 2008
Acropora retusa	Threatened	HI-PAC	Proposed: 85 FR 76262; November 27, 2020
Acropora speciosa	Threatened	HI-PAC	Proposed: 85 FR 76262; November 27, 2020
Pillar Coral (*Dendrogyra cylindrus*)	Threatened	NW-ATL-Florida and the Caribbean; GoMEX	Proposed: 85 FR 76302; November 27, 2020
Euphyllia paradivisa	Threated	HI-PAC	Proposed: 85 FR 76262; November 27, 2020
Isopora crateriformis	Threatened	HI-PAC	Proposed: 85 FR 76262; November 27, 2020
Rough Cactus Coral (*Mycetophyllia ferox*)	Threatened	NW-ATL-Florida and the Caribbean; GoMEX	Proposed: 85 FR 76262; November 27, 2020
Boulder Star Coral Complex (*Orbicella franksi; O. faveolata; O. annularis*)	Threatened	NW-ATL-Florida and the Caribbean; GoMEX	Proposed: 85 FR 76262; November 27, 2020
Cauliflower Coral (*Pocillopra meandrina*)	Candidate	HI-PAC	N/A[1]
Seriatopora aculeata	Threatened	HI-PAC	Proposed: 85 FR 76262; November 27, 2020
Siderastrea glynni	Endangered-Foreign	NEPAC-South	None

[1] N/A = not applicable. Because candidate species are not yet listed under the ESA, there is not currently designated critical habitat. Once the species is listed, critical habitat may be designated.

3.4.2.1.2.1 Black Abalone

Black abalone (*Haliotis cracherodii*) is listed as endangered under the ESA (74 FR 1937; January 14, 2009). Critical habitat (Section 3.4.8.1.2) includes approximately 139 square miles (mi^2; 360 square kilometers [km^2]) of rocky intertidal and subtidal habitat within five segments of California the coast from north of San Francisco to the Palos Verdes Peninsula, including the Farallon Islands and Año Nuevo Island near San Francisco as well as the Channel Islands in the Southern California Bight (76 FR 66805; October 27, 2011). Black abalone may occur in the NEPAC-South and NEPAC-North proposed action areas.

Black abalone historically occurred from Crescent City, California to southern Baja California, Mexico, but today the species' constricted range occurs from Point Arena, California to Bahia Tortugas, Mexico. The species is rare north of San Francisco, California (Butler et al. 2009), and south of Punta Eugenia, Mexico. Black abalone prefer rocky intertidal and subtidal habitat from the shore to a depth of 197 ft (60 m), but more often only to 20 ft (6 m), where they wedge themselves between rocks (Butler et al. 2009; California Department of Fish and Game 2005; National Oceanic and Atmospheric Administration 2015a). The majority of black abalone may be found in the high intertidal zone where drift kelp fragments tend to be concentrated by breaking surf (Butler et al. 2009). Black abalone may be found in waters with these characteristics close to the mainland, or close to islands located offshore. Massive declines in black abalone began in 1986 that resulted in significant large-scale population reductions by the early 1990's (Lafferty and Kuris 1993). Evidence of population decline has also been observed in central California (Raimondi et al. 2002). The NMFS Black Abalone Status Review Team estimated that, unless effective measures are put in place to counter the population decline caused by withering syndrome and overfishing, the species will be extinct within 30 years (Butler et al. 2009). Black abalone are herbivores that feed on a variety of kelp species (National Oceanic and Atmospheric Administration 2015a).

3.4.2.1.2.2 White Abalone

White abalone (*Haliotis sorenseni*) is listed as endangered under the ESA (66 FR 29046; May 29, 2001). No critical habitat is designated for this species. White abalone may occur in the NEPAC-South and NEPAC-North proposed action areas.

Historically, white abalone occurred from Point Conception, California to Punta Abreojos, Baja California, Mexico. They are the deepest-living of the abalone species (Hobday and Tegner 2000) and have been caught at depths of 66 to 200 ft (20 to 61 m), with the highest abundance at depths of 82 to 98 ft (25 to 30 m) (Cox 1960; Tutschulte 1976). At these depths, white abalone are found in open low relief rock or boulder habitat interspersed with sand cannels (Davis et al. 1996; Tutschulte 1976). In the Southern California Bight, white abalone are more commonly found near the offshore islands than the mainland coast (National Oceanic and Atmospheric Administration 2015d).

According to the California Department of Fish and Wildlife (2005), white abalone are classified as "near extinction." Current population estimates indicate that white abalone may have declined by as much as 99 percent in the last 25 years. An abundance estimate based on deep survey data estimated that 1,600 animals were spread over the entire geographic range documented for this species (Davis et al. 1998; Hobday and Tegner 2000). White abalone are herbivores that feed on drifting macroalgae and red algae (National Oceanic and Atmospheric Administration 2014f).

3.4.2.1.2.3 Chambered Nautilus

The chambered nautilus (*Nautilus pompilius*) is listed as threated under the ESA (83 FR 48976; September 28, 2018). No critical habitat has been designated for this species. Chambered nautilus may occur in geographically-limited areas of the HI-PAC proposed action area, specifically in the waters surrounding American Samoa.

The chambered nautilus is restricted to deep benthic, geographically-isolated habitats of the continental shelf of the Indo-Pacific region (Jereb 2005)). They occur on steep coral reef drop-offs and coral seamounts within depth ranges of 427–2,297 ft (130–700 m). They are bottom-dwelling scavengers and opportunistic predator species. The internal arrangement of their shell chamber restricts their depth limit to 2,624 ft (800 m) and requires the need to equilibrate at approximately 656 ft (200 m) as the organism ascends. They seem to avoid waters shallower than 328 ft (100 m) and water temperatures that exceed 77 F° (25 °C) because of predation by fish (Diversity 2016).

3.4.2.1.2.4 Giant Clam (Multiple Species)

Seven giant clam species are candidate species for listing under the ESA throughout their range (82 FR 28946; June 26, 2017). This includes five species in the genus *Tridacna* (*T. costata, T. derasa, T. gigas, T. squamosa, and T. tevora*) and two species in the genus *Hippopus* (*H. hippopus* and *H. porcellanus*). Giant clams may be encountered in regions of the HI-PAC proposed action area, particularly Hawaii, Guam, and the CNMI.

These clams are the largest living marine bivalves found in coastal areas of the Indo-Pacific region, and are frequently regarded as important ecological components of coral reefs, especially as providers of substrate and contributors to overall productivity (Neo et al. 2013). Giant clam distribution is not uniform, with greater diversity found in the central Indo-Pacific (Spalding et al. 2007). Modern giant clams are distributed along shallow shorelines and on reefs in the Indo-West Pacific in the area from South Africa to beyond French Polynesia and from Japan in the north to Australia in the south (Neo et al. 2015). There are reports that at least two species of *Tridacna* have been introduced in Hawaii (*T. derasa* and *T. squamosal*) (bin Othman et al. 2010).

3.4.2.1.2.5 Queen Conch

Queen conch (*Strombus gigas*) is a candidate for listing under the ESA throughout its range (84 FR 66885; December 6, 2019). Queen conch may occur in the NW-ATL-Florida and the Caribbean and GoMEX proposed action areas.

The queen conch has long been a principal source of food throughout the Caribbean (Brownell and Stevely 1981). Queen conch commonly inhabit sandy bottoms, residing at depths from a few inches (in; 8 to 10 centimeters [cm]) to 250 ft (76 m), but are rarely found deeper than 100 ft (30 m) (Randall 1964). They feed on numerous species of seagrass and algae. Among gastropods, conch have a unique style of locomotion, thrusting their foot against the substrate, causing the shell to be lifted and thrown forward in a hoping motion. The conch's characteristic motion does not result a clear trail predators can follow (Brownell and Stevely 1981).

3.4.2.1.2.6 Staghorn Coral

Staghorn coral (*Acropora cervicornis*) is designated as a threatened species under the ESA (71 FR 26852; May 9, 2006). Staghorn coral shares four areas of designated critical habitat (Section 3.4.8.1.2) with elkhorn coral (*Acropora palmata)* (Figure 3-4 and Figure 3-6), including exemptions (73 FR 72209;

November 26, 2008). This species may occur in the NW-ATL-Florida and the Caribbean and GoMEX proposed action areas.

Staghorn coral commonly occurs in lagoons and the upper to mid-reef slopes, at depths of 3–66 ft (1–20 m), and requires a salinity range of 34 to 37 ppt (Aronson et al. 2008a; Boulon et al. 2005). Staghorn coral distribution extends south from Palm Beach, Florida and along the East Coast to the Florida Keys, the Dry Tortugas, and through the Caribbean, particularly Puerto Rico and the U.S. Virgin Islands (Jaap 1984). Staghorn coral has a wider habitat range than elkhorn coral*,* particularly in southeast Florida (Wirt et al. 2015).

Long-term monitoring in the Florida Keys and the U.S. Virgin Islands has found that staghorn coral remains at 2 percent or less of all corals on reefs, a fraction of its former abundance (Boulon et al. 2005; Rothenberger et al. 2008).The marine snail (*Coralliophila abbreviata*) and the bearded fireworm (*Hermodice carunculata*) are the primary predators of staghorn coral (Grober-Dunsmore et al. 2006).

3.4.2.1.2.7 Elkhorn Coral

Elkhorn coral (*Acropora palmata*) is listed as a threatened species under the ESA (71 FR 26852; May 9, 2006). Elkhorn coral shares four areas of designated critical habitat (Section 3.4.8.1.2) with staghorn coral (73 FR 72209; November 26, 2008; Figure 3-4 and Figure 3-6). This species may occur in the NW-ATL-Florida and the Caribbean and GoMEX proposed action areas.

Elkhorn corals are typically found in the southeastern part of the Gulf of Mexico, the northern part of the Caribbean Sea, and the southern part of the southeast U.S. continental shelf. Elkhorn coral distribution extends from southeastern Florida through the Florida Keys, and surrounds Puerto Rico and the U.S. Virgin Islands (Aronson et al. 2008a). Two colonies of elkhorn coral occur in the Flower Garden Banks National Marine Sanctuary in the Gulf of Mexico.

Elkhorn coral is typically found on outer reef crests and slopes with exposure to wave action at depths of 3–66 ft (1–20 m), although it has been reported as deep as 98 ft (30 m) (Aronson et al. 2008a; Boulon et al. 2005). The optimal water temperature range for Elkhorn coral is 77 to 84 °F (25 to 29 °C), and it requires a salinity range of 34 to 37 ppt (Aronson et al. 2008a; Boulon et al. 2005). Elkhorn coral inhabits shallow waters with high oxygen content and low nutrient levels (Spalding et al. 2001). Clear, shallow water allows the coral sufficient sunlight exposure to support zooxanthellae. Elkhorn coral primarily inhabits the seaward margins of reefs where appropriate conditions are most likely to occur (Ginsburg and Shinn 1964).

3.4.2.1.2.8 *Acropora globiceps* Coral

Acropora globiceps is listed as threatened throughout its range under the ESA (79 FR 53851; September 10, 2014). Critical habitat has been proposed for this species (85 FR 76262; November 27, 2020) in the HI-PAC proposed action area and is discussed further in Section 3.4.8.1.2. This species of coral may occur in portions of the HI-PAC proposed action area.

The range of *A. globiceps* has been recorded in the central Indo-Pacific, the oceanic west Pacific, and the central Pacific (Wallace 1999). This species is considered common and relatively widespread longitudinally, but restricted by latitude. *A. globiceps* has been reported in intertidal areas, upper reef slopes, and reef flats in water depths ranging from 0 to 26 ft (0 to 8 m) (Australian Institute of Marine Science 2010). *A. globiceps* has been detected within the CNMI, and specifically within waters surrounding Tinian, from the shoreline to 3 nm offshore (National Marine Fisheries Service 2014a; Tetra Tech 2014; U.S. Department of the Navy 2014).

A. globiceps and *Seriatopora aculeata*, a colonial stony coral (Section 3.4.2.1.2.17), are often found in similar areas. Vernon (2014) confirmed records of *A. globiceps* and *S. aculeata* within the CNMI. *A. globiceps* occupies upper reef slopes, reef flats, and adjacent habitats in shallower depths, and both *A. globiceps* and *S. aculeata* prefer unconsolidated hard bottom habitat (Sheppard et al. 2009). *A. globiceps* and *S. aculeata* are both more commonly found in the upper reef slope zones as opposed to on artificial structures. The specific effects of predation are poorly known for both species; however, like most acroporid corals, this species may be preferentially consumed by predacious sea stars and snails, and is susceptible to the same suite of stressors that generally threaten corals (NOAA Fisheries 2020a).

3.4.2.1.2.9 *Acropora jacquelineae* Coral

Acropora jacquelineae is listed as threatened throughout its range under the ESA (79 FR 53851; September 10, 2014). Critical habitat has been proposed for this species (85 FR 76262; November 27, 2020) in the HI-PAC proposed action area and is discussed further in Section 3.4.8.1.2. This species of coral may occur in portions of the HI-PAC proposed action area.

Although *A. jacquelineae* has not been confirmed in Guam or the CNMI, it may occur in American Samoa (Hughes 2012). *A. jacquelineae* colonies grow in flat plates that can measure 3 ft (1m) in diameter. It is found in subtidal reef slope and back-reef habitats, including but not limited to lower reef slopes, walls, and ledges that are protected by wave action. Its depth range is 33–115 ft (10–35 m). Like most acroporid corals, this species may be preferentially consumed by predacious sea stars and snails, and is susceptible to the same suite of stressors that generally threaten corals (NOAA Fisheries 2020a).

3.4.2.1.2.10 *Acropora retusa* Coral

Acropora retusa is listed as threatened throughout its range under the ESA (79 FR 53851; September 10, 2014). Critical habitat has been proposed for this species (85 FR 76262; November 27, 2020) in the HI-PAC proposed action area and is discussed further in Section 3.4.8.1.2. This species of coral may occur in portions of the HI-PAC proposed action area.

A. retusa has a widespread distribution longitudinally, but is restricted by latitude (Brainard et al. 2011a). This species is not known to occur in the CNMI (Brainard et al. 2011a). However, *A. retusa* has been reported in the waters off Guam, but is considered a rare occurrence. *A. retusa* occurs in shallow, tropical reef environments and on upper reef slopes and in tidal pools from 3.3 to 16.4 ft (1 to 5 m). Like most acroporid corals, this species may be preferentially consumed by predacious sea stars and snails, and is susceptible to the same suite of stressors that generally threaten corals (NOAA Fisheries 2020a).

3.4.2.1.2.11 *Acropora speciosa* Coral

Acropora speciosa is listed as threatened throughout its range under the ESA (79 FR 53851; September 10, 2014). Critical habitat has been proposed for this species (85 FR 76262; November 27, 2020) in the HI-PAC proposed action area and is discussed further in Section 3.4.8.1.2. This species of coral may occur in portions of the HI-PAC proposed action area.

A. speciosa has been reported in American Samoa, but not in Guam or the CNMI. Colonies form thick cushions or bottlebrush branches. It occurs on lower reef slopes and wall, especially those characterized by clean water and high *Acropora* diversity in a depth range of 39–131 ft (12–40 m). Like most acroporid corals, this species may be preferentially consumed by predacious sea stars and snails, and is susceptible to the same suite of stressors that generally threaten corals (NOAA Fisheries 2020a).

3.4.2.1.2.12 *Euphyllia paradivisa* Coral

Euphyllia paradivisa or branching frogspawn coral is listed as threatened throughout its range under the ESA (79 FR 53851; September 10, 2014). Critical habitat has been proposed for this species (85 FR 76262; November 27, 2020) in the HI-PAC proposed action area and is discussed further in Section 3.4.8.1.2. This species of coral may occur in portions of the HI-PAC proposed action area.

E. paradivisa has been reported in American Samoa and through the Coral Triangle (the Philippines to Timor Leste and east to the Solomon Islands) (Brainard et al. 2011a). This species is made-up of branching, separate coraliites and polyps have branching tentacles. It is found in areas that are protected from wave action on the upper reef slopes and mid-slope terraces and lagoons. It occupies depths ranges of 7–82 ft (2–25 m) (NOAA Fisheries 2020b).

3.4.2.1.2.13 *Isopora crateriformis* Coral

Isopora crateriformis is listed as threatened (79 FR 53851; September 10, 2014). Critical habitat has been proposed for this species (85 FR 76262; November 27, 2020) in the HI-PAC proposed action area and is discussed further in Section 3.4.8.1.2. This species of coral may occur in portions of the HI-PAC proposed action area.

I. crateriformis is distributed within the Coral Triangle (the Philippines to Timor Leste and east to the Solomon Islands), in addition to parts of the western Pacific, including America Samoa (where it may be the most abundant in its range) and the Marshall Islands. This species forms flattened plates up to over 3 ft (1 m) in diameter. It predominantly resides in shallow areas with high-wave action, including reef flats, lower reef crest, and areas adjacent to upper reef slopes. It commonly occurs from areas exposed at low tide to 39 ft (12 m), but can occur to up to 164 ft (50 m) (NOAA Fisheries 2020c).

3.4.2.1.2.14 *Orbicella annularis* Complex

The boulder star coral (*Orbicella franksi*), mountainous star coral (*Orbicella faveolata*), and lobed star coral (*Orbicella annularis*) make up the *Orbicella annularis* complex. While there now is reasonable acceptance that these are three separate and valid species, decades of taxonomic uncertainty and difficult field identification have led many to consider these a single species complex. All three species have partially overlapping morphological characteristics, particularly in northern sections of their range, making identification less certain than for most other Caribbean corals. This species complex may occur in the NW-ATL-Florida and the Caribbean and GoMEX proposed action areas.

The boulder star coral, lobed star, and mountainous star coral are listed as threatened throughout their entire range under the ESA (79 FR 53852; September 10, 2014). Proposed critical habitat for boulder, mountainous and lobed star corals (85 FR 76302; November 26, 2020) overlaps with transit and operational areas of the NW-ATL-Florida and the Caribbean and GoMEX proposed action areas.

Orbicella species are key reef-builders that inhabit the Bahamas, Caribbean Sea, Gulf of Mexico, and Atlantic waters of Florida (Aronson et al. 2008a). With established colonies perhaps several feet across, these species have historically been the dominant members of reef ecosystems. In many areas, these species possess the largest average colony size for any coral (London 2014). The *O. annularis* complex has been reported to occur at depths of 230 to 295 ft (70 to 90 m) (Brainard et al. 2011b). *Orbicella* species occur in most reef habitat types, although less commonly on the reef flat and in the shallow zones dominated by elkhorn coral (Brainard et al. 2011b; Goreau 1959; National Marine Fisheries Service et al. 2012).

3.4.2.1.2.15 Rough Cactus Coral

The rough cactus coral (*Mycetophyllia ferox*) is listed as threatened under the ESA throughout its range (79 FR 53852; September 10, 2014).Proposed critical habitat for rough cactus coral (85 FR 76302; November 26, 2020) overlaps with transit and operational areas of the NW-ATL-Florida and the Caribbean and GoMEX proposed action areas. . This species may occur in the NW-ATL-Florida and the Caribbean and GoMEX proposed action areas.

Rough cactus coral is known to occur as deep as 262 to 295 ft (80 to 90 m) (Brainard et al. 2011b; National Marine Fisheries Service et al. 2012). This species is more commonly recorded from depths of 16 to 98 ft (5 to 30 m) (Aronson et al. 2008b), though this could be a result of high survey intensity by scuba divers at those depths. Rough cactus coral occurs in patch and fore reef habitat types, generally in lower energy parts of the reef (Brainard et al. 2011b; National Marine Fisheries Service et al. 2012). It is known to occur throughout the southern and southeastern part of the Gulf of Mexico, particularly south Florida, but is absent from the Flower Garden Banks (National Marine Fisheries Service 2014b). Rough cactus corals are considered uncommon or rare even within the areas they inhabit; they normally inhabit less than 1 percent, but sometimes up to 2 percent of the coral reef habitat (National Marine Fisheries Service et al. 2012).

3.4.2.1.2.16 Pillar Coral

The pillar coral (*Dendrogyra cylindrus*) is listed as threatened throughout its entire range under the ESA (79 FR 53852; September 10, 2014). Proposed critical habitat for pillar coral (85 FR 76302; November 26, 2020) overlaps with transit and operational areas of the NW-ATL-Florida and the Caribbean and GoMEX proposed action areas. This species may occur in the NW-ATL-Florida and the Caribbean and GoMEX proposed action areas.

Pillar coral most frequently occurs at depths of 10 to 26 ft (3 to 8 m) but has been documented at depths of 3–82 ft (1–25 m) (Brainard et al. 2011a; NOAA 2012). It is found on rocky outcrops in areas of high wave activity (Marhaver et al. 2015). It is known to occur in south Florida as far north as Broward County and there is one colony in Bermuda, but is not known to occur at the Flower Garden Banks or elsewhere in the northern or western Gulf of Mexico (National Marine Fisheries Service 2014b).

Pillar coral is both rare and conspicuous (due to its growth form). It has a limited habitat preference and colonies are often dispersed and isolated throughout the habitat range. In general, pillar coral is too rare for meaningful trends in abundance to be detected by typical reef monitoring programs (Brainard et al. 2011a). Predators of this species seem to be few, and though the corallivorous fireworm (*Hermodice carunculata*) feeds on diseased pillar coral, it does not seem to be a major predator (Brainard et al. 2011a).

3.4.2.1.2.17 *Seriatopora aculeata* Coral

Seriatopora aculeata is listed as threatened throughout their range under the ESA (79 FR 53851; September 10, 2014). Critical habitat has been proposed for this species (85 FR 76262; November 27, 2020) in the HI-PAC proposed action area and is discussed further in Section 3.4.8.1.2. This species of coral may occur in portions of the HI-PAC proposed action area.

The range of *S. aculeata* includes the western Pacific to the central Pacific as far east as the Pitcairn Islands (Liske-Clark 2015a). *S. aculeata* has a relatively confined distribution and is generally considered uncommon in the Indo-Pacific, including Australia, Fiji, Indonesia, Japan, Papua New Guinea, and the Northern Mariana Islands (Hoeksema et al. 2012).

Acropora globiceps and Seriatopora aculeata are often found in similar areas. Vernon (2014) confirmed records of *A. globiceps* and *S. aculeata* within the CNMI. *S. aculeata* has been recorded in a broad range of habitats on the reef slope and back-reef, including but not limited to upper reef slopes, mid-slope terraces, lower reef slopes, reef fats, and lagoons in water depths ranging from 10 to 131 ft (3 to 40 m) (Brainard et al. 2011a). *A. globiceps* and *S. aculeata* are both more commonly found in the upper reef slope zones as opposed to on artificial structures. The specific effects of predation are poorly known for both species; however, most acroporid corals are preferentially consumed by crown-of-thorns sea stars and by corallivorous snails (NOAA Fisheries 2020c).

3.4.2.2 Environmental Consequences to Marine Invertebrates

Impacts to marine invertebrates would potentially result from vessel noise and vessel movement associated with the Proposed Action and are discussed in detail in Sections 3.4.2.2.1 and 3.4.2.2.2, respectively. There would be no impacts to marine invertebrates from fathometer and Doppler speed log noise, aircraft noise, gunnery noise, and aircraft movement associated with the Proposed Action. Marine invertebrates would not be expected to experience levels of noise from any acoustic sources that would cause a hearing threshold shift and there would be no population level impacts to marine invertebrates from acoustic stressors associated with the Proposed Action. As discussed in Table 3-3, these acoustic stressors and potential impacts from MEM have been eliminated from further analysis in this PEIS/POEIS.

3.4.2.2.1 Vessel Noise

Marine invertebrates in the proposed action areas may be exposed to vessel noise during the Proposed Action. As discussed in Appendix F, hearing capabilities of invertebrates are not widely studied, although findings indicate they are not expected to hear sources above 3 kHz (Lovell et al. 2005; Popper 2008). In general, small vessel noise (e.g., OTH boat noise) would be expected to range from 1–7 kHz and large vessel noise (e.g., OPC vessel noise) would expected to range from 20–300 Hz (Section 3.2.1.2 and Table 2-2). Potential impacts to marine invertebrates ((i.e., crustaceans and cephalopods) that may detect low-frequency noise (Staaterman et al. 2011) caused by vessel noise include masking and behavioral reactions. Masking of important acoustic cues used by invertebrates during larval orientation and settlement may lead to localized reductions in recruitment success (Simpson et al. 2011). Masking effects from vessel noise would be intermittent and would only impact those individual marine invertebrates that would be close to the vessel while it transits throughout the proposed action areas. These individuals would no longer be impacted once the vessel moves out of their immediate area.

Recent research suggests that some invertebrates may experience sub-lethal physiological impacts from prolonged exposure to high amplitude (i.e., loud), low frequency sound (Celi et al. 2014; Wale et al. 2013). In general, vessels would be moving throughout the proposed action areas and any prolonged exposure to the loudest vessel noise (from 170–190 dB when 1 m from the vessel) is extremely unlikely given the extent of vessel movement, the swimming abilities of these marine invertebrates, and size of the proposed action areas. In addition, the highest density of marine invertebrates in all proposed action areas is located in the benthic zone and it is unlikely that any vessel noise would penetrate the benthic zone. Therefore, exposure to marine invertebrates would be limited to crustaceans and cephalopods within the water column. Since all ESA-listed marine invertebrates are categorized either as mollusks or corals and do not possess hearing capabilities, vessel noise would not be detectable, and there would be no effect to ESA-listed marine invertebrate species from vessel noise.

3.4.2.2.2 Vessel Movement

Marine invertebrates in the proposed action areas may be exposed to vessel movement during the Proposed Action. The operational speeds of the OPCs and OTH boats are discussed in Sections 2.2.1 and 2.2.3.1 and vessel use is discussed in Table 3-2. In general, all vessels would operate at speeds between 12–15 knots. Vessels have the potential to impact or harm marine invertebrates by directly striking organisms or by disturbing the water column (Bishop 2008). Species that occur at or near the surface (e.g., jellyfish, squid) would potentially be at risk of a direct vessel strikes. However, vessel hulls often have a hydrodynamic shape, and pelagic marine invertebrates are therefore generally disturbed, rather than struck, as the water flows around a vessel.

Vessel movement associated with the Proposed Action may result in short-term and localized disturbances to marine invertebrates near the water's surface. Propeller wash (water displaced by propellers used for propulsion) can potentially disturb marine invertebrates in the water column and are a likely cause of zooplankton mortality (Bickel et al. 2011). This is particularly true in areas where there are corals. However, in broadcast-spawning areas, there are typically high mortality rates under normal conditions, so any impacts resulting from OPC and support vessel operations would be biologically insignificant by comparison. Additionally, many pelagic invertebrates such as squid and zooplankton move away from the surface during the day, reducing potential exposure during daytime vessel operations.

Since the highest density of marine invertebrates occurs in the benthic zone, overlap of vessel movement and most marine invertebrates in the proposed action areas is not expected. Propeller wash of even the deepest draft vessels is likely indistinguishable from the water motion of periodic storm events and therefore, vessel operation in deeper waters beyond the continental shelf break would not affect the bottom. The potential for a vessel collision with an aquatic macroinvertebrate that could be found closer to the water's surface and not in their typical habitat, is considered rare. No measurable effects to invertebrate populations in the water column would be expected because the number of organisms potentially exposed to vessel movement would be low when compared to the total invertebrate biomass in the proposed action areas. Although some invertebrates could be disturbed or killed by a vessel collision, population level impacts would not be expected.

Based on the distribution of ESA-listed marine invertebrates and the large size of the proposed action areas, the likelihood of overlap with ESA-listed marine invertebrate species during the Proposed Action is low. ESA-listed species are only present in shallow waters (and not in offshore operational areas) and would therefore only be expected to overlap while vessels are in transit. It is unlikely that shallow-water corals would occur along shoreline adjacent to OPC transit areas; therefore, coral would not be expected to be affected by vessel movement. Additionally, the potential for a vessel collision with an aquatic ESA-listed marine invertebrate that could be found closer to the water's surface is considered extremely rare. Since all ESA-listed marine invertebrates are benthic, there would be no overlap between ESA-listed species and vessel movement. There would be no effect to critical habitat located within the proposed action areas from vessel movement.

Anchoring would only be employed when docking a vessel the size of an OPC in a port is not supported. While anchoring has the potential to disturb or strike organisms on the seafloor, it would only occur in designated anchorages, which are usually soft-bottom areas with regular bottom disturbance from other vessels also anchoring in these designated areas. A ship's anchor can shift and its mooring chain could swing across the seabed, causing abrasion of the seafloor and damage to benthic ecosystems, known as "anchor scour." it is likely that because these areas are designated anchorages, some areas of sea bottom have experienced repeated scouring over time. However, vessels associated with the

Proposed Action would remain at anchor for only a few days. Designated anchoring areas serve to protect vulnerable areas while at the same time delivering safety to the shipping industry (Davis et al. 2016). Therefore, population level impacts to marine invertebrates from vessel anchoring would not be expected. Anchoring the OPC would not occur during vessel transit or in deep waters of the proposed action areas. As ESA-listed species are rare, have a limited distribution within the proposed action areas, and are unlikely to be found in the designated anchoring area, the potential that vessel anchoring would overlap with ESA-listed marine invertebrates is low. There would be no effect to critical habitat located within the proposed action areas as a result of the Proposed Action as no vessel anchoring would occur within any designated critical habitat.

The potential for entanglement would be from the lines used in a vessel tow. For an organism to become entangled in a line or other tow material, the line materials would need to form loops and have a high breaking strength. Tow lines associated with the Proposed Action would not be expected to have any loops or slack. Since the density of macro invertebrates that could overlap with the presence of the tow line would be low, entanglement of marine invertebrates, including ESA-listed invertebrates, in tow lines would be extremely unlikely.

3.4.2.2.3 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, any potential impacts to marine invertebrates would be limited to vessel noise and vessel movement. Most vessel use associated with the Proposed Action would occur in waters primarily between 12 nm (22 km) from shore and inside 200 nm (370 km) and would be widely distributed throughout the proposed action areas. Vessel use in inshore waters would limited to transit to and from the vessel's homeport. As discussed in Section 3.4.2.2.2, the area exposed to vessel disturbance would be a very small portion of the surface and water column in all proposed action areas, and only a small number of individuals would be affected compared to overall abundance. Therefore, the impact of vessel movement on marine invertebrates would be inconsequential. Activities are not expected to yield any lasting effects on the survival, growth, recruitment, or reproduction of invertebrate species at the population level. As discussed in Section 3.4.2.2.1, potential impacts to marine invertebrates as a result of vessel noise include masking and behavioral reactions in those species that may detect low-frequency noise. However, effects from vessel noise would be intermittent and would only impact those individual marine invertebrates that would be close to the vessel noise while in transit through the proposed action areas and is unlikely that any vessel noise would penetrate the benthic zone, the area inhabited by the higher densities of marine invertebrates. Therefore, there would be no significant impact or harm to marine invertebrates under Alternative 1.

Species that do not occur at the surface, including all ESA-listed species, would not be exposed to vessel collisions. Pursuant to the ESA, the use of vessels as described under Alternative 1, may affect, but is not likely to adversely affect any ESA-listed marine invertebrates in the proposed action areas (Table 3-10). There would be no effect to critical habitat located within the proposed action areas as a result of the Proposed Action as no vessel anchoring would occur within any designated critical habitat (Section 3.4.8). Since vessel noise would not be detectable, there would be no effect to ESA-listed marine invertebrate species from vessel noise.

3.4.2.2.4 Impacts Under Alternatives 2–3

Under Alternatives 2–3, any potential impacts to marine invertebrates would be similar to those discussed for activities under Alternative 1. There could be a potential reduction in the number of vessels conducting the Coast Guard's mission in the proposed action areas. However, the difference would not result in substantive changes to the potential for or types of, impacts to marine invertebrates. Therefore, there would be no significant impact or harm to marine invertebrates under Alternatives 2–3.

As discussed in Section 3.4.2.2.3 (Impact from Vessels Under Alternative 1), pursuant to the ESA, the use of vessels as described under Alternatives 2–3, may affect, but is not likely to adversely affect any ESA-listed marine invertebrates in the proposed action areas (Table 3-10). Alternatives 2–3 would have no effect on ESA-listed species or designated critical habitat.

3.4.2.2.5 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, the physical disturbance from vessel movement and vessel noise would not be introduced into the marine environment, with the exception of OPCs 1–5. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impact or harm to marine invertebrates with implementation of the No Action Alternative.

3.4.3 Birds (Seabirds and Shorebirds)

3.4.3.1 Affected Environment

In general, birds are highly migratory species. Of the more than 650 species of birds that breed in North America, more than half are migratory. The annual, large-scale movement of birds between their breeding grounds and their non-breeding grounds usually occurs in spring and fall. Birds that nest in the Northern Hemisphere tend to move north in the spring to take advantage of increasing insect populations, budding plants, and many nesting locations. As winter approaches, food availability decreases, so birds move south to areas where these resources are more plentiful. However, there are some birds that do not migrate or make any seasonal movements. Therefore, presence in any given proposed action area may be seasonal or year-round, if the species is a permanent resident.

The Proposed Action has the potential to impact bird species that inhabitant forage in marine habitats of the proposed action areas. As such, the following discussions focus on the bird orders and ESA-listed species known to occur in these areas. Bird species that may be present within the proposed action area largely fall into two groups: those that are distributed mainly on land, but forage in marine habitats and those that are distributed in marine habitats where they also forage.

3.4.3.1.1 Major Groups of Seabirds and Shorebirds

The following provides an overview of the predominant bird species known to occur in the proposed action areas. Seven orders of birds potentially located within the proposed action areas are described in Table 3-11.

Table 3-11. Major Groups of Birds Present in the Proposed Action Areas

Taxonomic Group	*Representative Species*	*Description*	*Distribution Within the Proposed Action Area(s)*
Accipitriformes	Hawks, eagles, kites, vultures, and osprey.	Species are primarily terrestrial but may forage in coastal areas.	May occur in coastal areas throughout all proposed action areas.
Anseriformes	Ducks, geese, and other waterfowl.	They have the broadest habitat preferences of any aquatic bird, occupying all aquatic habitats except pelagic zones of the ocean.	May occur in shallow ocean waters and coastal areas throughout all proposed action areas.

Taxonomic Group	***Representative Species***	***Description***	***Distribution Within the Proposed Action Area(s)***
Charadriiformes	Stilts, plovers, avocets, lapwings, sandpipers, curlews, turnstones, knots, sanderlings, dunlins, dowitchers, snipes, phalaropes, yellowlegs, willets, gulls, terns, and skimmers.	A diverse group ranging from small shorebirds to large pelagic seabirds.	May occur throughout the marine environment and coastal areas throughout all proposed action areas.
Pelecaniformes	Pelicans, egrets, ibis, and herons.	These species are common amongst coastal areas and open ocean.	May occur in coastal areas and open ocean in all proposed action areas except the AK proposed action area.
Phaethontiformes	Tropicbirds.	Species are truly pelagic, spending most of their time out at sea.	May occur in pelagic areas in the NW-ATL; NW-ATL-Florida and the Caribbean; GoMEX; NEPAC-South, and HI-PAC proposed action areas.
Procellariiformes	Albatross, storm-petrels, shearwaters, and petrels.	These species are highly pelagic and widely distributed, coming to land only to breed.	May occur throughout the pelagic marine environment in all proposed action areas.
Suliformes	Frigatebirds, boobies, gannets, cormorants, shags, and the anhinga.	Species are broadly distributed from coastal environments to the open ocean.	May occur in coastal environments and open ocean throughout all proposed action areas.

3.4.3.1.1.1 Accipitriformes

Species of the order Accipitriformes are diurnal (active during the day and resting at night) birds of prey, hunting by sight during the day or at twilight. They are carnivorous and may prey on a variety of species such as fish, birds, invertebrates, and reptiles. Birds in the order Accipitriformes have low reproductive rates and typically nest in trees or tree cavities or along cliffs (Winkler et al. 2020a). Representative species that can be found in the proposed action areas include, but are not limited to, the osprey (*Pandion haliaetus*) and the bald eagle (*Haliaeetus leucocephalus*).

3.4.3.1.1.2 Anseriformes

Species of the order Anseriformes are omnivorous and may feed on aquatic or terrestrial plants, insects, aquatic invertebrates, amphibians, fish, and fish eggs. Waterfowl may be ground grazers, dabbling or skimming ducks, or diving birds. Anseriformes may occur in all proposed action areas. They inhabit a variety of aquatic habitats across the United States, including open ocean areas, bays, lagoons, lakes, ponds, and rivers (Winkler 2020a). Representative species that can be found in the proposed action areas include, but are not limited to, the common eider (*Somateria mollissima*) and the white-winged scoter (*Melanitta deglandi*).

3.4.3.1.1.3 Charadriiformes

The order Charadriiformes are a diverse group that ranges from small shorebirds to large pelagic seabirds. Charadriiformes may be found in all proposed action areas. Most Charadriiformes live and nest near fresh or salt water and prey on invertebrates or other small animals. Species in this order may probe the shoreline, plunge feed in the shallow waters, dive in deeper waters, or skim the surface of the water for food (Winkler 2020b). Charadriiformes that may occur in all proposed action areas include, but are not limited to, the piping plover (*Charadrius melodus*), red knot (*Calidris canutus*), marbled murrelet (*Brachyramphus marmoratus*), ring-billed gull (*Larus delawarensis*), and least tern (*Sternula antillarum*).

3.4.3.1.1.4 Pelecaniformes

Birds in the order of Pelecaniformes occur in a variety of marine and freshwater habitats across the country, foraging in shallow marshes, rivers, and lake edges for fish, dipping their large bills in the water to catch prey. Pelecaniformes birds feed mostly on fish, but have been known to consume amphibians, invertebrates, reptiles, mammals, and other birds (Vennesland and Butler 2020). Pelecaniformes may occur in all proposed action areas, except the AK proposed action area. Egrets, ibis, and herons are primarily wading birds and prefer areas of shallow water to hunt, generally living close by (Winkler et al. 2020a). Pelicans inhabit similar environments and capture fish by skimming the surface of the water and plunge diving (in deeper waters) (Winkler et al. 2020a). Representative examples of species that may occur within the proposed action areas include, but are not limited to, the American white pelican (*Pelecanus erythrorhynchos*) and the great blue heron (*Ardea herodias*).

3.4.3.1.1.5 Phaethontiformes

The order Phaethontiformes contains three species of tropicbirds. These species may occur in the NW-ATL, NW-ATL-Florida and the Caribbean, GoMEX, NEPAC-South, and HI-PAC proposed action areas. Tropicbirds inhabit a wide range across tropical waters where they live for the majority of the year, only leaving the ocean to breed and take care of their young on isolated islands. These pelagic birds plunge into the water to catch fish and aquatic invertebrates, such as squid (Winkler et al. 2020b). They can dive from heights of up to 164 ft (50 m) and remain underwater for a few seconds at depths of several meters (Schreiber and Schreiber 2020). Representative species that can be found in the proposed action areas include the white tailed tropicbird (*Phaethon lepturus*), red-billed tropicbird (*Phaethon aethereus*), and the red-tailed tropicbird (*Phaethon rubricauda*).

3.4.3.1.1.6 Procellariformes

Species in the order Procellariformes are highly pelagic species, occur in offshore environments across all proposed action areas, and spend the majority of their lives at sea. Similar to other pelagic seabirds, Procellariformes come ashore only to breed—typically on small, isolated islands. Procellariformes feed on surface-dwelling fish, crustaceans, and squid, occasionally diving to catch them if necessary (Lockley 2017). Representative species that may be found within the proposed action areas include the black footed albatross (*Phoebastria nigripes*), Wilson's storm petrel (*Oceanites oceanicus*), black storm petrel (*Oceanodroma melania*), and the northern fulmar (*Fulmarus glacialis*).

3.4.3.1.1.7 Suliformes

Species from the order Suliformes inhabit primarily aquatic habitats. They may occur throughout all proposed action areas. Species of frigatebirds are highly pelagic, coming ashore only during the breeding season in winter months. Catching their food in flight, frigatebirds feed primarily on fish or squid close to the surface (Diamond and Schreiber 2020). Boobies and gannets also feed on squid and fish, but dive for their prey rather than pluck from the surface (Grace et al. 2020). Cormorants and shags live along the coast and typically do not stray far from shore, feeding on fish, crustaceans, and mollusks (Dorr et al. 2020). Representative species include the magnificent frigatebird (*Fregata magnificens*), masked booby (*Sula dactylatra*), and double-crested cormorant (*Phalacrocorax auritus*).

3.4.3.1.2 ESA-Listed Birds

The USFWS oversees fish and wildlife species (including all bird species) designated as threatened or endangered under the ESA. There are 11 bird species listed as threatened or endangered under the ESA that may occur within various proposed action areas. Table 3-12 summarizes the presence of these species and their critical habitat (Section 3.4.3.1.2) in each proposed action area. Piping plover, western snowy plover, spectacled eider, and Steller's eider have critical habitat that overlaps with the proposed action areas (see Section 3.4.8.1.3 for critical habitat maps).

Table 3-12. ESA-Listed Birds within the Proposed Action Areas

Common Name (Scientific Name)	*Listing Status*	*Distribution*	*Proposed Action Area(s)*	*Critical Habitat within Proposed Action Area(s)*
Band-rumped storm petrel (*Oceanodroma castro*)	Endangered	Highly pelagic species ranging across the Atlantic and Pacific Oceans, nesting on steep coastal cliffs of Hawaiian islands.	HI-PAC	None
California least tern (*Sterna antillarum browni*)	Endangered	Shorebird distributed along the California and Mexican coast and found along beaches and estuaries.	NEPAC-South; NEPA-North	None
Marbled murrelet (*Brachyramphus marmoratus*)	Threatened	Nests in forested areas near the coast; forage close to shore at river mouths, bays and inlets.	NEPAC-South; NEPAC-North	None
Newell's Townsend's shearwater (*Puffinus auricularis newelli*)	Threatened	Highly pelagic tropical bird that breeds on coastal cliffs of Hawaiian islands.	HI-PAC	None
Piping plover (*Charadrius melodus*)	Threatened	Shorebird that inhabits beaches, alkali flats, and sandflats along the Atlantic and Gulf coasts.	NW-ATL; NW-ATL-Florida and the Caribbean; GoMEX	66 FR 36137; July 10, 2001
Red knot (*Calidris canutus rufa*)	Threatened	Prefer sandy coastal habitats at or near tidal inlets or the mouths of bays and estuaries along the Atlantic and Gulf coasts.	NW-ATL; NW-ATL-Florida and the Caribbean; GoMEX	None
Roseate tern (*Sterna dougallii dougallii*)	Endangered – Atlantic coast south to North Carolina Threatened – Florida, Puerto Rico, and Virgin Islands	Nest on nearshore islands, barrier islands, or barrier beaches. Migrate offshore and overwinter on sandbars or beaches at river mouths, estuaries, or ocean front.	NW-ATL; NW-ATL-Florida and the Caribbean	None
Short-tailed albatross (Phoebastria albatrus)	Endangered	Pelagic seabird distributed across most of the North Pacific Ocean, utilizing remote islands to breed.	NEPAC-North; AK; HI-PAC	None
Spectacled eider (*Somateria fischeri*)	Threatened	Pelagic seabird of Alaskan waters.	AK	66 FR 9146; February 6, 2001
Steller's eider (*Polysticta stelleri*)	Threatened	Pelagic seabirds of Alaskan waters that nest on Alaskan tundra near the coast.	AK	66 FR 8850; February 2, 2001

Common Name (Scientific Name)	***Listing Status***	***Distribution***	***Proposed Action Area(s)***	***Critical Habitat within Proposed Action Area(s)***
Western snowy plover (*Charadrius nivosus nivosus*)	Threatened	Shorebird that inhabits beaches and sandy areas along the Pacific coast.	NEPAC-South; NEPAC-North	77 FR 36727; June 19, 2012

3.4.3.1.2.1 Band-Rumped Storm Petrel

The band-rumped storm petrel (*Oceanodroma castro*) is listed as endangered under the ESA (81 FR 67786; September 30, 2016). There is currently no critical habitat designated for the species. They may occur in portions of the HI-PAC proposed action area.

Band-rumped storm petrels prefer warm, deep waters of 3,280 ft (1,000 m) to more than 6,560 ft (2,000 m) in the Hawaiian archipelago. This species occurs close to land where deep water is near islands; otherwise, they occur offshore or in upwelling regions (International Union for the Conservation of Nature 2016a). They prefer waters with temperatures ranging from 80–84 degrees Fahrenheit (°F; 27–29 degrees Celsius [°C]) (International Union for the Conservation of Nature 2016a).

During the breeding season, band-rumped storm petrels nest in areas with steep cliffs and barren lava flows at high elevations in the MHI. Nests are in burrows or crevices in rock or lava (International Union for the Conservation of Nature 2016a; USFWS 2005a) and the breeding season is believed to start in April or May and end in October (Slotterback 2002). During the nesting season, deep water habitats (more than 3,280 ft [1,000 m]) close to shore are typically used for foraging. Fishermen reported sightings of storm petrels mostly at about 3 miles (mi; 4.8 km) off the Nā Pali Coast of Kauai (International Union for the Conservation of Nature 2016a). During the non-breeding season, band-rumped storm petrels are distributed in the Pacific from Japan, east to Central America and northern South America (Slotterback 2002). The Hawaiian population at sea seems to remain in the central Pacific, ranging south to the Equatorial Countercurrent. Some individuals spend most of their time in open ocean, occurring far offshore from nesting islands; others seem to remain close to nesting colonies year-round (USFWS 2005a).

Based on records from the Galapagos Islands, band-rumped storm petrels most likely feed on small fish, squid, and crustaceans (USFWS 2005a). Diet information is not available for Hawaiian birds (USFWS 2005a). Food is captured while sitting on the water or off the surface by bill snatching as the bird gently flies just above the surface of the water (International Union for the Conservation of Nature 2016a). They have been sighted foraging during the day (Lee 1984) and may also forage at night based on stomach samples that reveal prey normally found in deeper water during the day (Slotterback 2002). Foraging occurs mostly in deep water throughout the year (USFWS 2005a).

3.4.3.1.2.2 California Least Tern

The California least tern (*Sterna antillarum browni*) is listed as endangered under the ESA (35 FR 8491; June 2, 1970). No critical habitat has been designated for the species. This species may occur within the NEPAC-North and NEPAC-South proposed action areas.

The California least tern is found along the U.S. Pacific Coast, from San Francisco to Baja California, Mexico. California least terns nest in colonies on open beaches that are mostly free of vegetation. Fall migration south begins in July or August. While the exact migratory route of the California least tern is unknown, they are thought to move south along the California Coast, resting and feeding. They commonly rest on sandy beaches, mudflats, and salt-pond dikes roosting at night on sandy beaches away from nesting areas for several weeks before nesting (Ehrlich et al. 1992; NatureServe 2018; Stiles and Skutch 1989).

California least terns mainly prey upon small fishes (generally less than 4 in [9 cm]) such as anchovy, topsmelt, surf-perch, killifish, and mosquitofish. They forage throughout most of the day, diving from the air into shallow water. Terns forage for prey by flying or hovering 3 to 33 ft (1 to 10 m) above the water, then quickly plunging to the surface. Normally, birds plunge dive then grasp prey with mandibles open, rising well out of the water after capturing prey to manipulate and swallow their food in flight (Burroughs 1966; Thompson et al. 1997). During their breeding season, they forage within a few hundred meters of nearby colonies (NatureServe 2018). Occasionally, they will eat shrimp and other invertebrates, particularly crustaceans, while standing in shallow water (Attwood and Kelly 1984; Carreker 1985).

3.4.3.1.2.3 Marbled Murrelet

The marbled murrelet (*Brachyramphus marmoratus*) is listed as threatened under the ESA (57 FR 45328; October 1, 1992). Designated critical habitat (81 FR 51348; August 4, 2016), is located outside of the proposed action area. Marbled murrelets may occur within the NEPAC-South and NEPAC-North proposed action areas.

Marbled murrelets are distributed along the Pacific Coast from Washington to southern California. Murrelets spend most of their lives in the marine environment. In their terrestrial environment, the presence of platforms (large branches or deformities) used for nesting is the most important characteristic of their nesting habitat. Marbled murrelets generally remain near breeding sites year-round in most areas (U.S. Fish and Wildlife Service 2005). Birds occur closer to shore in exposed coastal areas and farther offshore in protected coastal areas. The highest concentrations are found in protected inshore waters (U.S. Fish and Wildlife Service 2005). They are more commonly found inland during the summer breeding season, but make daily trips to the ocean to gather food and have been detected in forests throughout the year. When not nesting, the birds live at sea, spending their days feeding close to shore and then moving several miles offshore at night.

Marbled murrelets forage on small fish (e.g., sand lance, anchovy, herring, capelin, and smelt) and invertebrates (U.S. Fish and Wildlife Service 2005; USFWS 1997). Foraging habitat usually occurs within 3 mi (5 km) of the coast in waters less than 195 ft (59 m) deep (BirdLife International 2012; Day and Nigro 2000), though they have been documented foraging up to 186 mi (300 km) from shore in waters up to 1,312 ft (400 m) deep (Burger 2002; Piatt and Naslund 1995; Strachan et al. 1995). They are strong swimmers and can dive to depths up to 100 ft (30 m) while foraging, and can stay underwater for an average of 20 to 44 seconds (Strachan et al. 1995; Thoresen 1989). While at sea, marbled murrelets are preyed on by birds and mammals, including peregrine falcons, bald eagles, western gulls (*Larus occidentalis*), and northern fur seals (*Callorhinus ursinus*) (Nelson 1997).

3.4.3.1.2.4 Newell's Townsend's Shearwater

Newell's Townsend's shearwater (*Puffinus auricularis newelli*) is listed as threatened under the ESA (40 FR 44149; September 25, 1975). There is currently no critical habitat designated for the species. Newell's Townsend's shearwater may occur throughout a portion of the HI-PAC proposed action area.

Newell's shearwater nesting is confined to the MHI, from Lehua Island east to Hawaii, including Kaui. There is evidence, but no confirmation of nesting on Oahu, Maui, and Lanai (U.S. Fish and Wildlife Service 2005). During the non-breeding season Newell's shearwater spend most of their time in pelagic habitats (U.S. Fish and Wildlife Service 2005), frequenting tropical and subtropical waters overlying depths much greater than 6,562 ft (2,000 m) and mostly east and south of the Hawaiian Islands (Ainley et al. 1997). Newell's shearwaters show a preference for open ocean habitats with an average sea surface temperature of 80 °F (27 °C), sea surface salinity of 34.5 ppt, and depths of 250 ft (76 m) (Spear et al. 1995). The meteorological conditions favored by Newell's shearwaters are frequent clouds and rain squalls typical of intertropical convergence zones (Spear et al. 1995).

Newell's Townsend's shearwaters forage only over open ocean waters of depths greater than 6,562 ft (2,000 m) (Spear et al. 1995). Even when nesting, they feed over deep waters and are typically within 15 mi (24 km) of island shores (BirdLife International 2016). In particular, they find abundant food along oceanic fronts, such as the Equatorial Countercurrent (Spear et al. 1995). Although diet is not well known, research on these shearwaters foraging habits suggests that squid are a primary source of their diet. Newell's Townsend's shearwaters capture food by pursuit-plunging (diving into water and swimming after prey, typically 33 to 98 ft [10 to 30 m] deep), usually in company with multispecies feeding flocks associated with tuna (BirdLife International 2016).

3.4.3.1.2.5 Piping Plover

The piping plover (*Charadrius melodus*) is divided into two subspecies of plovers, the Atlantic Coast population (*C. m. melodus)* and the Northern Great Plains population (*C. m. circumcinctus)*. The piping plovers that winter on the Gulf Coast are a combination of the two populations/subspecies listed above, and the piping plovers that breed on the Atlantic Coast of the United States and Canada belong only to the Atlantic subspecies (*C. m. melodus*) ((USFWS 2009b). Both subspecies are listed as threatened under the ESA (50 FR 50726; December 11, 1985). Critical habitat (Section 3.4.8.1.3) has been designated for the Great Lakes breeding population (part of the Northern Great Plains population), Northern Great Plains breeding population, and wintering population of piping plovers (both subspecies/populations) (66 FR 36137; July 10, 2001), including areas within the NW-ATL-Florida and the Caribbean (Figure 3-4) and GoMEX proposed action areas (Figure 3-6). Both subspecies occur within the NW-ATL, NW-ATL-Florida and the Caribbean, and GoMEX proposed action areas.

Piping plover migration routes overlap breeding and wintering habitats. Individuals migrate through and winter in coastal areas of the United States from North Carolina to Texas and portions of the Yucatán in Mexico and the Caribbean. Nests are formed in areas with loose sand above the high tide line (USFWS 2020b). Evidence suggests that most of the threatened Northern Plains population winters on the Gulf Coast (Elliot-Smith and Haig 2020). In winter, the species is only found in coastal areas using a wide variety of habitats, including mudflats and dredge spoil areas and, most commonly, sandflats (Gratto-Trevor and Abbott 2011; O'Brien et al. 2006).

Piping plovers forage for food in the intertidal zone typically within 16 ft (5 m) of the water's edge (Elliot-Smith and Haig 2020). Prey items for the piping plover include terrestrial and benthic invertebrates as well as freshwater and marine invertebrates that have washed up on shore.

3.4.3.1.2.6 Red Knot

The red knot (*Calidris canutus*) is divided into three subspecies in North America. Those birds found on the Atlantic Coast of the United States and Canada belong to the subspecies *C. canutus rufa*. This subspecies of red knot is listed as threatened under the ESA (79 FR 73705; December 11, 2014). The other two subspecies of red knot are not listed under the ESA. There is currently no critical habitat designated for this species. This subspecies may occur within the NW-ATL, NW-ATL-Florida and the Caribbean, and GoMEX proposed action areas.

Red knots breed in the high arctic, nesting in tundra and gravel areas near streams, ponds, or the coast. During migration, red knots use marine habitats, preferring sandy areas along inlets, estuaries, and other intertidal areas. Red knots migrate some of the longest distances known for birds, with many individuals annually flying more than 9,321 mi (15,000 km), during which they may cross over the open ocean. Overwintering habitat consists of sandy beaches in the southern United States, as well as salt marshes and other wetland habitats (Baker 2020).

Red knots forage in the intertidal zone in tidal sandflats, mudflats, and beaches following the shoreline. Red knots on non-breeding grounds feed on marine invertebrates. Their preferred prey is small mollusks. Prey commonly found in the red knot diet consists of: mussels and other bivalves, amphipods, horseshoe crab eggs, *Corophium* spp. (Prater 1972), *Emerita* spp. (Harrington et al. 1986; Vooren and Chiaradia 1990), *Acanthohaustorius* spp., and polychaete worms (Baker et al. 2013; Piersma et al. 1994; Prater 1972).

3.4.3.1.2.7 Roseate Tern

The roseate tern (*Sterna dougallii dougallii*) is divided into two populations—one spanning the Atlantic Coast south to North Carolina, and the other in southern Florida. These populations are listed as endangered and threatened, respectively (52 FR 42064; November 2, 1987). There is currently no critical habitat designated for this species. This species may occur within the NW-ATL and NW-ATL-Florida and the Caribbean proposed action areas.

Roseate terns range from Nova Scotia to Florida and the Caribbean. Strictly a coastal species, roseate terns winter in pelagic habitats, nest on beaches, and forage in nearshore surf. Roseate terns are colonial breeders. The North Atlantic populations are known to nest on a limited number of small islands off New York and Massachusetts, while the Caribbean population similarly nests in Puerto Rico, the Dry Tortugas, and the Florida Keys (Nisbet 2020). They nest on islands near or under cover, such as vegetation, rocks, driftwood, and even human-made objects. They have also been documented nesting on sand dunes found at the end of barrier beaches (Blodget 1998). Approximately 3,200 pairs are estimated in the U.S. northeast population, with an additional 250 pairs in Florida (Nisbet 2020).

The roseate tern is a coastal species that forages almost exclusively on small pelagic fish inhabiting sandbars, shoals, and inlets. They hunt by plunge diving, entering the water from heights of up to 39 ft (12 m). Predators of roseate terns include larger birds, crabs, rats, and ants (Nisbet 2020).

3.4.3.1.2.8 Short-Tailed Albatross

The short-tailed albatross (*Phoebastria albatrus*) is listed as endangered under the ESA throughout its range (65 FR 46643; July 31, 2000). Currently, no critical habitat has been designated for this species. Short-tailed albatross may occur within the NEPAC-North, AK, and HI-PAC proposed action areas (International Union for the Conservation of Nature 2016b).

Short-tailed albatross move seasonally around the North Pacific Ocean. The northernmost extent of the range of the short-tailed albatross is the Bering Strait and the southernmost extent of their range, along the coast of North America, is northern California (USFWS 2005b). Occurrence in the Bering Sea of Alaska is common, as short-tailed albatrosses feed along the shelf break and the Aleutian Island chain (USFWS 2005b). Most commonly, these birds are pelagic, occurring at the edges of the basins in the Bering Sea. They tend to concentrate along the edge of the continental shelf and upwelling zones (NatureServe 2004).

During the breeding season, short-tailed albatrosses prefer to nest on isolated, windswept, offshore islands protected from human access (USFWS 2000). Almost all of these birds nest on two uninhabited islands outside of the proposed action areas: Torishima Island (78 percent of breeding pairs) and Minami-Kojima (22 percent of breeding pairs).

Short-tailed albatrosses are surface feeders and scavengers, foraging frequently in sight of land and farther inshore than other North Pacific albatrosses. Short-tailed albatrosses feed at the surface and their diet consists of shrimp, squid, and fish (USFWS 2005b).

3.4.3.1.2.9 Spectacled Eider

The spectacled eider (*Somateria fischeri*) is listed as threatened under the ESA (58 FR 27474; May 10, 1993). Critical habitat (3.4.8.1.3) has been designated in coastal marine areas of Alaska (66 FR 9146; February 6, 2001; Figure 3-9). This species may occur within the AK proposed action area.

Spectacled eiders spend a significant portion of their life in the offshore marine environment off Alaska. They have been recorded up to 128 mi (206 km) offshore (Petersen et al. 1999). In the winter, spectacled eiders congregate in the Bering Sea around polynyas (open leads in the ice) and holes in pack ice or over pelagic habitats with water depths greater than 262 ft (80 m) (Grebmeier and Cooper 1995). They are not restricted to polynyas, however, and may use areas with greater than 60 percent ice coverage (Petersen et al. 1999). They are typically found south of 64 degrees North longitude (° N), north of 61° N, west of 168 degrees West latitude (° W), and east of 175° W. Their core wintering area in most years is restricted to a relatively small area (about 31 by 47 mi [50 by 75 km]) centered at about 62° N 173° W (southwest of Saint Lawrence Island) (Petersen et al. 1995; Petersen et al. 1999). Rarely, individuals or small flocks of spectacled eiders inhabit Izembek Lagoon, Kodiak Island, and Kachemak Bay in the winter, but the vast majority of the population inhabit the Bering Sea (Dau and Kistchinski 1977). During their spring and fall migration periods, spectacled eiders inhabit the offshore regions of the Arctic, Chukchi, and Bering Seas (Petersen et al. 1995; Petersen et al. 1999).

During the breeding season, most spectacled eiders in North America breed in western Alaska at the Yukon-Kuskokwim Delta, from Nelson Island to the Askinuk Mountains, near the Bering Sea. In northern Alaska, they breed in wetlands along the coasts of the Beaufort and Chukchi seas from Demarcation Point to Utqiagvik and from Utqiagvik to Wainwright during the summer months. Spectacled eiders nest on small islands and peninsulas, along the shorelines of ponds, and in dry areas of wet meadows (Anderson et al. 1999; Dau 1976; Kistchinski and Flint 1974; Pearce et al. 1998; Petersen et al. 2000).

Females migrate to molting areas in July if unsuccessful at nesting, or in August/September if successful (Petersen et al. 1999). When migrating between nesting and molting areas, spectacled eiders travel along the coast up to 37 mi (60 km) offshore (Petersen et al. 1999). Molting flocks gather in relatively shallow coastal water, usually less than 118 ft (36 m) deep. Late summer and fall molting areas have been identified in eastern Norton Sound (northern Bering Sea) and Ledyard Bay (eastern Chukchi Sea) in Alaska (U.S. Fish and Wildlife Service 2003). Eiders are particularly vulnerable during the fall molting period, when they are unable to fly for approximately three weeks between June and October (Petersen et al. 1999).

While living inland during the breeding season, spectacled eiders prey upon insects and insect larvae, seeds, and plant materials along the edges and bottoms of freshwater ponds (Kistchinski and Flint 1974; Petersen et al. 2000) by feeding at the surface, upending, dabbling, or diving for their prey (Kistchinski and Flint 1974; Petersen et al. 2000). During the non-breeding seasons, they forage in marine habitats and mostly consume benthic invertebrates in waters greater than 262 ft (80 m) deep (Petersen et al. 1998) by diving for their prey (Petersen et al. 2000).

3.4.3.1.2.10 Steller's Eider

Steller's eider (*Polysticta stelleri*) is listed as threatened under the ESA (62 FR 31748; June 11, 1997). Critical habitat (Section 3.4.8.1.3) is designated off the Alaskan Coast (66 FR 8850; February 2, 2001) and is within the AK proposed action area (Figure 3-9). Steller's eiders may occur within the AK proposed action area.

In the U.S., Steller's eider are mostly described as a nearshore Alaskan species; however, they have been detected over 19 mi (30 km) from shore in Kuskokwim Bay (U.S. Fish and Wildlife Service 2001) and frequently use waters up to 98 ft (30 m) deep in winter, possibly for resting and/or foraging on zooplankton (Martin et al. 2015). Usually, wintering Steller's eiders are found within 0.25 mi (400 m) of shore except where shallows extend farther offshore in bays and lagoons or near reefs (USFWS 2002). As a result, the Kuskokwim Bay portion of the critical habitat extends up to about 25 mi (40 km) seaward.

During their southward fall migration, Steller's eiders inhabit shallow seas near the coast and shallow coastal lagoons (Fredrickson 2001). Most molt in a few lagoons on the north side of the Alaska Peninsula and along the western Alaska Coast (U.S. Fish and Wildlife Service 2011). Some remain in these areas throughout winter, while others disperse to the coastal waters of the eastern Aleutian Islands, southern Alaska Peninsula, Kodiak Archipelago, and southern Cook Inlet, intermixing with the far more abundant (and non-listed) Russian Pacific population. In the spring, Steller's eiders return to their breeding grounds, generally moving east and north in large flocks along the coast, although birds may take shortcuts across Bristol Bay and Kotzebue Sound (Minerals Management Service 2006). They migrate in long lines only a few feet above the water (Alaska Department of Fish and Game 2017b).

In marine environments, Steller's eiders prey upon mollusks, crustaceans, polychaete worms, echinoderms, small fish, gephyrean worms, gastropods, and brachiopods (Bustnes et al. 2000; Petersen 1981). They forage in coastal lagoons and inlets, around reefs, and in marine bays. They are often associated with sea lettuce (*Ulva* spp.), eelgrass (*Zostera* spp.), and brown seaweed (*Fucus* spp.) where small mollusks, gastropods, and crustaceans are abundant (Fredrickson 2001). They typically dive for their prey in water 16 to 33 ft (5 to 10 m) deep (Fredrickson 2001). Steller's eiders spend more time foraging in the winter (76.1 percent) than in the spring (54.5 percent), but they forage mainly in Izembek Lagoon and Cold Bay within the Aleutian Basin during both seasons (Fredrickson 2001).

3.4.3.1.2.11 Western Snowy Plover

The western snowy plover (*Charadrius nivosus nivosus*) is listed as threatened under the ESA (58 FR 12864; March 5, 1993). Critical habitat (Section 3.4.8.1.3) has been designated along the coast of Washington, Oregon, and California (77 FR 36727; June 19, 2012) within the NEPAC-North proposed action area (Figure 3-8). Western snowy plover may occur from Damon Point, Washington south to Bahia Magdelena, Baja California, Mexico (Arcata Fish and Wildlife Office 2017) within the NEPAC-South and NEPAC-North proposed action areas.

Western snowy plovers range along the Pacific Coast from southern Washington to Baja California, Mexico. Western snowy plovers are a partial-migrant species, consisting of a mix of permanent residents and migratory birds, based on individual variation in migratory behavior (Brindock and Colwell 2011). Plovers typically winter and breed in the same habitats, which consist of mostly sandy, ocean-fronting beaches. Western snowy plovers primarily breed above the high tide line on coastal beaches, sand spits, dune-backed beaches, sparsely vegetated dunes, beaches at creek and river mouths, and salt pans at lagoons and estuaries; plovers select open habitats with little vegetation in order to facilitate early predator detection (Patrick and Colwell 2014). Their breeding season typically begins in early March and continues into September (Lafferty 2001b). Winter roosts may consist of 200 to 300 birds, spread over approximately 650 ft (198 m) along upper beach habitat, in depressions, or behind sheltering debris such as driftwood or kelp (Lafferty 2001a).

Western snowy plovers feed by pausing, looking, running, and then seizing prey from the beach surface or tidal flat. They may also probe in the sand at the base of low growing plants above the high tide line (Page et al. 2009). This species typically forages in open, sandy areas above and below high tide, though not while those areas are underwater. Typical prey includes flies, beetles, small clams and crabs, amphipods, seed shrimp, and polychaetes (Page et al. 2009).

3.4.3.2 Environmental Consequences to Birds

Impacts to birds would potentially result from vessel noise (Section 3.4.3.2.1), aircraft noise (Section 3.4.3.2.2), gunnery noise (Section 3.4.3.2.3), vessel movement (Section 3.4.3.2.4), aircraft movement (Section 3.4.3.2.5), and MEM (Section 3.4.3.2.6) associated with the Proposed Action and are discussed in detail in the corresponding sections below. As discussed in Table 3-3, fathometer and Doppler speed log noise and gunnery training are not expected to impact measurable impact birds and have been eliminated from further analysis in this PEIS/POEIS. Continuous noise exposure at levels above 90– 95 dBA re 20 µPa would not be caused by any sources associated with the Proposed Action; therefore, threshold shifts would not be expected as an impact to birds as a result of exposure to acoustic stressors associated with the Proposed Action.

3.4.3.2.1 Vessel Noise

Seabirds and shorebirds could be exposed to in-air noise and diving birds could be exposed to in-water noise generated by the vessels. As discussed in Appendix F, hearing capabilities of birds in-air are between 1 and 3 kHz (Crowell et al. 2015b) and in-water are from 0.5–4 kHz. Potential impacts to birds as a result of vessel noise include masking and behavioral reactions. As discussed in Section 3.2.1.2, small vessel noise (e.g., OTH boat noise) would be expected to range from 1–7 kHz and large vessel (e.g., OPC vessel noise) would be expected to range from 20–300 Hz (Table 2-2). Therefore, birds may be able to detect vessel noise, but would be more likely detect the higher frequencies of the OTH boats when compared to the OPC.

Since most vessel noise is low frequency (less than 1 kHz), it is below the range of best hearing for most birds, both in air and underwater. With a limited ability to detect the sounds of vessels, any impacts to birds would be limited to short term startle responses, which may cause temporary displacement from the location where the vessels are operating, and masking. However, due to the lack of research in this area, it is unknown whether hearing plays a significant role in the life history of birds as researchers are unable to estimate the potential masking effects of vessel noise (Dooling and Popper 2007).

Bird presence would vary depending on vessel location. Underwater exposure to birds from vessel noise would be brief and limited to the area beneath the vessel. Due to the swimming and diving capabilities of birds, underwater impacts from vessel noise would be short-term and temporary as the vessel moves through the proposed action areas. Effects from in-water or in-air vessel noise on seabirds would be limited to short-term startle responses and temporary displacement from the location in which vessels are operating. Due to variable species communication styles, behaviors, and hearing capabilities, researchers are unable to estimate the potential masking effects from vessel noise (Dooling and Popper 2007), but masking could impact a bird’s ability to detect a predator. However, in the offshore area where most proposed action activities and vessel noise would occur, birds have few predators. Although birds would likely be foraging in the proposed action areas, since birds are visual predators, it is assumed that vessel noise would have little to no impact on a seabird’s ability to hunt for prey.

Any increase in ambient noise as a result of an OPC or OTH would be temporary and localized to the position of the vessel as it moves throughout the proposed action areas. Birds are either not likely to respond to vessel noise or are not likely to respond in ways that would significantly disrupt normal behavior patterns which include, but are not limited to, migration, breeding, feeding, or sheltering. Vessel noise associated with the Proposed Action would not alter the physical and biological features (PBFs) essential to the conservation of ESA-listed bird species. Coast Guard would follow SOPs (Appendix C) and would maintain properly trained lookouts and would not purposefully approach large flocks of birds, particularly those that are molting and unable to fly. Vessel noise associated with the Proposed Action may impact individual birds within the proposed action areas; however, because vessel noise is low frequency and located at the edge of the hearing range of most birds, the effects of vessel noise would be expected to be limited to temporary behavioral effects. Birds would be expected to return to normal behavior within minutes of a disruption and thus, vessel noise would not be expected to have any population level impacts.

3.4.3.2.2 Aircraft Noise

Birds in the proposed action areas may be exposed to aircraft noise during the Proposed Action. As discussed in Appendix F, birds hear best in air between 1 and 3 kHz (Crowell et al. 2015a). Helicopter noise ranges from 20 Hz to 5 kHz (Table 2-2) with dominant tones typically below 500 Hz (Richardson et al. 1995). In air, seabirds would have to fly within the narrow cone directly beneath the helicopter (Appendix D) to detect any noise. Average seabird flight altitudes range from 33–130 ft (10–40 m), depending on the species, with most species flying at the lower end of this range (Cook et al. 2012; Day et al. 2005; Krijgsveld et al. 2005). Helicopters would fly at an altitude of 2,000 ft (610m) (COMDTINST M3710.1 (series)). Therefore, seabirds would generally remain well below the typical helicopter flight altitudes associated with the Proposed Action. Higher-altitude migrations by seabirds and shorebirds could occur over parts of the NEPAC-North and AK proposed action areas, but these altitudes are on the order of 0.62 mi (1 km) (Alerstam et al. 2007; Alerstam and Gudmundsson 1999a; Alerstam and Gudmundsson 1999b; Gudmundsson et al. 2002), which would not overlap with typical helicopter altitudes. Takeoffs and landings, which pass through lower altitudes, would mostly occur on land at established facilities or in offshore waters, where there would be less disruption to birds. In addition, for safety reasons, pilots would avoid taking off, landing, or flying into birds.

Helicopters would not hover for prolonged periods over one area. While aircraft noise is within the range of hearing for birds, the source of noise would not be continuous. As a result, potential impacts to birds as a result of in-air aircraft noise would be limited to masking and behavioral reactions.

As described in Appendix D, any helicopter noise that would enter the water would be within a narrow cone directly beneath the helicopter. The sound levels within that narrow cone would be at relatively low levels at the air-water interface and would quickly attenuate with depth or distance away from the cone. Beyond the narrow cone, sound would be expected to either be absorbed by the surface it comes in contact with or refracted off the surface and dissipate. Underwater, noise from an MH-60 or MH-65 helicopter flying at 1,000 ft (305 m) would produce an in-water maximum received level of less than 125 dB re 1 μPa (Richardson et al. 1995). Because diving birds do not spend prolonged periods of time underwater (Hawkins et al. 2000; Heath et al. 2007) and the helicopter noise would neither be prolonged nor intense, the impacts to birds from underwater aircraft noise would be limited to behavioral reactions.

Noise from helicopters may elicit short-term behavioral or physiological responses in exposed birds, such as an alert or startle response, or temporary increases in heart rate. A behavioral response may include the disruption of feeding of birds at or near the water’s surface, or a behavioral disturbance of birds in flight or on land. However, in a Swiss study documenting the reactions of water birds to overflights ranging from 262-1969 ft (80-600 m), birds returned to normal behavior within five minutes of each flight passing overhead and showed no behavioral response to flights above 1,476 ft (450 m) (Komenda-Zehnder et al. 2003). Therefore, with the exception of take offs and landings, in the unlikely event that and aircraft were to cause a behavioral reaction, overflights of aircraft are not expected to cause more than short-term behavioral responses in birds, including those ESA-listed species that may occur within the proposed action areas.

Coast Guard would avoid flights over large gatherings of seabirds and shorebirds, both for the safety of personnel and flight operations and for the protection of these animals. All flight operations would follow the SOPs (Appendix C) and the Coast Guard Air Operations Manual (COMDTINST M3710.1 (series)). Therefore, any behavioral reactions by birds would be limited to a small number of individuals. Repeated exposure of individual birds or groups of birds is also unlikely, based on the SOPs and avoidance measures and variability of flight operations in the proposed action areas. Thus, the general health of individual birds would not be compromised.

Aircraft noise associated with the Proposed Action would not alter the PBFs essential to the conservation of ESA-listed bird species. The long-term effect of the Proposed Action on ESA-listed birds is expected to be negligible because any behavioral response is expected to be temporary and any bird that exhibits a behavioral response would be expected to return to its normal behavior once the aircraft has passed through the area. Birds are either not likely to respond to aircraft noise or are not likely to respond in ways that would significantly disrupt normal behavior patterns which include, but are not limited to: migration, breeding, feeding, or sheltering. Flight paths in the proposed action areas would be planned to avoid critical habitat areas (Section 3.4.8.1.7) and areas where there are known gatherings of birds, such as those used when molting.

3.4.3.2.3 Gunnery Noise

Birds in the proposed action areas may be exposed to gunnery noise during the Proposed Action. In air, bird hearing ranges from 1–3 kHz (Appendix F). Gunnery noise ranges from 150 Hz to 2.5 kHz (Table 2-2). Therefore, the noise from gunnery training may be detected by seabirds that are where this training would occur. Sounds produced by gunnery training—weapons firing (muzzle blast), launch boosters, and projectile travel—are potential stressors to birds. Sound generated by a muzzle blast is intense, but very brief.

Most weapons firing activities would occur far from shore (Section 2.3.5), therefore only those seabirds that forage or migrate greater than 3 nm (6 km) offshore are likely to detect and potentially respond to gunnery noise. Because gunnery training would avoid areas where seabird colonies are located, few, if any, impacts on breeding seabird populations would result from gunnery noise. Some seabirds that commonly follow vessels (e.g., fishing vessels) include certain species of gulls, storm petrels, and albatross (Hamilton 1958; Hyrenbach 2001; Hyrenbach et al. 2006). However, gunnery training would occur away from active fishing. Any other activities in the general area that precede gunnery training, such as vessel movement or target setting, would potentially disperse seabirds away from the area in which gunnery noise would be detected. Gunnery noise may cause seabirds remaining in the area to disperse for the duration of the firing activity (less than 30 minutes).

Seabird responses to gunnery noise may include short-term behavioral or physiological responses such as alert responses, startle responses, or temporary increases in heart rate. However, the duration of active gunnery training is expected to be less than 30 minutes. Therefore, exposure of seabirds to gunnery noise would be brief and temporary. While an individual seabird may be exposed to multiple noises during gunnery training, repeated exposures to individual seabirds over many days is extremely unlikely. Startle or alert reactions to gunnery are not likely to disrupt major behavior patterns, such as migrating, breeding, feeding, and sheltering, or to result in serious injury to any seabirds. Therefore, the impact on seabirds from noise produced by weapons firing would be minor and temporary and would not have any population level impacts. Although unlikely, any impacts to migratory or breeding seabirds related to startle reactions, displacement from a preferred area, or reduced foraging success in offshore waters would likely be short-term and infrequent and would not impact seabird or migratory bird populations.

The ESA-listed California least tern, piping plover, red knot, roseate tern, and western snowy plover are shorebirds and would not be expected in offshore areas where gunnery training would occur. The marbled murrelet is rarely found more than 1.2 mi (2 km) offshore in the waters of the NEPAC-North proposed action area; therefore, they are not expected in areas in which gunnery training would occur. ESA-listed species that may occur in offshore areas include the band-rumped storm petrel, Newell's Townsend's shearwater, short-tailed albatross, spectacled eider, and Steller's eider. Gunnery noise associated with the Proposed Action would not alter the PBFs essential to the conservation of ESA-listed birds or their critical habitats, as they would be avoided as potential locations to conduct gunnery training.

3.4.3.2.4 Vessel Movement

Birds in the proposed action areas may be exposed to vessel movement associated with OPCs and OTHs during the Proposed Action. While it is difficult to differentiate between behavioral responses to vessel sound and visual cues associated with the presence of a vessel (Hazel et al. 2007), vessel noise is outside the range of best hearing of most birds. However, it is assumed that both play a role in prompting reactions from animals. Due to the maneuverability of birds in both air and water, it is extremely unlikely that a bird would be struck by a vessel as it moves through the proposed action areas. Regardless of vessel speeds, vessel collisions with birds are possible, particularly during periods of reduced visibility or reduced mobility of the bird. However, the likelihood of a vessel collision with a bird is extremely low because an OPC would operate farther offshore than where the majority of birds would be expected; an OPC would only operate navigational safety lights at night that would not be expected to attract birds; and during times of reduced visibility, a vessel would likely reduce vessel speeds for navigational safety. Flightless birds, including molting birds, would also be susceptible to a vessel collision; however, OPCs would operate farther offshore than where the majority of molting would be expected to occur. When possible, OPCs would avoid transiting in areas where molting birds would be expected to occur. In the unlikely event that a vessel collided with a bird, an individual impact would not result in population level impacts. Coast Guard's SOPs (Appendix C) would also minimize potential impacts from vessel movement to seabirds.

Vessel presence would be dispersed throughout the proposed action areas. As a result, any response caused by the Proposed Action would be limited to a behavioral disturbance, which would be temporary and localized to the position of the vessel. Behavioral responses of birds to vessels may include changes in general activity (e.g., from resting or feeding to active avoidance), changes in flight patterns, and changes in speed and direction of movement. The most likely response of a bird to any disturbance is flushing from the area; however, birds would be expected to return to normal behavior soon after the disturbance has occurred. Birds are either not likely to respond to vessel movement or are not likely to respond in ways that would significantly disrupt normal behavior patterns which include, but are not limited to, migration, breeding, feeding, or sheltering. Coast Guard would follow SOPs (Appendix B) to maintain properly trained lookouts and would not purposefully approach large flocks of birds, particularly those that are molting and unable to fly.

3.4.3.2.5 Aircraft Movement

Birds in the proposed action areas may be exposed to aircraft movement during the Proposed Action. Potential impacts to birds from aircraft movement would be disturbance, collision, injury, or death. However, as discussed in Section 3.4.3.2.2, birds generally remain well below the typical helicopter flight altitudes (i.e., 2,000 ft (610 m)) associated with the Proposed Action. While it is difficult to differentiate behavioral responses to sound and visual cues associated with the presence of an aircraft, aircraft noise would only increase overall noise for short periods and geographically-limited to the helicopter as it travels along its route to and from the OPC (Table 3-3). However, it is assumed that both play a role in prompting reactions from animals. Seabird responses to disturbance may include short-term behavioral or physiological responses such as alert responses, startle responses, or temporary increases in heart rate. However, helicopters would be transiting through the airspace. Therefore, exposure of seabirds to aircraft movement would be brief and temporary.

Average seabird flight altitudes typically range between 33–130 ft (10–40 m), depending on the species, with most species flying at the lower end of this range (Cook et al. 2012; Day et al. 2005; Krijgsveld et al. 2005). Encounters between birds and aircraft are more likely to occur during aircraft takeoffs and landings than when the aircraft is engaged in level flight. In a study of reported bird strikes from civil aircraft from 1990 to 2005, 60 percent of strikes occurred below 100 ft (31 m) and 74 percent of strikes occurred below 500 ft (150 m) (Cleary et al. 2006). Birds would be most at risk of a strike during takeoff and landing because the helicopter is passing through the lower altitudes where these birds may be found. However, the duration of helicopter takeoffs and landings would be brief because helicopters would spend most of their flight time in transit. Thus, it is unlikely that a large number of birds would be struck during helicopter operations.

Bird strikes are a serious concern for helicopter crews not only because of the risk to the birds, but also because they can harm aircrews and equipment. For this reason, Coast Guard would follow SOPs (Appendix C) and Coast Guard Air Operations Manual (COMDTINST M3710.1 (series)) and avoid large flocks of birds to increase personnel safety and minimize any risk associated with a bird-aircraft strike. Thus, while there is some risk of a collision between aircraft and a bird, due to the measures described in Appendix C and the limited duration of operations (Section 2.3.7) in the typical altitude ranges of seabirds and migratory shorebirds, the risk of a strike is low. Should a collision occur, bird mortality or injuries due to aircraft movement may result, but population level impacts to birds are not expected. Aircraft movement associated with the Proposed Action would not alter the PBFs essential to the conservation of ESA-listed bird species (Table 3-12).

3.4.3.2.6 Military Expended Materials

Birds in the proposed action areas may be exposed to MEM during the Proposed Action. Inert small caliber (0.50 caliber or MK-38 standard [25 mm]) gun rounds, large caliber (57 mm) gun rounds, and the Nulka decoy round used in gunnery training may enter the water as MEM during the Proposed Action and would not be recovered in addition to any non-recoverable targets that would be used. As discussed in Section 3.4.3.2.3, gunnery training would occur far from shore. Therefore, seabirds that forage or migrate greater than 3 nm (6 km) offshore are most likely to overlap with the presence of MEM from gunnery training. Because gunnery training would not occur where seabird colonies are located, no impacts to seabird colony habitat is expected and no large impacts to breeding seabird populations would result from MEM. The potential impact to individual birds from MEM is ingestion, which may result in injury or death.

Physiological harm to birds from ingesting small caliber munitions generally includes blocked digestive tracts and subsequent interruption of food passage, blockage of digestive enzymes, lowered steroid hormone levels, delayed ovulation (egg maturation), reproductive failure, nutrient dilution (nonnutritive debris displaces nutritious food in the gut), and altered appetite satiation (the sensation of feeling full), which can lead to starvation (Azzarello and Vleet 1987). However, while ingestion of marine debris has been linked to bird mortality, non-lethal harm is more common (Moser and Lee 1992). Gunnery training would occur in offshore locations where water depths are deeper than the depths to which most bird species could dive to while foraging. Because of the small numbers of targets and gun rounds, the size of the Nulka decoy round, and due to the distance and depth at which they would be dispersed across the proposed action areas, MEM would not present a significant threat to bird populations.

Gunnery training would not be conducted in nearshore areas where the majority of bird species inhabit, nor near areas where ESA-listed birds would be expected to congregate. Therefore, overlap between nearshore bird species and MEM would be minimal. In addition, MEM associated with the Proposed Action would not alter the PBFs essential to the conservation of ESA-listed bird species (Table 3-12).

3.4.3.2.7 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, any potential impacts to birds would be limited to vessel noise, vessel movement, aircraft noise, aircraft movement, as well as gunnery noise, and MEM associated with gunnery training from the Proposed Action.

Most vessel use associated with the Proposed Action would occur in waters primarily between 12 nm (22 km) from shore and inside 200 nm (370 km) and would be widely distributed throughout the proposed action areas. Vessel use in inshore waters would limited to transit to and from the vessel's homeport. As discussed in Sections 3.4.3.2.1 and 3.4.3.2.4, respectively, the area exposed to noise and disturbance from vessels would be a small portion of the proposed action areas, and only a small number of individuals would be affected compared to overall abundance. Therefore, the impact of vessel movement and vessel noise on birds would be inconsequential and would not result in significant impact or harm to birds.

As discussed in Sections 3.4.3.2.2 and 3.4.3.2.5, respectively, noise and movement resulting from overflights of aircraft are not expected to cause more than short-term behavioral responses in birds, including those ESA-listed species that may occur within the proposed action areas. Additionally, the Coast Guard would follow SOPs (Appendix C) and Coast Guard Air Operations Manual (COMDTINST M3710.1 (series)) and avoid large flocks of birds to increase personnel safety and minimize any risk associated with a bird-aircraft strike. Therefore, the impact of aircraft noise and aircraft movement on birds would be inconsequential and would not result in significant impact or harm to birds.

Most weapons firing activities would occur far from shore (Section 2.3.5), and as discussed in Section 3.4.3.2.3, those seabirds that forage or migrate greater than 3 nm (6 km) offshore are likely to detect and potentially respond to gunnery noise. Additionally, as discussed in Section 3.4.3.2.6, because of the small numbers of targets and gun rounds, and due to the distance and depth at which they would be dispersed across the proposed action areas, MEM would not present a significant threat to bird populations. Because gunnery training would avoid areas where seabird colonies are located, impacts on breeding seabird populations would not result from gunnery noise or MEM associated with gunnery training.

Under Alternative 1, any potential impacts to birds from the Proposed Action would be limited to vessel noise, vessel movement, aircraft noise, aircraft movement, gunnery noise, and MEM and would not result in significant impact or harm to birds. Pursuant to the ESA, Alternative 1, vessel noise, aircraft noise, gunnery noise, vessel movement, aircraft movement, and MEM, may affect, but is not likely to adversely affect the ESA-listed birds in the proposed action areas (Table 3-12). Additionally, Alternative 1 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed birds (Section 3.4.8.1.3). Pursuant to the Migratory Bird Treaty Act (MBTA), Alternative 1 would not result in a significant adverse effect on migratory bird populations.

3.4.3.2.8 Impacts Under Alternatives 2–3

Under Alternatives 2–3, any potential impacts to birds would be similar to those discussed for activities under Alternative 1. There could be a potential reduction in the number of vessels conducting the Coast Guard's mission in the proposed action areas. However, the difference would not result in substantive changes to the potential for or types of, impacts to birds. Therefore, there would be no significant impact or harm to birds under Alternatives 2–3.

As discussed in Section 3.4.3.2.7, pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect the ESA-listed birds (Table 3-12). Additionally, the Alternative 2–3 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed birds (Section 3.4.8.1.3).Pursuant to the MBTA, Alternatives 2–3 would not result in a significant adverse effect on migratory bird populations.

3.4.3.2.9 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, the physical and acoustic disturbances associated with the Proposed Action would not be introduced into the marine environment, with the exception of OPCs 1–5. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impact or harm to birds with implementation of the No Action Alternative.

3.4.4 Marine Fish

3.4.4.1 Affected Environment

Fish are not distributed evenly throughout the proposed action areas; rather, they are closely associated with particular habitats. Many factors affect the abundance and distribution of fish; however, the primary driving factors include temperature, salinity, pH, physical habitat, ocean currents, latitudinal gradients, and fish life stage (Helfman et al. 2009; Nelson et al. 2016). A species' mobility at various life stages (e.g., pelagic larvae versus demersal adult) also affects distribution (Bowen and Avise 1990). In general, coastal ecosystems support a greater diversity of fish species, and the open ocean and freshwater areas support a lower diversity and biomass of fish species (Nelson et al. 2016).

OPCs would transit to and from ports and homeports to operational areas. For the purposes of analysis in this PEIS/POEIS, the transit area is defined as from the coastline to 12 nm (22 km) from shore and the operational area is defined as waters beyond 12 nm (22 km) from shore. During transit, OPCs would mainly be travelling out to areas where OPC missions and training (Table 2-1) would be conducted. Navigational systems would be used as the OPC would be underway. For the purposes of analyzing marine fish, the focus on of the analysis is on those that overlap with the operational area.

3.4.4.1.1 Major Groups of Marine Fish

Fish within the proposed action areas can be broadly categorized into three groups based on distance from shore (e.g., offshore, coastal marine, estuarine/brackish), and by distribution at depths within the water column (e.g., pelagic, demersal), and their association with particular habitats (e.g., reefs, seagrass, saltmarsh). While the distribution of each species is unique, the general trend among fish species is for larvae and juveniles to occur nearshore where shallow coastal waters and complex environments serve as protective nurseries (Bowen and Avise 1990; Rowe and Kennicutt 2009). Therefore, adult fish species are also expected to occur in these environments, but for a limited time compared to larvae and juveniles. There are exceptions to this trend, such as ratfish, which deposit their eggs offshore, and halosaurids, whose larvae have been recovered from depths over 3,281 ft (1,000 m) (McEachran and Fechhelm 1998).

The fish communities within the proposed action areas are diverse and variable, as would be expected given the diversity of climates and habitats where the OPCs would operate. A brief survey of the various fish communities is provided below. Table G- 5 in Appendix G lists major groups of marine fish whose range overlaps with the proposed action areas and the rationale for why they were not considered further in this PEIS and thus, are not discussed further in this PEIS/POEIS.

Table 3-13 lists major fish groups that would be expected to occur in the proposed action areas. Representative species or groups have the potential to occur within the proposed action areas, however, individual species, with the exception of ESA-listed species, are not evaluated. Although some groups contain species which spend all or part of their lives in freshwater, these freshwater habitats do not generally overlap with the proposed action areas and potential impacts to those freshwater species were not evaluated in this PEIS/POEIS.

Table 3-13. Major Groups of Fish Present in the Proposed Action Areas

Taxonomic Order	*Representative Species or Groups*	*Water Column and Marine or Fresh Water Distribution*	*Preferred Habitat*
Sharks			
Carcharhiniformes	Ground sharks: Scalloped hammerhead shark	All portions of water column and seafloor; predominantly marine, some occasionally enter fresh water.	Most species spend at least some time on the bottom and may occur along sandy, muddy, or rocky bottom.
Heterodontiformes	Horn shark	Demersal (living close to the bottom); marine.	Small, nocturnal, coastal sharks common in California. Prefer complex habitats such as outcroppings, kelp, and reefs.
Hexanchiformes	Sharpnose sevengill shark, bluntnose sixgill shark	Demersal; marine.	Typically found along the outer continental shelf and slope that occasionally travel into coastal waters.
Lamniformes	Bigeye thresher shark, shortfin mako	Pelagic (living in the upper layer of the open ocean), some demersal; marine and estuarine.	Most species are strong, pelagic hunters. May occur in coastal or open ocean waters.
Orectolobiformes	Nurse shark, whale shark	Pelagic (whale sharks) and demersal (nurse sharks); marine.	Found from continental shelf to open ocean. Some species (e.g. Nurse shark, *Ginglymostoma cirratum*) prefer coral reefs or rocky or sandy bottom.
Squaliformes	Spiny dogfish, bramble shark	Demersal; predominantly marine, some estuarine.	Small; occur along the continental shelf and slope, some deep water species.
Squatiniformes	Atlantic angel shark	Demersal; marine.	Prefers to burrow in soft sediment of the continental shelf and slope

Taxonomic Order	***Representative Species or Groups***	***Water Column and Marine or Fresh Water Distribution***	***Preferred Habitat***
Skates and Rays			
Myliobatiformes	Roughtail stingrays, cownose rays	Pelagic and demersal; marine and estuarine, occasionally in fresh water.	Although some species are pelagic and others demersal, all species feed along the bottom. Occur on the continental shelf and in offshore waters.
Pristiformes	Sawfish	Demersal; all salinities.	Coastal shark-like rays that use their narrow saw-like rostrum to capture benthic prey. All species are endangered.
Rajiformes	Spinose skate, leaf-nose leg skate	Demersal; marine and estuarine.	Found along the outer continental shelf and slope, but prefer deep waters.
Torpediniformes	Electric ray, Brazilian electric ray	Demersal; marine.	Prefer to burrow in soft sediment for at least one life stage. Occur on the continental shelf and slope.
Epipelagic Bony Fish			
Atheriniformes	Silversides	Pelagic or epipelagic (living within the photic zone). Predominantly marine, few freshwater species.	Coastal pelagic planktivores common in temperate and tropical waters worldwide.
Beloniformes	Needlefish, flying fish	Pelagic, eggs are demersal; marine and estuarine.	Most species inhabit warmer coastal waters; however, flying fish species are common offshore.
Elopiformes	Tarpon, ladyfish	Pelagic, marine.	Primarily coastal; however, some may spawn offshore (e.g., ladyfish [*Elops saurus*].
Gonorynchiformes	Milkfish (Chanos chanos)	Pelagic; marine and estuarine.	The milkfish is the only species. Common in tropical coastal waters of the Pacific.
Mugiliformes	Mullets, smelts	Pelagic; all salinities.	Cosmopolitan schooling fish that typically remain in coastal areas. May spawn offshore.
Demersal Bony Fish			
Acipenseriformes	Sturgeon, paddlefish	Demersal; all salinities.	Some species occur exclusively in fresh water, others coastal marine and/or anadromous (migrate from the ocean to river to spawn).
Albuliformes	Bonefishes	Demersal; marine and estuarine.	Coastal tropical and subtropical species common in mangroves and sandy flats.
Anguilliformes	Cutthroat eel, moray eel, American eel	Demersal; all salinities.	Some species are catadromous (migrate from the river to ocean to spawn). Moray eels are marine and are often associated with reefs.

Taxonomic Order	*Representative Species or Groups*	*Water Column and Marine or Fresh Water Distribution*	*Preferred Habitat*
Batrachoidiformes	Toadfishes	Demersal; marine.	Prefer sandy or muddy bottom or coral reef habitat on the continental shelf.
Beryciformes	Squirrelfish, soldierfish, orange roughy	Demersal; marine.	Many species common on reefs and rocky outcrops. A few pelagic species are in deeper waters.
Gobiesociformes	Clingfishes	Demersal; predominantly marine, occasionally brackish or fresh water.	Generally small, slim coastal fishes associated with complex demersal habitats (reefs, seagrass). Restricted to the Gulf of Mexico.
Lophiiformes	Batfishes, frogfishes	Primarily demersal; marine.	Batfishes prefer mud or sand bottoms of the continental shelf and slope.
Myxiniformes	Hagfish	Primarily demersal; marine.	May occur along the continental shelf, but more common in deep waters.
Ophidiiformes	Cusk-eels, pearlfish, brotulas	Demersal; predominantly marine, some species limited to fresh water.	May inhabit invertebrate hosts, including bivalves, holothurians, and asteroids. Occur from the continental shelf to the abyssal plain.
Pleuronectiformes	Gulf stream flounder, deepwater dab	Demersal (adult), pelagic (juvenile); mostly marine/estuarine, some fresh water.	Adults prefer soft-bottom habitats in estuaries and along the continental shelf and slope.
Polymixiiformes	Beardfish	Demersal; marine.	Prefers soft-bottom habitats of the continental shelf and slope.
Scorpaeniformes	Searobins, sculpins, scorpionfish	Demersal; predominantly marine, a few freshwater species.	Prefer soft sand and mud bottoms, although some species are associated with coral or rocky reefs. Occur along the continental shelf and slope.
Cosmopolitan Bony Fish			
Aulopiformes	Barracudinas, greeneyes, lizardfishes	All portions of water column and seafloor; marine and estuarine.	Demersal species prefer mud and clay bottoms. Coastal marine and estuarine out to continental slope.
Gadiformes	Grenadiers, hake, cod	Primarily demersal, some pelagic; marine.	Some species prefer soft-bottom, while others are abundant on banks and reefs. Coastal to continental slope.
Gasterosteiformes	Sticklebacks, tube snouts	Found throughout the water column; marine, brackish, and fresh water.	Found in diverse coastal marine and freshwater environments. Small and varied body forms. Males tend eggs.

Taxonomic Order	***Representative Species or Groups***	***Water Column and Marine or Fresh Water Distribution***	***Preferred Habitat***
Perciformes	Tuna, snapper, bass	All portions of water column and seafloor; all salinities.	The most diverse and largest order of bony fish. Contains species of varied shape and size found in all freshwater and marine waters of the world.
Syngnathiformes	Seahorses, pipefish	All portions of water column. Marine and coastal estuarine.	Most common in tropical and subtropical coastal waters. Many species are habitat-associated.
Tetraodontiformes	Filefish, trunkfish, ocean sunfish	Primarily pelagic, some offshore species benthic (living on or in the bottom sediment). Primarily marine, but some freshwater species.	Widespread, but commonly associated with reefs and rocky habitats, including offshore reefs.
Anadromous and Catadromous Bony Fish			
Clupeiformes	Alewife, Pacific sardine	Pelagic; marine and freshwater.	Schooling fish found along the continental shelf. Some anadromous species.
Osmeriformes	Eulachon, smelt	All portions of the water column; most species anadromous.	Common, small, silvery schooling fish abundant throughout coastal rivers, estuaries, and nearshore pelagic environments worldwide.
Salmoniformes	Salmon, trout	All portions of water column; all salinities.	Some species anadromous, some species freshwater or landlocked populations of anadromous species. Marine species more common in Pacific.
Estuarine and Brackish Bony Fish			
Characiformes	Piranhas, tetras	All portions of water column; primarily freshwater, some species brackish or marine.	Abundant in freshwater lakes and rivers. Most common in tropical and subtropical waters.
Cypriniformes	Carps, minnows	All portions of water column and seafloor; fresh and brackish water, occasionally marine.	Predominantly fresh and brackish species found in lakes, backwaters, and marshes. Many are detrivores (feed on detritus).
Cyprinodontiformes	Killifish, topminnows	All portions of water column and seafloor; all salinities.	Abundant forage fish species. Very common in brackish environments and shallow coastal waters.
Siluriformes	Catfish	Demersal; predominantly freshwater, occasionally brackish/estuarine.	Most species found in freshwater river systems. Benthic predators or detritvores. Some species can move into estuarine or coastal marine waters.

Taxonomic Order	***Representative Species or Groups***	***Water Column and Marine or Fresh Water Distribution***	***Preferred Habitat***
Jawless Fish			
Myxiniformes	Hagfish	Primarily demersal; marine.	May occur along the continental shelf, but more common in deep waters.
Petromyzontiformes	Lampreys	Demersal; all salinities.	Some species are catatromous, others are strictly freshwater. Roughly half are parasitic.

Table Sources: (Compagno 1984b; FishBase 2019; McEachran and Fechhelm 1998, 2005; Nelson et al. 2016)

3.4.4.1.1.1 Offshore Marine Fish Communities

For the purpose of this analysis, offshore marine fish communities are generally defined as those who predominantly inhabit the waters extending beyond the continental shelf, continental slope, and the ocean basins. The pelagic fish communities of the continental shelf typically fall into two categories: (1) large, predatory species (e.g., tunas, mackerels, and coastal sharks); and (2) smaller, omnivorous and herbivorous species that are prey for larger fish, as well as birds and marine mammals (e.g., herrings, mullets, silversides) (Collette and Klein-MacPhee 2002; Moyle and Cech Jr 2004; U.S. Bureau of Ocean Energy Management Gulf of Mexico OCS Region 2017). The latter group is more likely to be dependent upon the coastal environment and, thus, most likely to be abundant in large numbers within the transiting areas (specifically within 3 nm of shore) of the proposed action areas. The former group is more broadly distributed and could be encountered regularly throughout the proposed action areas (Nelson et al. 2016; U.S. Bureau of Ocean Energy Management Gulf of Mexico OCS Region 2017).

In the open ocean portions of the proposed action areas, pelagic fish occur throughout the water column, and temperature, salinity, turbidity, and other physical characteristics generally dictate species distribution (Froese and Pauly 2019; Helfman et al. 2009; U.S. Bureau of Ocean Energy Management Gulf of Mexico OCS Region 2017). Distribution of epipelagic species (those inhabiting the upper 492 ft [150 m] of the water column) are also heavily influenced by the presence of physical features such as eddies and currents; geologic features such as canyons, banks, and seamounts; and biological features such as drifting mats of *Sargassum* spp. seaweed or plankton blooms (Froese and Pauly 2019; Nelson et al. 2016). Some pelagic species inhabit deeper water during the day, avoiding predators, and migrate to the surface at night to feed on plankton, a process known as diel vertical migration.

U.S. coastal waters are also home to a large variety of demersal fish, many of which, such as cod, haddock, pollock, and rockfish, are commercially important (Froese 2019; Froese and Pauly 2019; NMFS 2018c). These fish are typically opportunistic feeders, preying on a wide variety of available sources of food on the seafloor and in the water column (Helfman et al. 2009; U.S. Bureau of Ocean Energy Management Gulf of Mexico OCS Region 2017).

Some pelagic species have wider ranges and are commonly referred to as highly migratory fishes. Examples of these species include billfishes (marlins and sailfish), Atlantic swordfish (*Xiphias gladius*), members of the mackerel family (e.g., Atlantic albacore tuna [*Thunnus alalunga*] and Atlantic bluefin tuna [*Thunnus thynnus*]), as well as many shark species (e.g., basking shark [*Cetorhinus maximus*], and sand tiger shark [*Carcharias taurus*]). These species transit through both broad geographical ranges and throughout the water column. Although they are present throughout the offshore portions of the proposed action areas, they are rarely present at a high density, and thus, would only occasionally be encountered (Froese and Pauly 2019; Nelson et al. 2016).

Most species have a pelagic larval stage, even if the adults are demersal (Froese and Pauly 2019; McEachran and Fechhelm 2005). Until larvae develop sufficiently to control their mobility, their distribution is entirely influenced by the local currents, resulting in larvae often entering into estuaries or concentrating at the frontal boundaries of these currents (U.S. Bureau of Ocean Energy Management Gulf of Mexico OCS Region 2017; U.S. Department of the Navy 2007). Floating seaweeds such as kelp or *Sargassum* (Section 3.4.1) also provide nursery habitat for these early life stages (U.S. Bureau of Ocean Energy Management Gulf of Mexico OCS Region 2017).

3.4.4.1.1.2 Nearshore Marine Fish Communities

Both rocky substrate and coral reefs (Section 3.4.2) provide important nearshore habitat and can form the base of unique ecosystems where they occur within the proposed action areas. Reefs provide important nursery habitat for larval and juvenile fish, which in turn support a large and diverse food web of fish and invertebrates (Gulf of Mexico Fishery Management Council 1981; Page and Burr 2011; Paxton and Eschmeyer 1998; Williams et al. 2010). Over 300 species of reef-dependent fish have been identified within the Gulf of Mexico, (U.S. Department of the Navy 2007) and rocky reefs of the Atlantic and Pacific Oceans also support high diversity (Collette and Klein-MacPhee 2002; Nelson et al. 2016; Williams et al. 2010). Common commercially-exploited fish groups associated with reefs include snappers, groupers, and grunts, as well as smaller omnivorous or herbivorous groups such as wrasses, gobies, and damselfish (Ajemian et al. 2015; Moyle and Cech Jr 2004; Page and Burr 2011). Pelagic species may also be present on reefs, including jacks, runners, and schools of forage fish (Ajemian et al. 2015; Cross and Allen 1993).

Estuaries and the coastal habitats therein (e.g., saltmarshes, mangroves, seagrass beds) also support a tremendous abundance of fish species and are largely influenced by the timing and magnitude of tides and freshwater inflows (Armor and Herrgesell 1985; Helfman 2009; Leidy 1999; McEachran and Fechhelm 1998). A wide variety of life stages and strategies are common in estuarine waters, from pelagic planktivores such as anchovy and herring; to bottomfish that prefer sandy or muddy bottoms, such as flounders, skates, and goatfish; to habitat-associated fish such as wrasses, rockfish, and many sea bass species (Miller and Lea 1972; Nelson et al. 2016; Paxton and Eschmeyer 1998).

Large numbers of fish also move through these shallow, nearshore waters each year. Many of these migrants are saltwater species that are dependent on shallow estuarine and wetland habitat in their juvenile phases. Migrants include diverse species assemblage such as the California halibut (*Paralichthys californicus*), black seabass (*Centropristis striata*), croaker (*Genyonemus lineatus* in the Pacific and *Cynoscion regalis* in the Atlantic), and northern anchovy (*Engraulis mordax*) (Allen et al. 2006; Collette and Klein-MacPhee 2002; USFWS 2011). Several species of commercially and ecologically important anadromous fish travel from the ocean, through estuaries and their associated habitats, to freshwater spawning streams. Examples of these species include Chinook salmon (*Oncorhynchus tshawytscha*), steelhead trout (*Oncorhynchus mykiss*), green sturgeon (*Acipenser medirostris*), longfin smelt (*Spirinchus thaleichthys*), American shad (*Alosa sapidissima*), and striped bass (*Morone saxatilis*).

The total number of fish species present in a given coastal area is variable, but consistently high (Koslow et al. 2015; Miller and Lea 1972; Roedel 1953). For example, Cross and Allen (1993) report approximately 480 species of marine fish inhabit the Southern California Bight (within the NEPAC-South proposed action area), while Collette and Klein MacPhee (2002) catalog roughly 252 species in the Gulf of Maine (within the NW-ATL proposed action area). In large part, this high diversity is because numerous fish species utilize nearshore coastal habitats such as bays and estuaries, as well as the associated marshes, kelp forests, seagrass beds, and mangroves as spawning, nursery, feeding, and seasonal grounds (Allen et al. 2006; Horn and Allen 1978; Koslow et al. 2015; Miller and Lea 1972; Roedel 1953).

Feeding strategies among nearshore fish species are highly variable. Fish may actively hunt, ambush hunt, lure prey with modified body parts, feign death, scavenge, or filter feed (Helfman et al. 2009). The variety of food sources is equally diverse, including fish, invertebrates, phytoplankton, feces and detritus, eggs of fish and invertebrates, amongst others (Helfman et al. 2009). Planktonic larvae typically feed upon phytoplankton or zooplankton until they are large enough to consume larger prey (Hintz et al. 2017; Wang 2010). Reef fishes commonly prey upon invertebrates on the reef, such as shrimp, crabs, amphipods, octopus, and squid. Larger fish are typically more piscivorous than smaller fish (Allen et al. 2006; Gulf of Mexico Fishery Management Council 1981; Helfman 2009).

3.4.4.1.2 ESA-Listed Marine Fish

A general description of habitat preference and life history of all ESA-listed species that may occur within the proposed action areas are provided in this section. In some cases, individual fish from ESA-listed stocks (such as those from a particular run or region) can intermingle with non-listed individuals from the same species. Table 3-14 details the distribution of ESA-listed fish species within the proposed action areas.

Table 3-14. Distribution of ESA-Listed Marine Fish in the Proposed Action Areas

Common Name (Scientific name)	*Likelihood[1] of Occurrence While OPC is in Transit[2] and/or Conducting Operations[3] in the Proposed Action Areas*						
	NW-ATL	*NW-ATL-Florida and the Caribbean*	*GoMEX*	*NEPAC-South*	*NEPAC-North*	*AK*	*HI-PAC*
Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)	T: Present	-	-	-	-	-	-
Bocaccio (*Sebastes paucispinis*)	-	-	-	Not ESA-listed	T: Present; O: Potentially	Not ESA-listed	-
Chinook salmon (*Oncorhynchus tshawytscha*)	-	-	-	-	T: Present	T: Present	-
Chum salmon (*Oncorhynchus keta*)	-	-	-	-	T: Present; O: Present	T: Present; O: Present	-
Coho salmon (*Oncorhynchus kisutch*)	-	-	-	-	T: Present; O: Present	T: Present; O: Present	-
Eulachon (*Thaleichthys pacificus*)	-	-	-	-	T: Present; O: Present	T: Present; O: Present	-
Giant manta ray (*Manta birostris*)	T: Present; O: Present	T: Present; O: Present	T: Present; O: Present	T: Present; O: Present	T: Present; O: Present	T: Present; O: Present	T: Present; O: Present
Green sturgeon (*Acipenser medirostris*)	-	-	-	T: Present	T: Present	T: Present	-
Gulf sturgeon (*Acipenser oxyrinchus desotoi*)	-	-	T: Present	-	-	-	-
Largetooth sawfish (*Pristis pristis*)	-	T: Potentially	T: Potentially	-	-	-	T: Potentially
Nassau grouper (*Epinephelus striatus*)	-	T: Present	T: Present	-	-	-	-
Oceanic whitetip shark (*Carcharhinus longimanus*)	-	O: Present	O: Present	-	-	-	-
Scalloped hammerhead shark (*Sphyrna lewini*)	Not ESA-listed	T: Likely; O: Likely	-	T: Present; O: Present	T: Potentially; O: Potentially	-	Not ESA-listed
Shortnose sturgeon (*Acipenser brevirostrum*)	T: Potentially	T: Potentially	-	-	-	-	-
Smalltooth sawfish (*Pristis pectinata*)	T: Potentially	T: Present	T: Present	-	-	-	-

Common Name (Scientific name)	*Likelihood[1] of Occurrence While OPC is in Transit[2] and/or Conducting Operations[3] in the Proposed Action Areas*						
	NW-ATL	***NW-ATL-Florida and the Caribbean***	***GoMEX***	***NEPAC-South***	***NEPAC-North***	***AK***	***HI-PAC***
Sockeye salmon (*Oncorhynchus nerka*)	-	-	-	-	T: Present; O: Present	T: Present; O: Present	-
Steelhead trout (*Oncorhynchus mykiss*)	-	-	-	T: Potentially	T: Present; O: Potentially	T: Present; O: Potentially	-
Yelloweye rockfish (*Sebastes ruberrimus*)	-	-	-	Not ESA-listed	T: Present; O: Potentially	Not ESA-listed	-

* "Not Present" means occurrence is unlikely based on current distribution information and is shown in the table with a dash and gray cell.
[1] The likelihood of occurrence is designated as "Not Present," "Rare," "Potentially," or "Present" based on species-specific literature research from NOAA stock assessment reports. "Rare" means occurrences have been documented but are extremely rare or extralimital. "Potentially" means the species may occur or there is casual occurrence history, and "Present" means there is a strong possibility of occurrence in the proposed action area.
[2] Transit Area (T): coastline to 12 nm from shore.
[3] Operational Area (O): greater than 12 nm from shore.

Table 3-15 summarizes the presence of these species (including the distinct population segment [DPS] or evolutionary significant unit [ESU] if there is one) and their critical habitat in each proposed action area. Any proposed action area where ESA-listed individuals may occur is included in Table 3-15, even if individuals from listed stocks would be substantially outnumbered by individuals from non-listed stocks (e.g., most Pacific salmon species in Alaska). Where the species exists but all individuals present would be expected to belong to non-listed stocks (e.g., scalloped hammerhead sharks [*Sphyrna lewini*] in Hawaii), that proposed action area is not included. In this section, "transit area" refers to the OPC transiting to and from port to 12 nm on its way to the operational area beyond 12 nm.

Table 3-15. ESA-Listed Marine Fish within the Proposed Action Areas

Common Name (Scientific Name)	*DPS or ESU: ESA-Listing Status*	*Distribution*	*Critical Habitat within Proposed Action Area(s)*
Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)	Carolina DPS: Endangered	the western Atlantic along the East Coast from New Brunswick, Canada to Florida	None
	Chesapeake Bay DPS: Endangered		None
	Maine DPS: Threatened		None
	New York Bight DPS: Endangered		None
	South Atlantic DPS: Endangered		None
Bocaccio (*Sebastes paucispinis*)	Puget Sound/Georgia Basin: Endangered	from the Gulf of Alaska (off Krozoff and Kodiak Islands) to Punta Blanca, Baja California, Mexico	79 FR 68041; November 13, 2014
Chinook salmon (*Oncorhynchus tshawytscha*)	California Coastal ESU: Threatened	from the Chukchi Sea, Alaska to Monterey Bay, California	None
	Central Valley Spring Run ESU: Threatened		None
	Lower Columbia River ESU: Threatened		None
	Puget Sound ESU: Threatened		None
	Sacramento River Winter Run ESU: Endangered		None
	Snake River Fall Run ESU: Threatened		None
	Snake River Spring/Summer Run ESU: Threatened		None
	Upper Columbia River Spring Run ESU: Endangered		None
	Upper Willamette River ESU: Threatened		None
Chum salmon (*Oncorhynchus keta*)	Columbia River ESU: Threatened	from the Arctic Coast of Canada, to off the coast of Alaska, as far south as Yaquina Bay, Oregon	None
	Hood Canal Summer Run ESU: Threatened		None

Common Name (Scientific Name)	***DPS or ESU: ESA-Listing Status***	***Distribution***	***Critical Habitat within Proposed Action Area(s)***
Coho salmon (*Oncorhynchus kisutch*)	Lower Columbia River ESU: Threatened	In the northeast Pacific, from Point Hope, Alaska to Mexico	None
	Oregon Coast ESU: Threatened		None
	Southern Oregon & Northern California Coast ESU: Threatened		None
	Central California Coast ESU: Endangered		None
Eulachon (*Thaleichthys pacificus*)	Southern DPS: Threatened	from the Bering Sea to northern California	76 FR 65324; October 20, 2011
Giant manta ray (*Manta birostris*)	Threatened	between 40 °N and 40 °S latitude; as far north as southern California on the Pacific Coast and as far north as New Jersey on the Atlantic Coast	None
Green sturgeon (*Acipenser medirostris*)	Southern DPS: Threatened	most common from southeast Alaska to Point Conception, California	74 FR 52300; October 9, 2009
Gulf sturgeon (*Acipenser oxyrinchus desotoi*)	Threatened	in the Gulf of Mexico from Florida to Louisiana	68 FR 13356; April 18, 2003
Largetooth sawfish (*Pristis pristis*)	Endangered	historically in the Gulf of Mexico, mainly along the Texas Coast and east into the waters of Florida, but may be extinct in U.S. waters; in coastal waters of Pacific islands	None
Nassau grouper (*Epinephelus striatus*)	Threatened	waters from Bermuda, the Bahamas, Florida, and throughout the Caribbean Sea	None
Oceanic whitetip shark (*Carcharhinus longimanus*)	Threatened	between 30 °N and 35 °S latitude; from Maine to Argentina in the Atlantic and throughout the Pacific and Gulf of Mexico	None
Scalloped hammerhead shark (*Sphyrna lewini*)	Central & Southwest Atlantic DPS: Threatened	from New Jersey to Brazil in the Atlantic and from southern California to Peru in the Pacific, as well as throughout the Pacific Islands (not all ESA-listed)	None
	Eastern Pacific DPS: Endangered		None
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	along eastern North America from New Brunswick, Canada to the Saint Johns River, Florida	None
Smalltooth sawfish (*Pristis pectinata*)	Endangered	off the southwest coast of Florida from Charlotte Harbor to coastal areas of the Gulf of Mexico	74 FR 45353; October 02, 2009

Common Name (Scientific Name)	***DPS or ESU: ESA-Listing Status***	***Distribution***	***Critical Habitat within Proposed Action Area(s)***
Sockeye salmon (*Oncorhynchus nerka*)	Snake River ESU: Endangered	from the Beaufort Sea to coastal Oregon	None
	Ozette Lake ESU: Threatened		None
Steelhead trout (*Oncorhynchus mykiss*)	Central California Coast DPS: Threatened	from the Aleutian Islands to southern California	70 FR 52630; September 2, 2005
	Lower Columbia River DPS: Threatened		None
	Middle Columbia River Experimental Population: Threatened		None
	Northern California, California Central Valley DPS: Threatened		None
	Puget Sound DPS: Threatened		None
	Snake River Basin DPS: Threatened		None
	South-Central California Coast DPS: Threatened		None
	Southern California DPS: Endangered		None
	Upper Columbia River DPS: Threatened		None
	Upper Willamette River DPS: Threatened		None
Yelloweye rockfish (*Sebastes ruberrimus*)	Puget Sound/Georgia Basin: Threatened	from Prince William Sound, Alaska to Ensenada, Mexico	79 FR 68042; November 13, 2014

3.4.4.1.2.1 Atlantic Sturgeon

Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) are grouped into five distinct population segments (DPSs) that are listed as endangered or threatened under the ESA (77 FR 5880; February 6, 2012 and 77 FR 5914; February 6, 2012). Atlantic sturgeon are co-managed by the Atlantic States Marine Fisheries Commission and NMFS. Critical habitat is designated (82 FR 39160; August 17, 2017), but does not overlap with any of the proposed action areas. Atlantic sturgeon may occur in transit areas in the NW-ATL proposed action area.

Atlantic sturgeon are well-studied during their juvenile and spawning life phases in riverine environments, but their subadult and adult estuarine and marine phases are less understood. The Atlantic sturgeon is an anadromous fish that undergoes seasonal migrations between freshwater ecosystems where they spawn and shallow marine waters (33 to 164 ft [10 to 50 m]) where they forage and grow.

The age of sexual maturity varies from 5 to 34 years depending on latitude, averaging about 15 years (Atlantic Sturgeon Status Review Team 2007). In the natal river, the highly adhesive eggs are deposited on cobble substrate. Larvae hatch out in four to seven days, and the newly hatched young swim actively, frequently leaving the bottom and swimming throughout the water column. Juveniles begin to move downstream into their natal estuary (Atlantic Sturgeon Status Review Team 2007). In general, juveniles remain for several years in a riverine environment before migrating out to sea, but individuals may move downstream in the fall when temperatures drop.

At around three years of age, subadults (typically those exceeding 28 in [70 cm] in total length) move from natal estuaries and begin to migrate to marine waters (Bain et al. 2000). Tagging data indicate that immature Atlantic sturgeon disperse extensively once they move into coastal waters (Secor et al. 2000). Atlantic sturgeon may occur within the western Atlantic along the U.S. East Coast. Adults may also undertake seasonal coastal migrations. Despite extensive mixing in coastal waters, adults return to their natal rivers to spawn. During non-spawning years, Atlantic sturgeon may remain at sea year-round, or they may seasonally venture into either natal or non-natal estuarine environments (Bain 1997; Hager et al. 2014).

Atlantic sturgeon prey upon benthic invertebrates such as isopods, crustaceans, worms, mollusks (NMFS 2019a), and fishes (Bain 1997). Evidence of predation on sturgeon is scant, but it is speculated that juveniles may be eaten by striped bass and sharks (Dadswell 2006; NMFS 1998).

3.4.4.1.2.2 Bocaccio

The bocaccio (*Sebastes paucipinus*) Puget Sound/Georgia Basin DPS is listed as endangered under the ESA (75 FR 22276; April 28, 2010). Critical habitat (Section 3.4.8.1.4) for this DPS is designated in portions of Puget Sound/Georgia Basin (79 FR 68041; November 13, 2014; Figure 3-8. Bocaccio from the listed DPS would only be expected in the NEPAC-North proposed action area, though bocaccio from non-listed DPS may occur in the NEPAC-South and AK proposed action areas. Designated critical habitat overlaps with transit areas in the NEPAC-North proposed action area.

Bocaccio range from Punta Blanca, Baja California to the Gulf of Alaska off Krozoff and Kodiak Islands. They are most common between Oregon and northern Baja California. In Puget Sound, most bocaccio's are found south of Tacoma Narrows. Bocaccios are most commonly found at depths between 160 and 820 ft (50 and 250 m), but they may be found as deep as 1,560 ft (475 m). Adults generally move into deeper water as they increase in size and age, but they usually exhibit strong site fidelity to rocky bottoms and outcrops. Juveniles and subadults may be more common than adults in shallower water and are associated with rocky reefs, kelp canopies, and artificial structures, such as piers and oil platforms. Approximately 50 percent of adult bocaccios mature in four to six years. Bocaccio are difficult to age, but are suspected to live as long as 50 years (National Oceanic and Atmospheric Administration 2014a).

Larval rockfish, such as bocaccio, feed on diatoms, dinoflagellates, tintinnids, and cladocerans; juveniles consume copepods and euphausiids. Adults eat demersal invertebrates and small fishes (including other species of rockfish) associated with kelp beds, rocky reefs, pinnacles, and sharp drop-offs (National Oceanic and Atmospheric Administration 2014a).

3.4.4.1.2.3 Chinook Salmon

The Upper Columbia River spring-run and Sacramento River winter-run ESUs of Chinook salmon (*Oncorhynchus tshawytscha*) are listed as endangered under the ESA (79 FR 40004; July 11, 2004 and 59 FR 440; January 4, 1994). Seven other ESUs, including Snake River (fall-run, spring/summer-run) and

Lower Columbia River are listed as threatened (81 FR 51549; August 4, 2106). Critical habitat for Chinook salmon is designated in areas of Oregon, Washington, and California, but does not overlap with the proposed action areas. ESA listed Chinook salmon would be expected in the NEPAC-North and AK proposed action areas. It should be noted that none of the Alaskan ESU's are ESA-listed.

Chinook salmon are anadromous species; in spring, the adults migrate from marine waters to estuarine waters, shortly before moving upriver to spawn in freshwater streams and rivers (Keefer et al. 2008). These salmon only spawn once, then die. Juveniles spend anywhere from three months to two years inhabiting freshwater environments before they migrate to marine waters to feed and mature (NMFS 2014a).

Juvenile Chinook prefer coastal areas (less than 34 mi [55 km] from the shore) throughout California, Oregon, and Washington, north to the Strait of Georgia and the Inside Passage, Alaska (Pacific Fishery Management Council 2000). Trudel et al. (2009) documented catch of juvenile Chinook salmon from ESA-listed ESUs offshore of central Alaska, but in smaller numbers as compared to other locations. The majority of marine juveniles are found within 17 mi (28 km) of the coast, and they tend to concentrate around areas of pronounced coastal upwelling (Pacific Fishery Management Council 2000). Chinook originating in rivers south of the Rogue River, Oregon rear in estuarine waters off California and Oregon, whereas salmon originating in rivers north of the Rogue River migrate north and west along the Pacific Coast (NMFS 2005a). Masuda et al. (2017) documented encounters of a substantial portion of Chinook salmon from Washington and Oregon in the Gulf of Alaska. These migrations are important from a management perspective since fish from Oregon, Washington, British Columbia, and Alaska have the potential of being harvested in the Gulf of Alaska (NOAA 2005).

Juvenile Chinook salmon feed on terrestrial and aquatic insects, amphipods, and other crustaceans. Adult Chinook salmon feed primarily on other fish species (AECOM 2013).

3.4.4.1.2.4 Chum Salmon

Two ESUs of chum salmon (*Oncorhynchus keta*) are listed as threatened under the ESA—the Columbia River ESU and the Hood Canal summer-run ESU. Both ESUs would be expected within the NEPAC-North and AK proposed action areas, though no Alaskan ESUs are ESA-listed (70 FR 37160; June 28, 2005). Designated critical habitat for chum salmon is located within Washington and Oregon, but critical habitat remains entirely in fresh water and, therefore, does not overlap with the proposed action areas (70 FR 52630; September 2, 2005).

Chum salmon have the largest range of natural geographic and spawning distribution of all the Pacific salmon species (Pauley et al. 1988). Historically, in North America, chum salmon occurred from Monterey, California, to the Arctic coast of Alaska and east to the Mackenzie River, which flows into the Beaufort Sea. Present spawning populations are now found only as far south as Tillamook Bay on the northern Oregon Coast (National Oceanic and Atmospheric Administration 2014b; Salo 1991). Juvenile chum occur along the coast of North America and Alaska in a band that extends out to 22 mi (36 km) from shore (Salo 1991).

Chum salmon are an anadromous species (Salo 1991). In order to mate, adults migrate from a marine environment into the freshwater streams and rivers of their birth. They are highly migratory with fry heading seaward immediately after emergence (North Pacific Fishery Management Council 1990; Salo 1991). Chum salmon do not have the clearly defined smelt stages that occur in other salmonids; however, they are capable of adapting to seawater soon after emergence from their gravel nursery habitats (Salo 1991). Migrations of juvenile chum are correlated with the warming of nearshore waters (Salo 1991). Juvenile chum salmon are primarily epipelagic and are found from the surface down to 312 ft (100 m) (Emmett 1991). Chum salmon are found at a wide range of temperatures, from 37 to 72 °F (3 to 21°C), but they prefer temperatures from 47 to 60 °F (8 to 15 °C) (Pauley et al. 1988).

Juvenile chum salmon migrations follow the Gulf of Alaska coastal belt to the north, west, and south during their first summer at sea (Salo 1991). Maturing fish destined for North American streams are widely distributed throughout the Gulf of Alaska during the spring and summer (Salo 1991). Quinn and Meyers (2004) show that the migration pattern of chum salmon is typically further offshore into deeper waters, and as such, this species is not frequently encountered in coastal waters until they return to their natal streams at maturity.

Chum salmon feed on insects and marine invertebrates while in rivers. While rearing in estuarine environments, juvenile chum salmon eat primarily epibenthic invertebrates, including copepods, amphipods, mysids, and other crustaceans (Brewer et al. 2005; NMFS 2013a). As adults, they feed on copepods, fish, mollusks, squid, and tunicates (National Oceanic and Atmospheric Administration 2014b).

3.4.4.1.2.5 Coho Salmon

Three ESUs (Lower Columbia River, Oregon Coast, and Southern Oregon & Northern California Coasts) of coho salmon (*Oncorhynchus kisutch*) are listed as threatened under the ESA, and the Central California Coast ESU is listed as endangered (70 FR 37160; June 28, 2005; 76 FR 35755; June 20, 2011). All four ESUs would be expected in the NEPAC-North and AK proposed action areas, though no Alaska ESUs are ESA-listed. Critical habitat for coho salmon is designated within freshwater rivers and tributaries in Washington, Oregon, and California, but it does not overlap with the proposed action areas.

Coho salmon spawn in freshwater drainages from Monterey Bay, California northwards along the Pacific Coast of North America up to Alaska, around the Bering Sea south through Russia to Hokkaido, Japan (California Department of Fish and Game 2002a). Oceanic life stages are found from Baja California north to Point Hope, Alaska and through the Aleutian Islands (Marine Biological Consultants 1987; Sandercock 1991). Adult coho salmon migrate into their natal streams in the fall where they deposit their eggs in gravel (Sandercock 1991). Adults die after spawning. Eggs incubate throughout the winter and emerge in the spring as free-swimming fry (Sandercock 1991).

Fry spend one year in fresh water before migrating to the ocean during the following spring. Immature fish remain inshore, but mature fish may migrate to join schools from other river systems (California Department of Fish and Wildlife 2016; Weitkamp and Neely 2002). Weitkamp and Neely (2002) found that nearly all coho salmon recovered by coastal fishermen in southeastern Alaska and Cook Inlet originated north of the United States–Canada border; however, Weitkamp (2010) notes that for several well-studied salmon species (e.g., Chinook and coho), stocks from rivers in Oregon and Washington tend to move north into Canadian and southeast Alaskan waters. In marine environments, both juvenile and adult coho salmon typically stay within 33 ft (10 m) of the surface (Emmett et al. 1991). Coho salmon spend a minimum of 18 months at sea before returning to their natal streams to spawn (North Pacific Fishery Management Council 1990; Sandercock 1991).

Coho salmon eat a variety of aquatic and terrestrial insects and invertebrates while rearing and have been observed leaping from the water to capture flying insects. Coho salmon rapidly transition to piscivory, including cannibalism, to supplement their diet during their extended overwinter rearing interval. Oceanic coho salmon eat a variety of small fish and larger invertebrates, including amphipods, isopods, and euphausiids (California Department of Fish and Game 2002b; California Department of Fish and Wildlife 2016; Miller and Simenstad 1997; Sandercock 1991).

3.4.4.1.2.6 Eulachon

The Southern DPS of Pacific eulachon (*Thaleichthys pacificus*) is listed as threatened under the ESA (75 FR 13012; March 18, 2010) and can be found throughout the NEPAC-North and in the southern portions of the AK proposed action area. Although the vast majority of eulachon found in Alaska would belong to the non-listed Northern DPS, there are isolated records of Southern DPS individuals in the southern portion of southeast Alaska. Critical habitat (Section 3.4.8.1.4) is designated in a combination of freshwater creeks and rivers and their associated estuaries (76 FR 65324; October 20, 2011). The estuarine portions of this critical habitat although unlikely, may overlap with transit areas in the NEPAC-North proposed action area (Figure 3-8); however, because the exact location of homeports is unknown and thus the extent of overlap is uncertain, potential impacts during transit are considered here.

Eulachon are endemic to the eastern Pacific Ocean, ranging from northern California to southwest Alaska and into the southeastern Bering Sea. In the continental United States, most eulachon originate in the Columbia River Basin. Other areas where eulachon have been documented include: the Sacramento River, Russian River, Humboldt Bay and several nearby smaller coastal rivers (e.g., Mad River), and the Klamath River in California; the Rogue River and Umpqua Rivers in Oregon; and infrequently in coastal rivers and tributaries to Puget Sound, Washington. Pacific eulachon are filter feeders that feed on plankton, but feed only when they are at sea ((NMFS 2014d).

Eulachon occur in nearshore ocean waters, except for the brief spawning runs into their natal streams. Spawning grounds are typically in the lower reaches of larger snowmelt-fed rivers with water temperatures ranging from 39 to 50 °F (4 to 10 °C) (NMFS 2014d). Pacific eulachon typically spend three to five years in saltwater before returning to freshwater to spawn from late winter through mid-spring. Eggs are fertilized in the water column. After fertilization, the eggs sink and adhere to the river bottom, typically in areas of gravel and coarse sand. Most eulachon adults die after spawning. Juvenile eulachon move from shallow, nearshore areas to mid-depth areas. Juveniles may be observed in depths up to 2,000 ft (610 m), but they typically remain between 80 and 500 ft (25 and 150 m) (Allen and Smith 1988).

3.4.4.1.2.7 Giant Manta Ray

The giant manta ray (*Manta birostris*) is listed as threatened under the ESA throughout its range, and may occur in all proposed action areas (83 FR 2916; January 22, 2018). Currently, no critical habitat has been designated.

The giant manta ray is a cosmopolitan yet uncommon species, with worldwide distribution throughout tropical and temperate waters between 40 °N and 40 °S latitude, though most have a tropical to subtropical distribution, preferring water temperatures of 68–79 °F (20–26 °C) (Dewar et al. 2008; NMFS 2019b). In the United States, they have been documented as far north as southern California (NEPAC-South proposed action area) on the Pacific Coast and as far north as New Jersey on the Atlantic Coast (NW-ATL proposed action area).

They utilize sandy bottom habitat, seagrass beds, shallow reefs, and the ocean surface both nearshore and offshore. The giant manta ray is the largest mobulid rays (e.g., manta rays and devil rays), and they are highly migratory, making seasonal visits along productive coastlines with regular upwelling, oceanic island groups, and near offshore pinnacles and seamounts in all three temperate and tropical ocean basins (Froese and Pauly 2019). Seasonal migrations are usually more than 621 mi (1,000 km); however, migrations across ocean basins are not likely (NMFS 2019b). The timing of these seasonal migrations varies by region and seems to correspond with the movement of zooplankton, current circulation and tidal patterns, seasonal upwelling, seawater temperature, and possibly mating behavior. Although the species tends to be solitary, they aggregate at cleaning stations (i.e., areas where rays are cleaned by small fish or crustaceans) as well as to feed and mate (Marshall et al. 2011; NMFS 2017). Regional populations are small and commonly show a degree of site fidelity to specific regions, such as cleaning stations and feeding sites (Marshall et al. 2011).

Giant manta rays forage by swimming with their cephalic fins in an "O" shape and opening their mouths wide, creating a funnel that pulls water and prey through their mouth and over their gill rakers. Manta rays primarily feed on planktonic organisms such as euphausiids, copepods, mysids, decapod larvae, and shrimp, but some studies have noted their consumption of small and moderately sized fish as well (Couturier et al. 2012). Within the Gulf of Mexico, giant manta rays commonly feed around rings, eddies, and upwelling zones associated with the predominant Loop Current.

Manta rays feed on zooplanktonic organisms. As a result, they are generally found in shallow waters, but may dive to 3,281 ft (1,000 m) or more to supplement foraging on deep sea organisms (Burgess 2017). A similar sized species, the giant devil ray (*Mobula mobular*), has been recorded at depths of 1,969 to 2,297 ft ([600 to 700 m], but spent the majority (81.5 percent) of time above a depth of 164 ft [50 m]) in the Mediterranean Sea (Canese et al. 2011). The same species was recorded at depths to 6,562 ft (2,000 m) in the eastern North Atlantic Ocean (Thorrold et al. 2014).

3.4.4.1.2.8 Green Sturgeon

The southern DPS of North American green sturgeon (*Acipenser medirostris*) is listed as threatened under the ESA (71 FR 17757; April 7, 2006). Designated critical habitat (Section 3.4.8.1.4) specifically includes freshwater, estuarine, and marine habitat in the Sacramento-San Joaquin Delta and within the Yolo and Sutter bypasses (74 FR 52300; October 9, 2009). Critical habitat would only overlap with transit areas in the NEPAC-North proposed action area (Figure 3-8). Green sturgeon may occur within the NEPAC-North proposed action area, and there would be a potential for encounters in the NEPAC-South and AK proposed action areas.

Green sturgeons inhabit areas along the U.S. Pacific Coast. They can be found from Mexico to the marine waters of Alaska (NMFS 2014b). They are broadly distributed, wide-ranging, and the most marine-oriented species of the sturgeon family. Green sturgeons inhabit both fresh and marine areas. They spend the majority of their lives in nearshore oceanic waters, bays, and estuaries. Juvenile green sturgeons inhabit freshwater areas, and adults only migrate to freshwater habitats to spawn when they are about 15 years of age (NMFS 2014b). They spawn in deep pools in large, turbulent, freshwater rivers (Moyle et al. 1992) only once every 2 to 5 years (Moyle 2002). Adults migrate to freshwater spawning habitats starting in late February, with peak spawning times from April to June (Moyle et al. 1995). Juvenile green sturgeons spend a few years in fresh and estuarine ecosystems before they migrate to saltwater ecosystems where they disperse widely (NMFS 2014b). Green sturgeon rarely occur more than 12 mi (19 km) from the coast. Green sturgeon forage on benthic invertebrates such as shrimp, mollusks, and amphipods. They also occasionally prey upon small fish (Moyle et al. 1992).

3.4.4.1.2.9 Gulf Sturgeon

The Gulf sturgeon (*Acipenser oxyrinchus desotoi*) is listed as threatened under the ESA throughout its entire range and is co-managed by NMFS and USFWS (56 FR 49653; September 30, 1991). Designated critical habitat for Gulf sturgeon (Section 3.4.8.1.4) is located in 14 geographic areas from Florida to Louisiana (68 FR 13356; April 18, 2003) and would only overlap with transit areas in the GoMEX proposed action area (Figure 3-6). The Gulf sturgeon would only be expected in the transit area of the GoMEX proposed action area and not in the operational area.

This anadromous species occurs in the Gulf of Mexico in bays, estuaries, rivers, and in the marine environment from Florida to Louisiana (NMFS 2010). Adults inhabit nearshore waters from October through February (Robydek and Nunley 2012) with distribution influenced by prey availability (Ross et al. 2009). Their spring spawning migration toward natal rivers begins as riverine water temperatures reach 64 to 72 °F (18 to 22 °C) (Edwards et al. 2003; Heise et al. 2004; Rogillio et al. 2007). Spawning occurs during fall in some watersheds (Randall and Sulak 2012). Once post-spawned adults leave rivers, they remain within 3,281 ft (1,000 m) of the shoreline (Robydek and Nunley 2012) and often inhabit estuaries and nearshore bays in water less than 33 ft (10 m) deep (Ross et al. 2009). It has been suggested that Gulf sturgeon are typically associated with depths of 7–13 ft (2–4 m) and substrata having 80 percent or more sand when in the marine environment (Fox et al. 2002). Some individuals, particularly females between spawning years (Fox et al. 2002; Ross et al. 2009), move into deeper offshore waters for short periods during cold weather (Sulak et al. 2009).

Juvenile Gulf sturgeon inhabit river environments for about two to three years before migrating to the Gulf of Mexico (NMFS 2014c). By December, only the young-of-the-year and juveniles remain in the rivers (Carr et al. 1996; Foster and Clugston 1997; Smith and Clugston 1997). Young-of-the-year nursery habitat includes riverine sandbars and shoals (Carr et al. 1996). Juveniles prefer sand or vegetated habitats (Wakeford 2001), tolerate high salinity levels for extended durations, and appear to use estuaries infrequently (Sulak et al. 2009).

Subadult and adult foraging grounds include barrier island inlets with strong tidal currents and estuaries less than 7 ft (2 m) deep with clean sand substrate (Fox et al. 2002; Harris et al. 2005; Ross et al. 2009). Gulf sturgeon winter near the beaches of northwestern Florida and southeast of the mouth of St. Andrew Bay (USFWS 2009a). Other individuals migrate northeast of St. Andrew Bay at depths ranging from 12 to 40 ft (4 to 12 m) in waters 0.5 to 2 mi (0.8 to 3.2 km) offshore, likely for the purpose of feeding on prey associated with fine sand and shell hash substrates (USFWS 2009a, 2014a).

Prey varies based on life stage, but Gulf sturgeon is considered an opportunistic feeder. In estuarine and marine habitats, they prey upon a wide range of benthic invertebrates (Florida Museum of Natural History 2018), including branchiopods, mollusks, worms, and crustaceans (Florida Museum of Natural History 2018; NMFS 2015b). Adults typically do not feed while in fresh water.

3.4.4.1.2.10 Largetooth Sawfish

The largetooth sawfish (*Pristis pristis*) is listed as endangered under the ESA (76 FR 40822; August 11, 2011). There is currently no critical habitat designated. This species may occur in portions of the NW-ATL-Florida and the Caribbean, GoMEX, and HI-PAC proposed action areas.

Largetooth sawfish have the largest historic range of all sawfishes. This species historically occurred throughout the Indo-Pacific near Southeast Asia and Australia and throughout the Indian Ocean to east Africa. Largetooth sawfish have also been noted in the eastern Pacific Ocean from Mexico to northern Peru, but are considered locally extinct on Mexico's Pacific Coast and considered extirpated in Ecuador, but have been caught by fishermen in Peru (Bonfil et al. 2018; Cabanillas-Torpoco et al. 2020; Chirichigno and Cornejo 2001). In the Atlantic Ocean, largetooth sawfish historically inhabited warm temperate to tropical marine waters from Brazil to the Gulf of Mexico in the western Atlantic (National Oceanic and Atmospheric Administration 2015c). In the United States, they were reported in the Gulf of Mexico, mainly along the Texas Coast and east into the waters of Florida. Historical occurrences in North America were much more limited than those of the related smalltooth sawfish, with the largetooth sawfish strictly confined to shallow, nearshore, warm (greater than 64 to 86 °F [18 to 30 °C]), temperate and tropical estuarine localities in partly enclosed lagoons or similar areas.

The range and size of the largetooth sawfish population has declined dramatically and this species is now extinct in areas where it was once abundant. The most recent confirmed reports of largetooth sawfish within the designated proposed action areas are from Texas in the 1960s, and the species may possibly be extinct or nearly extinct in U.S. waters. There are also historical confirmed sightings from the Pacific Coast of Mexico, southern Florida, the Florida Keys, and unconfirmed sightings from the greater Caribbean (Burgess et al. 2009). In the western Atlantic, recent reports of largetooth sawfish only exist from Costa Rica and Brazil. Currently, they are thought to primarily occur in freshwater habitats in Central (including Mexico) and South America and West Africa (National Oceanic and Atmospheric Administration 2015c). Largetooth sawfish prey mostly upon other fish species, but they will also target invertebrates (National Oceanic and Atmospheric Administration 2015c).

3.4.4.1.2.11 Nassau Grouper

The Nassau grouper (*Epinephelus striatus*) is listed as threatened throughout its range (81 FR 42268; June 29, 2016). There is currently no critical habitat designated. Nassau grouper are commonly reef-associated, and would only be expected in the transit area of the NW-ATL-Florida and the Caribbean and GoMEX proposed action areas.

The Nassau grouper is a fairly large grouper species which inhabits waters from Bermuda and Florida throughout the Bahamas and the Caribbean Sea. They are perhaps best known for their massive spawning aggregations, which typically occur on winter full moons. Although occasionally found in deeper waters, they are most abundant in clear waters, shallower than 426 ft (130 m) deep, with high relief coral reefs or rocky substrate (Sadovy and Aguilar-Perera 2018). Post-settlement fish inhabit algal clumps, seagrass beds, and coral (Cornish and Eklund 2003).Younger Nassau groupers forage on small crustaceans and fish, and older fish are almost exclusively piscivorous ambush predators that rely on suction to swallow prey whole (Eggleston et al. 1998)

3.4.4.1.2.12 Oceanic Whitetip Shark

The oceanic whitetip shark (*Carcharhinus longimanus*) is listed as threatened under the ESA throughout its range (83 FR 4153; January 30, 2018). Currently, no critical habitat has been designated for the species. Oceanic whitetip sharks may occur in the operational areas of the NW-ATL, NW-ATL-Florida and the Caribbean, NEPAC-South, GoMEX, and HI-PAC proposed action areas.

Oceanic whitetip sharks are found worldwide in warm tropical and subtropical waters between 30 °N and 35 °S latitude near the surface of the water column (Young et al. 2017). This species has a clear preference for deep, open ocean waters likely occurring near the surface, with abundances decreasing with greater proximity to the continental shelf and offshore islands. Oceanic whitetip sharks that were tagged in the North Atlantic Ocean (off the southeast United States) dove to a maximum depth of 3,550 ft (1,082 m), but most dives were shallower than 394 ft (120 m) (Howey-Jordan et al. 2013). While they are normally slow swimmers, fast bursts of speed are common when darting towards prey. Preferring warm offshore waters near or over 68 °F (20 °C), the oceanic whitetip shark is known to undertake seasonal movements to higher latitudes in the summer and may regularly survey extreme environments (i.e., deep depths, low temperatures) as a foraging strategy (Young et al. 2017).

Oceanic whitetip sharks are usually solitary, but small numbers have been observed following pods of pilot whales. It is believed that oceanic whitetip sharks exploit the pilot whales' ability to find squid, which is a preferred prey item for both species (Compagno 1984a). Oceanic whitetip sharks are also known to congregate in larger groups near shipwrecks or plane crashes for convenient prey. Oceanic whitetip sharks are opportunistic feeders. They feed primarily on fish and cephalopods (Bonfil et al. 2008). However, blackfin tuna (*Thunnus atlanticus*), barracuda, and white marlin (*Tetrapturus albidus*) have been found in the stomachs of oceanic whitetip sharks (Backus et al. 1956). These sharks are also known to feed on marine birds, marine mammals, other sharks and rays, mollusks, crustaceans, and even garbage (Compagno 1984a; Cortés 1999).

3.4.4.1.2.13 Scalloped Hammerhead Shark

The scalloped hammerhead shark (*Sphyma lewini*) is listed under the ESA (79 FR 38214; July 3, 2014). NMFS determined in 2014 that the species is comprised of six DPSs: Northwest Atlantic and Gulf of Mexico DPS, Central and Southwest Atlantic DPS, Eastern Atlantic DPS, Indo-West Pacific DPS, Central Pacific DPS, and Eastern Pacific DPS (Miller et al. 2014). The Central and Southwest Atlantic DPS and the Indo-West Pacific DPS are listed as threatened; the Eastern Pacific DPS and Eastern Atlantic DPS are listed as endangered. No critical habitat has been designated for this species. Individuals from ESA-listed populations may occur in the NW-ATL-Florida and the Caribbean and NEPAC-South proposed action areas. Though sightings north of Point Conception, California are rare, there is a potential for encounters in the NEPAC-North proposed action area. It should be noted that individuals from non-ESA-listed populations of scalloped hammerhead may occur in the NW-ATL-Florida and the Caribbean, GoMEX, and HI-PAC proposed action areas, and possibly in the southern portions of the NW-ATL proposed action area.

The scalloped hammerhead shark is circumglobal, occurring in all temperate to tropical waters (Duncan and Holland 2006b) from the surface to depths of 1,600 ft (512 m) and possibly deeper (Jorgensen et al. 2009; Ketchum et al. 2014c; Miller et al. 2014). Scalloped hammerhead sharks are semi-coastal, utilizing both coastal-estuarine nursery grounds and offshore areas throughout their range (Clarke 1971; Simpfendorfer and Milward 1993). They typically inhabit nearshore waters of bays and estuaries where water temperatures are at least 72 °F (22 °C) (Castro 1983; Compagno 1984a; Ketchum et al. 2014c). The scalloped hammerhead shark remains close to shore during the day and moves to deeper waters at night to feed (Bester 2003). When they do move into deeper water, they appear to inhabit the thermocline in temperatures between 73 and 79 °F (23 and 26 °C) (Bessudo et al. 2011; Ketchum et al. 2014a; Ketchum et al. 2014b). Duncan and Holland (2006a) determined that enclosed nurseries may provide juvenile scalloped hammerhead sharks protection from predation. A genetic marker study suggests that females typically remain close to coastal habitats, but males are more likely to disperse across larger open ocean areas (Daly-Engel et al. 2012).

Scalloped hammerhead sharks are a high trophic level predator and feed opportunistically on all types of teleost fish, cephalopods, crustaceans, and rays (Bethea et al. 2011; Compagno 1984b; Torres-Rojas et al. 2010; Torres-Rojas et al. 2014; Vaske et al. 2009). Juveniles feed mainly on coastal benthic prey as well as epipelagic and benthic squid (Galván-Magaña et al. 2013; Musick and Fowler 2007; Torres-Rojas et al. 2010; Torres-Rojas et al. 2014).

3.4.4.1.2.14 Shortnose Sturgeon

In 1967, the USFWS listed the shortnose sturgeon (*Acipenser brevirostrum*) as endangered throughout its range (32 FR 4001; March 11, 1967). The species remained listed following enactment of the ESA in 1973 (Wippelhauser and Squiers Jr 2015), and NMFS assumed jurisdiction for shortnose sturgeon from the USFWS under a 1974 government reorganization plan. Currently, there is no critical habitat designated for this species. Shortnose sturgeon may occur in transit areas in the NW-ATL and NW-ATL-Florida and the Caribbean proposed action areas.

The geographic range of shortnose sturgeon runs along eastern North America from the Saint John River, New Brunswick, Canada to the Saint Johns River, Florida (Kynard 1997; NMFS 1998). Shortnose sturgeon are benthic fish, mainly occupying the deep channel sections of rivers. They are amphidromous, meaning they spend most of their lives in fresh water with periodic visits to estuarine salt water (Collette and Klein-MacPhee 2002). There also is evidence of migration between river systems using nearshore coastal waters (Dadswell 2006; NMFS 1998; Richmond and Kynard 1995; Wippelhauser et al. 2015). Migratory movements are associated with spawning, feeding, and overwintering activities. In estuaries, juveniles and adults occupy areas with little or no current over a bottom composed primarily of mud and sand (Secor et al. 2000). Spawning occurs in freshwater rivers.

After hatching in rivers, larvae orient into the current and away from light, generally staying near the bottom and seeking cover. Within two weeks, the larvae emerge from cover and swim in the water column, moving downstream from the spawning site, but remaining within freshwater habitats. Older juveniles or subadults tend to move downstream in fall and winter as water temperatures decline and move upstream in freshwater reaches during summer. Adult shortnose sturgeon leave the spawning groups soon after spawning and head to summer foraging areas when temperatures exceed 59 °F (15 °C) (Squiers et al. 1982). Kieffer and Kynard (1993) reported that post-spawning migrations were correlated with increasing spring water temperature and river discharge. Post-spawning migration rates range from 2 to 22 mi (3.5 to 36 km) per day (Buckley and Kynard 1985; Kieffer and Kynard 1993). During these movements, shortnose sturgeon appear to move singly and "home" to very specific sites (Dadswell et al. 1984; Kieffer and Kynard 1993; Savoy and Shake 1992).

Sturgeon feed in fresh water during summer and over sand-mud bottoms in the lower estuary during fall, winter, and spring (NMFS 1998). Shortnose sturgeon feed by suctioning insects, crustaceans, mollusks, worms, and small benthic fishes (NMFS 1998; Stein et al. 2004). Freshwater mussels are a main prey item for adult sturgeon. McCleave et al. (1977) examined several stomachs from shortnose sturgeon captured in Montsweag Bay, Maine and found that shrimp (*Crangon septemspinosa*), clams, and small winter flounder (*Pleuronectes americanus*) were common prey items. Juveniles have been found in the stomachs of yellow perch (*Perca flavescens*). Predation on subadults and adults is not well documented; however, sharks are also likely predators in the marine environment (NMFS 1998).

3.4.4.1.2.15 Smalltooth Sawfish

Both the United States and foreign DPSs of smalltooth sawfish (*Pristis pectinata*) are listed as endangered under the ESA (70 FR 69464; April 1, 2003). The U.S. DPS is co-managed by NMFS and USFWS. Critical habitat (Section 3.4.8.1.4) for smalltooth sawfish is designated along the southwestern coast of Florida between Charlotte Harbor and Florida Bay (74 FR 45353; October 02, 2009), which may overlap with transit areas of the NW-ATL-Florida and the Caribbean (Figure 3-4) and GoMEX proposed action areas (Figure 3-6). Smalltooth sawfish may occur in the transit area of the NW-ATL, NW-ATL-Florida and the Caribbean, and GoMEX proposed action areas.

Smalltooth sawfish inhabit shallow coastal waters of tropical seas and estuaries throughout the world. They are usually found in waters less than 32 ft (10 m) deep that are very close to shore and over muddy or sandy bottoms, thus overlap with OPCs while in transit would be extremely limited. Preferred habitat includes sheltered bays, shallow banks, and estuaries or river mouths. Smalltooth sawfish prefer warmer water temperature of 71 to 82 °F (22 to 28 °C). They can ascend inland in river systems and have been shown to have a salinity preference of 18 to 24 ppt (National Oceanic and Atmospheric Administration 2014d).

In the United States, smalltooth sawfish are most often found off the southwest coast of Florida from Charlotte Harbor to the Everglades region (National Oceanic and Atmospheric Administration 2014d). The smalltooth sawfish occurs in the Gulf of Mexico, particularly at river mouths (e.g., Mississippi River), shallow tropical or subtropical estuarine and marine waters associated with sandy and muddy deep holes, limestone hard bottom, coral reefs, sea fans, artificial reefs, and offshore drilling platforms (NMFS

2009c; Poulakis and Seitz 2004; Simpfendorfer 2006). Nursery areas of the smalltooth sawfish include estuaries and mangroves with the roots providing refuge from predators (NMFS 2009c; Seitz and Poulakis 2006; Simpfendorfer and Wiley 2006). Juveniles exhibit a high site fidelity to nearshore areas (residence up to 55 days) and upstream movement toward preferred lower salinity conditions (Poulakis et al. 2013; Simpfendorfer et al. 2011). Larger individuals may occur to a depth of 394 ft (120 m) (Poulakis and Seitz 2004; Simpfendorfer 2006), although adults are known to spend more time in shallower habitat than in deeper waters (Simpfendorfer and Wiley 2006).

Smalltooth sawfish are nocturnal feeders and use the saw-like rostrum to disrupt the substrate to expose crustaceans and to stun and slash schooling fish. Smalltooth sawfish prey mostly upon other fish species, but they will also target invertebrates (National Oceanic and Atmospheric Administration 2014d).

3.4.4.1.2.16 Sockeye Salmon

The sockeye salmon (*Oncorhynchus nerka*) is listed under the ESA for two ESUs: Ozette Lake (listed as threatened) and Snake River (listed as endangered). While both ESU's may occur within the NEPAC-North and AK proposed action areas, a substantial portion of the Ozette Lake ESU is landlocked, and most sockeye salmon encountered in Alaska would belong to non-listed Alaskan populations. Designated critical habitat for sockeye salmon is located in interior Washington State (Snake River ESU: 58 FR 68543; December 28, 1993 and Ozette Lake ESU: 70 FR 52630; September 2, 2005), outside of the proposed action areas.

Sockeye salmon are the third most abundant of the Pacific salmonids. On the Pacific Coast, sockeye salmon inhabit marine, riverine, and lake environments from the Klamath River and its tributaries in Oregon and northern California, north and west to western Alaska (NMFS 2015a). Sockeye salmon also are common throughout Alaska, but most individuals found in Alaska, particularly in inshore regions, would be from Alaskan natal stocks, which are not ESA-listed (Beacham et al. 2005; Tucker et al. 2009).

Sockeye salmon are primarily anadromous (Burgner 1991; Emmett et al. 1991). Spawning is temperature-dependent and varies by location, generally occurring from August to December and peaking in October (Emmett et al. 1991). Sockeye salmon typically spawn in streams associated with lakes where the juveniles rear in the limnetic zone before they migrate to the ocean (Burgner 1991; Emmett et al. 1991).

The Snake River ESU has the longest migration of any sockeye salmon. Fry emerge in April and May and rear in lakes for one to three years. The migration to the ocean spans 900 mi (1,448 km) and passes through the Salmon, Snake, and Columbia Rivers. Salmon then spend one to three years in the ocean, and adult salmon begin the return migration in June and July. Few fish complete the full migration to the ocean and back due to the presence of dams along the Snake and Columbia Rivers (NMFS 2015a).

Smolts stay close to shore and feed on insects and plankton. Once they move offshore, their diet turns mainly to amphipods, copepods, squid, and fish (National Oceanic and Atmospheric Administration 2014e).

3.4.4.1.2.17 Steelhead Trout

The steelhead trout (*Oncorhynchus mykiss*) DPSs were listed under the ESA from 1997–2000. There are fifteen DPSs: the Southern California DPS is listed as endangered under the ESA (62 FR 43937; August 18, 1997), ten are listed as threatened (62 FR 43937; August 18, 1997 and 63 FR 13347; March 19, 1998 and 64 FR 14517; March 25, 1999 and 65 FR 36074; June 7, 2000), and one is an ESA species of concern (NMFS 2014e). All of the listed DPSs may occur within the NEPAC-South, NEPAC-North, and AK proposed action areas, though the endangered southern California DPS would be restricted to the NEPAC-South proposed action area and is very rare, even where it is found. Listed stocks in the NEPAC-North proposed action area may occasionally move into Alaskan waters, although steelhead migrate less than the other Pacific salmon species. Steelhead are abundant in Alaska, but most individuals belong to non-ESA-listed DPSs. Critical habitat (Section 3.4.8.1.4) is designated for each DPS (70 FR 52630; September 2, 2005) and is largely restricted to freshwater and a few limited brackish systems; therefore, it does not overlap with the proposed action areas apart from critical habitat in San Francisco Bay (Figure 2-6). However, San Francisco Bay has not been officially designated as a homeport; however any overlap with critical habitat in this area would be limited to vessel transit to and from the port. The Coast Guard would evaluate homeports separate NEPA document.

The present distribution of steelhead trout extends from the Kamchatka Peninsula in Russia, east to Alaska and south to southern California (Good et al. 2005). Steelhead trout are found along the entire U.S. Pacific Coast. This species has also been introduced (by stocking) in other locations throughout the world, including freshwater streams in Hawaii at the Kokee State Park on the island of Kauai (NMFS 2014e), although this particular population does not migrate into the ocean. The ocean distributions for steelhead trout are not known in detail, but steelhead trout are caught only rarely in ocean salmon fisheries. Studies suggest that steelhead trout do not generally congregate in large schools as do other Pacific salmon species (Burgner 1992; Groot 1991).

Steelhead trout exhibit a great diversity of life history patterns, and are phylogenetically and ecologically complex. Steelhead may exhibit either an anadromous life style or a freshwater residency, where they spend their entire life in fresh water (NMFS 1997). Ocean-maturing steelhead trout typically spawn between December and April, with the peak between January and March (Leidy 1999).

Juvenile steelhead trout feed primarily on zooplankton. Adult steelhead trout feed on aquatic and terrestrial insects, mollusks, crustaceans, fish eggs, minnows, and other small fish species (NMFS 2014f).

3.4.4.1.2.18 Yelloweye Rockfish

The Puget Sound/Georgia Basin DPS of yelloweye rockfish (*Sebastes ruberrimus*) is listed as threatened under the ESA (75 FR 22276; April 28, 2010). Critical habitat (Section 3.4.8.1.4) for this DPS is designated in Puget Sound/Georgia Basin (79 FR 68042; November 13, 2014) and overlaps with transiting areas in the NEPAC-North proposed action area (Figure 3-8). While yelloweye rockfish may occur in the NEPAC-South and AK proposed action areas, these are not ESA-listed individuals. ESA-listed yelloweye rockfish would only be expected in the NEPAC-North proposed action area.

Yelloweye rockfish range from northern Baja California to the Aleutian Islands, Alaska, but they are most common from central California northward to the Gulf of Alaska. Yelloweye rockfish larval release occurs between February and September. The larval young are found in surface waters and may be distributed over a wide area extending several hundred miles offshore. Larvae and small juvenile rockfish may remain in open waters for several months, being passively dispersed by ocean currents. Yelloweye rockfish juveniles, unlike bocaccio (Section 3.4.4.1.2.2), do not typically occupy shallow, intertidal areas, but they, instead, settle in deeper waters from 300–590 ft (91–180 m) (Drake et al. 2010).

Juveniles and subadults tend to be more common than adults in shallower water, and they are associated with rocky reefs, kelp canopies, and artificial structures, such as piers and oil platforms. Adults generally move into deeper water as they increase in size and age, but they usually exhibit strong site fidelity to rocky bottoms and outcrops. Yelloweye rockfish occur in waters 80 to 1,560 ft (25 to 475 m) deep, but they are most commonly found between 300 and 590 ft (91 and 180 m). Approximately 50 percent of adult yelloweye rockfish are mature by 16 in (41 cm) total length, at roughly 6 years of age.

Yelloweye rockfish are among the longest lived of rockfishes, living up to 118 years (National Oceanic and Atmospheric Administration 2014g).

Larval rockfish feed on diatoms, dinoflagellates, tintinnids (protozoa), and cladocerans (small crustaceans), and juveniles consume copepods and euphausiids. Adults eat demersal invertebrates and small fishes (including other species of rockfish) associated with kelp beds, rocky reefs, pinnacles, and sharp drop-offs (National Oceanic and Atmospheric Administration 2014g).

3.4.4.2 Environmental Consequences to Marine Fish

Impacts to marine fish would potentially result from fathometer noise (Section 3.4.4.2.1), vessel noise (Section 3.4.4.2.2), vessel movement (Section 3.4.4.2.3), and MEM (Section 3.4.4.2.4) associated with the Proposed Action and are discussed below. There would be no impacts to marine fish from Doppler speed log noise as it is outside of any fish hearing ranges (Appendix F). However, potential impacts to marine fish from hearing threshold shifts from fathometer, vessel, and aircraft noise; behavioral responses from aircraft noise, aircraft movement, and gunnery training; and entanglement from towed vessels and targets are discussed in Table 3-3, and are not further analyzed in this PEIS/POEIS.

The hearing range of all fish, including sharks, ranges from 20 Hz to 1.5 kHz (Appendix F), which does overlap with aircraft noise (ranges from 20 Hz to 5 kHz; Table 2-2 and Section 3.2.2.2). However, aircraft noise would only be detected in a narrow cone directly beneath the aircraft as it moves throughout the proposed action areas (Appendix D), and then only by marine fish once it has travelled through the air-water interface (Section 3.2.1.3). As most species of marine fish are not located at the water's surface, impacts to marine fish, including ESA-listed fish, from aircraft noise would not be expected due to the low intensity of aircraft noise below the water's surface.

3.4.4.2.1 Fathometer Noise

Marine fish in the proposed action areas may be exposed to fathometer noise during the Proposed Action. The single beam echosounder used for navigation aboard the OPC is discussed in detail in Section 2.2.1.1 and detailed in Table 2-2. The frequency range of the echosounder is expected to range from 50–200 kHz. The hearing range of most fish, including sharks, is from 20 Hz to 1.5 kHz (Appendix F). However, some species of fish are capable of detecting high-frequency sounds above 4 kHz (Popper 2008; Popper and Fay 2010). Therefore, while most species of fish, including ESA-listed species, would not detect noise from fathometer noise, some species of clupeiformes (e.g., herrings, shads, sardines, anchovies) and gadiformes (e.g., cod, shad) could detect the echosounder.

As discussed in Section 3.2.1.1, fathometer noise would be considered a *de minimis* acoustic source. This determination by Coast Guard is based on the Navy's definition of a *de minimis* source (Navy 2013), which includes any in-water, active acoustic source with: narrow beam widths; downward directed transmissions; short pulse lengths; frequencies outside of known hearing ranges (e.g., marine mammals); low source levels; or a combination of any of these factors. Most fish do not hear the frequency range of the echosounder. Fish in the herring family have been observed responding to frequencies up to 200 kHz and the American shad changed schooling behavior in response to echosounders at 150 kHz (Velez 2015).

Fish use sounds to detect both predators and prey, and for schooling, mating, and navigating (Popper 2003). Masking of sounds associated with these behaviors could impact or harm fish by reducing their ability to perform these biological functions. Any noise detectable by a fish can prevent the fish from hearing biologically important sounds including those produced by prey or predators (Popper 2003). Masking can impede the flight response of fish from predators or may not allow fish to detect potential prey in the area. Additionally, most biological sounds within the ocean environment are in the low frequency band of noise which would not overlap with the frequency range produced by the echosounder. Thus, masking of biological sounds by the echosounder is not expected to cause significant impacts to fish as a result of the Proposed Action. The operational characteristics of the source exclude the possibility of any significant impact to a species. As a result, even if there is a possibility that some fish species may be exposed to and detect fathometer noise, any response is expected to be short-term and inconsequential.

Studies documenting behavioral responses of fish to vessels show that Barents Sea capelin (*Mallotus villosus*) may exhibit avoidance responses to engine noise, sonar, depth finders, and fish finders (Jorgensen et al. 2004). Avoidance reactions are quite variable depending on the type of fish, its life history stage, behavior, time of day, and the sound propagation characteristics of the water (Schwartz 1985). Behavioral responses to loud noises could include a startle response, such as a fish swimming away from the source; a freeze response, a fish staying in place; or a flight response, such as scattering (Popper 2015). If an individual fish with enhanced hearing capabilities were to detect fathometer noise, the fish would be expected to exhibit short-term behavioral reactions when initially exposed to the source. The Proposed Action may result in behavioral reactions by pelagic hearing specialists (clupeiformes and gadiformes) in close proximity to the acoustic signals, with fish exhibiting a startle response and/or vacating the area of increased noise. Due to the low intensity of the fathometer noise, fish would likely return to the area and assume normal behavior soon after exposure. Even if they were in the direct path of the sound, the ship would be moving, and thus marine fish exposed to the sound would presumably return to normal behavior after the ship passed. This response would not significantly alter patterns such as breeding, feeding, or sheltering and therefore would have no population level effects.

3.4.4.2.2 Vessel Noise

Marine fish in the proposed action areas may be exposed to vessel noise during the Proposed Action. In general, small vessel noise (e.g., OTH boat noise) would be expected to range from 1–7 kHz and large vessel (e.g., OPC vessel noise) would be expected to range from 20–300 Hz (Table 2-2). As discussed in Appendix F, the hearing range of most fish, including sharks, is from 20 Hz to 1.5 kHz. However, some species of fish are capable of detecting high-frequency sounds above 4 kHz (Popper 2008; Popper and Fay 2010). Therefore, marine fish may be able to detect all vessel noise, but would better detect the lower frequencies expected from the OPC. In addition, low-frequency noise has the potential to expose marine fish to both sound and disturbance from particle motion. Therefore, potential impacts to fish from vessel noise includes masking and behavioral reactions.

As discussed in Section 3.4.4.2.1, fish use sounds to detect both predators and prey, and for schooling, mating, and navigating (Popper 2003). Masking of sounds associated with these behaviors could impact or harm fish by reducing their ability to perform these biological functions. However, any masking would only likely occur as vessels move throughout the vast proposed action areas. Therefore, masking would occur intermittently and only to those individual fish that may be close to the vessel. These individuals would no longer be impacted once the vessel moves out of their immediate area.

Vessel noise could result in short-term behavioral or physiological responses (e.g., avoidance, stress, increased respiration rate) by marine fish. Misund (1997) found that fish swimming ahead of a ship showed avoidance reactions at ranges of 161 to 489 ft (49 to 149 m). When the vessel passed over them, some species of fish exhibited sudden escape responses that included lateral avoidance or downward compression of the school; though it is unclear if this avoidance behavior was due to the physical presence of the vessel, particle motion, or actual detection of the sound. Avoidance behavior of vessels, vertically or horizontally in the water column, has been reported for cod and herring, and was attributed to vessel noise (Handegard et al. 2003; Vabø et al. 2002). Vessel activity can also alter schooling behavior and swimming speed of fish (UNEP 2012). It would be anticipated that temporary behavioral reactions (e.g., temporary cessation of feeding or avoidance response) would not impact the individual fitness of a fish, as individuals are expected to resume feeding upon cessation of the sound exposure and unconsumed prey would still be available in the environment. Furthermore, while vessel sounds may influence the behavior of some fish species (e.g., startle response, masking), other fish species could be equally unresponsive (Becker et al. 2013). Thus, effects from vessel noise would be limited to short-term startle responses and temporary displacement from the location in which vessels are operating. Vessel noise associated with the Proposed Action may impact individual fish within the proposed action areas; however, responses to vessel noise would be short-term and temporary behavioral reactions, and thus, would not be expected to have any population level impacts.

3.4.4.2.3 Vessel Movement

Marine fish in the proposed action areas may be exposed to vessel movement during the Proposed Action. The operational speeds of the OPCs and OTH boats are discussed in Sections 2-15 and 2.2.3.1 and vessel use is discussed in Table 3-2. In general, all vessels would operate at speeds of 12–15 knots. Marine fish within the proposed action areas may be exposed to vessel movement associated with the Proposed Action, including towing and anchoring. It is difficult to differentiate between behavioral responses to vessel sound and visual cues associated with the presence of a vessel (Hazel et al. 2007); thus, it is assumed that both play a role in prompting reactions from animals. Vessels have the potential to impact or harm fish by disturbing fish in the water column or causing mortality or serious injury from vessel collisions.

In most of the proposed action areas, the majority of the fish biomass is benthic, and therefore not at risk of a vessel collision. The potential for a pelagic fish to be struck by a vessel associated with the Proposed Action would be extremely low because most fish can detect and avoid vessel movement. As a vessel approaches, a fish could have a detectable behavioral or physiological response (e.g., swimming away and increased heart rate) as the passing vessel displaces them. Regardless of speeds, vessel collisions with fish are possible, albeit extremely rare. Any isolated case of a vessel striking an individual fish could injure or kill that fish, but would not be expected to have population level impacts. Behavioral reactions to vessels often include changes in general activity (e.g., from resting or feeding to active avoidance) and changes in speed and direction of movement. Sudden escape responses of fish to a vessel may include a lateral avoidance or downward compression of the school. It would be anticipated that temporary behavioral reactions (e.g., temporary cessation of feeding or avoidance response) would not impact the individual fitness of a fish, as individuals are expected to resume normal behavior after the vessel passes through the area.

Anchoring, which is considered in this PEIS/POEIS to be a part of vessel movement, would occur in designated anchorages, which are usually soft-bottom areas with regular bottom disturbance. Anchoring may disturb benthic fish species and would likely cause behavioral reactions similar to those caused by general vessel movement, as discussed above. Anchoring would not be expected to strike, injure, or kill any fish found in the proposed action area.

3.4.4.2.4 Military Expended Materials

Marine fish in the proposed action areas may be exposed to MEM during the Proposed Action. Inert small caliber (0.50 caliber or MK-38 standard [25 mm]) and large caliber (57 mm) gun rounds, as well as the Nulka round, used in gunnery training may enter the water as MEM during the Proposed Action and would not be recovered. MEM from targets would not present a significant threat to marine fish populations because of the small numbers of these targets used and the large distance which expended material would be dispersed throughout the established training range within a proposed action areas. Therefore, targets left as expended material are not in high enough densities to cause population level impacts to fish. In addition, it would be expected that marine microbes and fungi would degrade targets over time (Doi et al. 1992), although potentially at a slow rate (Shah et al. 2008).

Small and large caliber practice munitions immediately travel through the water column and settle on the seafloor. Thus, the potential for ingestion risk is present for fish species that feed on the seafloor and in relatively deep waters where gunnery training would occur. Bottom-dwelling fish could ingest these settled projectiles from the seafloor. It is also possible that settled projectiles (including the Nulka decoy) would be colonized by seafloor organisms, mistaken for prey, and accidentally or intentionally eaten during foraging. The metal of the munitions would corrode slowly or may become covered by sediment in some habitats, reducing the likelihood that a fish would encounter them. Due to the infrequent occurrence and the offshore location of gunnery training, MEM would not present a significant threat to marine fish populations. As there are no bottom-dwelling ESA-listed species that occur at the offshore locations where small and large caliber projectiles would be expended, the potential does not exist for ESA-listed fish species to ingest these items. All ESA-listed benthic feeders are located in nearshore environments.

3.4.4.2.5 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, any potential impacts to marine fish would be limited to fathometer noise and vessel noise, vessel movement, and MEM associated with gunnery training from the Proposed Action.

Most vessel use associated with the Proposed Action would occur in waters primarily between 12 nm (22 km) from shore and inside 200 nm (370 km) and would be widely distributed throughout the proposed action areas. Vessel use in inshore waters would limited to transit to and from the vessel's homeport. As discussed in Sections 3.4.4.2.1, 3.4.4.2.2, and 3.4.4.2.3 respectively, the area exposed to noise and disturbance from vessels would be a small portion of the proposed action areas, and only a small number of individuals would be affected compared to overall abundance. Therefore, the impact of the fathometer and vessel noise, and vessel movement on marine fish would be inconsequential and would not result in significant impact or harm to marine fish.

Most weapons firing activities would occur far from shore (Section 2.3.5), and as discussed in Section 3.4.4.2.4, those seabirds that forage or migrate greater than 3 nm (6 km) offshore are likely to detect and potentially respond to gunnery noise. Additionally, as discussed in Section 3.4.3.2.6, due to the infrequent occurrence and the offshore location of gunnery training, MEM would not present a significant threat to marine fish populations.

Pursuant to the ESA, there would be no effect to ESA-listed fish (Table 3-15), from fathometer and Doppler speed log noise, as the effects of acoustic noise are generally thought to be outside of the hearing ranges of these species. There would also be no effect to ESA-listed fish species (Table 3-15) as a result of MEM under Alternative 1, as there are no bottom-dwelling ESA-listed species that occur at the offshore locations where small caliber projectiles would be expended, the potential does not exist for ESA-listed fish species to ingest these items. All ESA-listed benthic feeders are located in nearshore environments. Vessel noise and vessel movement associated with the Proposed Action may affect, but are not likely to adversely affect ESA-listed fish species (Table 3-15) under Alternative 1.

3.4.4.2.6 Impacts Under Alternatives 2–3

Under Alternatives 2–3, any potential impacts to marine fish would be similar to those discussed for activities under Alternative 1. There could be a potential reduction in the number of vessels conducting the Coast Guard's mission in the proposed action areas. However, the difference would not result in substantive changes to the potential for or types of, impacts to marine fish. Therefore, there would be no significant impact or harm to marine fish under Alternatives 2–3.

As discussed above, the fathometer and vessel noise, vessel movement, and MEM associated with the Proposed Action would not result in significant impact or harm to marine fish. Pursuant to the ESA, there would be no effect to ESA-listed fish (Table 3-15) from fathometer and Doppler speed log noise, as the effects of acoustic noise are generally thought to be outside of the hearing ranges of these species. There would also be no effect to ESA-listed fish species (Table 3-15) as a result of MEM under Alternatives 2–3. Vessel noise and vessel movement associated with the Proposed Action may affect, but are not likely to adversely affect ESA-listed fish species (Table 3-15) under Alternatives 2–3.

3.4.4.2.7 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, the physical and acoustic disturbances associated with the Proposed Action would not be introduced into the marine environment, with the exception of OPCs 1–5. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impact or harm to marine fish with implementation of the No Action Alternative.

3.4.5 Essential Fish Habitat

3.4.5.1 Affected Environment

The fisheries of the United States are managed within a framework of overlapping international, federal, state, interstate, and tribal authorities. States have jurisdiction over fisheries in marine waters within close proximity, typically within 3 nm (5 km) of the state's coast, except for the Gulf of Mexico (Texas, Louisiana, Mississippi, Alabama and the Gulf coast of Florida) where state waters extend to 9 nm (15km). Federal jurisdiction includes fisheries in marine waters inside the U.S. territorial waters and the U.S. EEZ, which encompasses the area from the outer boundary of state waters out to 200 nm (370 km) offshore of any U.S. coastline, except where intersected closer than this by bordering countries (61 FR 19390; May 1, 1996). The proposed action areas cover coastal and offshore ecosystems within the U.S. EEZ, as well as state waters.

To protect fisheries resources, NMFS works with the eight regional fishery management councils (FMCs) to identify the essential habitat for every life stage of each federally-managed fish species. EFH is defined as the waters and seafloor necessary for spawning, breeding, or growth to maturity, and has been designated for approximately 1,000 managed species to date (50 CFR, 600.05 through 600.930). EFH includes all types of aquatic habitat including wetlands, coral reefs, seagrasses, and rivers, targeting locations where fish spawn, breed, feed, or grow to maturity (16 U.S.C. § 1802(10)).

NMFS's Highly Migratory Species Division is responsible for tunas, sharks, swordfish, and billfish in the Atlantic Ocean and Gulf of Mexico (NMFS 2009a). FMCs are required to identify EFH for each fishery covered under a fishery management plan (FMP). In many cases, where fish move between regions or occupy large home ranges, the FMCs may co-manage a species, and/or may designate EFH for a species that stretches into the jurisdictional area of a different council, causing substantial overlap in the designation of EFH. Figure 3-1 shows an overview map of the EFH designated within each proposed action area.

Virtually all marine waters of the U.S. and U.S. EEZ are designated as EFH for at least one managed species of fish. Table 3-16 outlines which species have EFH designated in each proposed action area, and which councils are responsible for the management of each species. In some cases, the species (e.g., spiny lobster) is mentioned in the table multiple times. This may be because the species is managed separately by different councils (in this case, the South Atlantic Fishery Management Council [SAFMC], Caribbean Fishery Management Council [CFMC], and Western Pacific Regional Fishery Management Council [WPRFMC]). In other cases, the species is co-managed (e.g., Atlantic mackerel, squid, and butterfish, which are co-managed by the New England Fishery Management Council [NEFMC] and the Mid-Atlantic Fishery Management Council [MAFMC]), and therefore the species is listed in Table 3-16 only once.

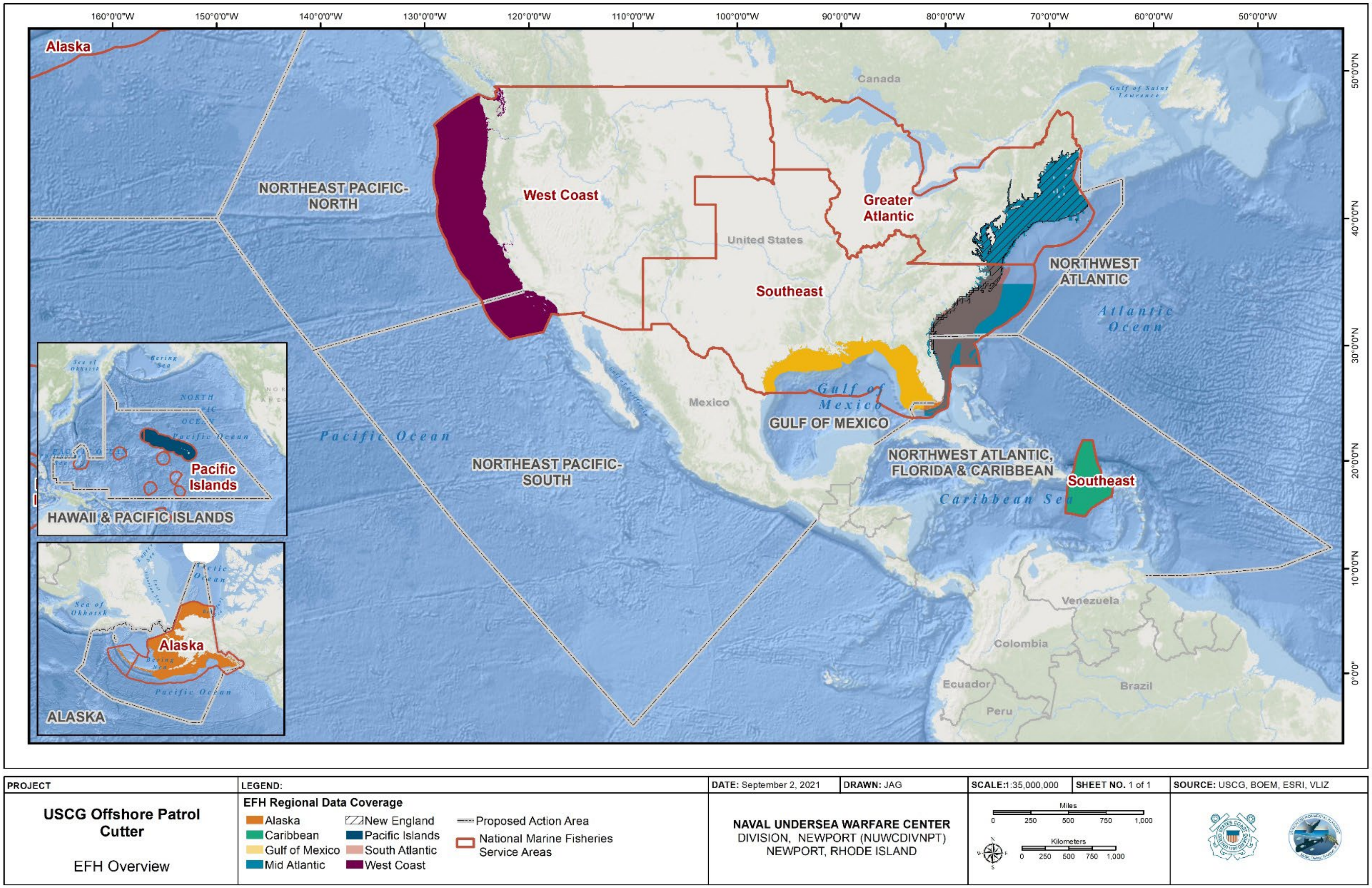


Figure 3-1. EFH Designated within the Proposed Action Areas

Table 3-16. EFH Designations by Proposed Action Area

Fishery Management Plan/Management Unit	Proposed Action Areas							Managing Agency or FMC
	NW-ATL	NW-ATL Florida and the Caribbean	GoMEX	NEPAC-South	NEPAC-North	AK	HI-PAC	
Atlantic herring	x							New England Fishery Management Council (NEFMC)
Atlantic salmon	x							
Monkfish	x							
Northeast multispecies	x							
Northeast skate complex	x							
Sea scallop	x							
Atlantic mackerel, squid, and butterfish	x							Mid Atlantic Fishery Management Council (MAFMC)
Bluefish	x							
Dogfish	x							
Summer flounder, scup, black sea bass	x							
Surfclam and ocean quahog	x							
Tilefish	x							
Coastal migratory pelagics	x	x	x					South Atlantic Fishery Management Council (SAFMC)
Corals	x	x						
Dolphin-Wahoo	x	x						
Golden crab	x	x						
Sargassum	x	x						
Shrimp		x	x					
Spiny lobster	x	x	x					
Snapper-Grouper (grunt, jack, porgie, seabass, grouper, snapper, spadefish, tilefish, triggerfish, wrasse, wreckfish)	x	x	x					
Red drum		x	x					Gulf of Mexico Fishery
Reef fish		x	x					
Stone crab		x	x					

Fishery Management Plan/Management Unit	*Proposed Action Areas*							*Managing Agency or FMC*
	NW-ATL	*NW-ATL Florida and the Caribbean*	*GoMEX*	*NEPAC-South*	*NEPAC-North*	*AK*	*HI-PAC*	
								Management Council (GMFMC)
Corals and reef-associated invertebrates of Puerto Rico and the U.S. Virgin Islands		x						Caribbean Fishery Management Council (CFMC)
Queen conch resources of Puerto Rico and the U.S. Virgin Islands		x						
Reef fish fishery of Puerto Rico and the U.S. Virgin Islands (angelfish, boxfish, goatfish, jack, parrotfish, porgie, squirrelfish, sturgeonfish, triggerfish, filefish, wrasse)		x						
Spiny lobster		x						
Atlantic highly migratory species (billfish, sharks, swordfish, tunas)	x	x	x					NOAA-NMFS
Alaska salmon						x		North Pacific Fishery Management Council (NPFMC)
Alaska weathervane scallops						x		
Bering Sea/Aleutian Islands groundfish						x		
Bering Sea/Aleutian Islands king and tanner crabs						x		
Fish resources of the Arctic Management Area						x		
Gulf of Alaska groundfish						x		
Coastal pelagics				x	x			

Fishery Management Plan/Management Unit	*Proposed Action Areas*							*Managing Agency or FMC*
	NW-ATL	*NW-ATL Florida and the Caribbean*	*GoMEX*	*NEPAC-South*	*NEPAC-North*	*AK*	*HI-PAC*	
Pacific Coast groundfish (flatfish, rockfish, roundfish, skates/sharks/chimaeras, thornyhead)				x	x			Pacific Fishery Management Council (PFMC)
Bottomfish and seamount groundfish							x	Western Pacific Regional Fishery Management Council (WPRFMC)
Crustacean (kona crab and deepwater shrimp)							x	
Pelagic fish							x	
Precious corals							x	

A brief review of the general types of habitats which are frequently designated as EFH by the various councils are provided in Table 3-17.

Table 3-17. EFH Habitat Types

EFH Category	*Description*	*Example FMPs*	*Proposed Action Areas*	*Section in PEIS/POEIS*
Water column	All waters from the surface to the ocean floor (but not including the ocean bottom), including bays, estuaries, and rivers and floating Sargassum	NEFMC Atlantic Herring; SAFMC Sargassum; WPRFMC Pelagic Fish	All	Section 3.4.5.1.1
Benthic: soft-bottom	May include the seafloor substrate on the continental shelf and slope that consists of soft or unconsolidated sediments such as gravel, cobbles, pebbles, sand, clay, mud, silt, and shell fragments	NEFMC Northeast Multispecies; MAFMC Surfclam and Ocean Quahog; NPFMC Gulf of Alaska Groundfish	All	Section 3.4.5.1.2
Benthic: hard-bottom	Consolidated sediments such as rock, areas of vertical relief such as crevices, overhangs, and vertical walls	CFMC Reef Fish of Puerto Rico and the U.S. Virgin Islands; GMFMC Reef Fish; SAFMC Coral	NW-ATL; NW-ATL-Florida and the Caribbean; GoMEX; HI-PAC. Uncommon in NEPAC-South, NEPAC-North, and AK.	Section 3.4.5.1.3
Submerged and shoreline vegetation	Seagrass, kelp, macroalgae, saltmarsh, mangrove	SAFMC Sargassum, MAFMC Summer Flounder, Scup, Black Seabass; SAFMC/GMFMC Snapper Grouper	All	Section 3.4.5.1.4
Biogenic reefs	Scallop beds, mussel beds, oyster reefs, coral reefs	NPFMC Weathervane Scallop; WPRFMC Precious Corals; CFMC Corals and Reef Associated Invertebrates	All	Section 3.4.5.1.5

3.4.5.1.1 Water Column

The water column itself, apart from associated benthic or structural features, provides EFH for many species. Coastal and open ocean waters occur above the continental shelf and roughly encompass the top 600 ft (200 m) of the ocean known as the photic zone (Karleskint et al. 2012). All waters from the surface to the ocean floor (but not including the ocean bottom) are part of the marine water column, though EFH for some species and/or life stages is restricted to certain portions of the water column (e.g., the photic zone). The water column is particularly important for planktonic life stages (eggs and larvae) and all life stages of planktivorous (plankton-eating) species, such as herring, sardine, and anchovy (New England Fisheries Management Council 2016; NMFS 2009a; South Atlantic Fishery Management Council 1998, 2009).

Oceanic currents influence the occurrence and abundance of marine fish throughout the proposed action areas. The nearshore Atlantic Ocean is dominated by the warm Gulf Stream, which provides a dispersal mechanism for the larvae of many species (such as the Snapper-Grouper Management Unit, Coastal Migratory Pelagic Management Unit, Dolphin-Wahoo Management Unit, and Golden Crab Management Unit) (South Atlantic Fishery Management Council 2009). The Loop Current in the Gulf of Mexico and the Florida Current in the Florida Straits provide critical transport of larvae and floating *Sargassum*, connecting populations in the Gulf of Mexico, the Caribbean Sea, and the Atlantic Ocean (Pickard and Emery 2016). *Sargassum* is important EFH that provides habitat for numerous pelagic fishes and other organisms (Hurd et al. 2014).

Major surface currents in the NEPAC-North and NEPAC-South proposed action areas include the California Current, the California Countercurrent, the North Equatorial Current (NEC), the North Hawaiian Ridge Current, and the Hawaii Lee Current. Eastern boundary currents such as the California Current carry cold waters from higher latitudes to lower latitudes. The California Current flows south along the coasts of Washington, Oregon, California, and the Baja Peninsula, where it joins the North Pacific Subtropical Gyre via the westward flowing NEC. It carries cold, low-salinity water with high dissolved oxygen and high nutrient concentrations southward, producing a region of high productivity which supports a diverse fishery (Di Lorenzo et al. 2013).

The HI-PAC proposed action area is influenced by the North Pacific Current, NEC, North Hawaiian Ridge Current, and Hawaii Lee Current. Surface currents around the Mariana Archipelago are heavily influenced by the NEC, which is driven westward by trade winds (Wolanski et al. 2003). The currents, combined with geographic isolation, combine to support extensive migrations and ranges for some species (e.g., tunas and sea turtles), while also producing ecosystems with a high degree of endemism, particularly within the reef fish community (Helfman 2009; Nelson et al. 2016).

Bays, estuaries, and lagoons are designated as water column EFH for spawning, nesting, development, dispersal, and feeding for many species (South Atlantic Fishery Management Council 1998). In some cases (such as for bluefish and summer flounder), EFH is further defined by certain salinity ranges within estuarine areas, as larval fish often tend to move along the edge of the “salt wedge” of an estuary as it moves in and out seasonally and tidally. A substantial number of finfishes and shellfishes in the proposed action areas are estuarine-dependent for some part of their lives, including commercially-valuable shrimp, oyster, menhaden, and crabs. In addition, anadromous fishes may use estuaries as temporary stopovers during spawning migrations (Froese and Pauly 2019; Nelson et al. 2016).

3.4.5.1.2 Benthic: Soft-Bottom

Soft-bottom benthic habitat refers to unconsolidated bottom habitats including loose rocks, gravel, cobble, pebbles, sand, clay, mud, silt, and shell fragments, as well as the water-sediment interface used by many invertebrates. A variety of species, including fishery target species such as cod and flounder, as well as important forage species like sand lance, use these unconsolidated bottom habitats for spawning and nesting, development, dispersal, and feeding (New England Fisheries Management Council 2016; NMFS 2000; South Atlantic Fishery Management Council 1998).

Soft-bottom sediments range in size from gravel (larger than 2.0 millimeters [mm]) to sand (0.05 to 2.0 mm), silt (0.002 to 0.05 mm), and clay (< 0.002 mm). Sediment deposited on the continental shelf is mostly delivered by rivers, but also by local and regional currents and wind (Wren and Leonard 2005). Sediment quality is influenced by its physical, chemical, and biological components, where it is deposited, and the properties of seawater, contaminants, and other factors. Benthic fauna and infauna often disturb and process sediments in the process of feeding and burrowing. In this way, marine organisms can influence the structure, texture, and composition of sediments as well as the horizontal and vertical distribution of substances in the sediment (Boudreau 1998).

Almost the entire continental shelf along the eastern United States is covered by medium-sized sand (0.35 to 0.50 mm). Nearshore areas of capes and the extensive estuaries of the Atlantic Coast, such as Chesapeake Bay, Long Island Sound, and Narragansett Bay, tend to trap much of the fine sediment delivered by rivers (Murray and Thieler 2004). In Alaska and the Pacific Northwest, the dominant bottom substrate of the continental shelf and slope is typically covered with silts, clays, and fine sediments (Molnia 2012). Soft-bottom habitat is the dominant habitat in the NEPAC-North and NEPAC-South proposed action areas, accounting for about 70 to 90 percent of bottom habitat (Stephens et al. 2006). Sandy sediments are common in nearshore and shelf break portions of the proposed action areas, while silt, clay, and mud sediments are common between the shelf break and nearshore sand sediments. Bays and harbors in the Pacific Islands are dominated by fluvial sediment (sediments deposited by rivers and streams) and sediments composed of carbonate grains derived from organisms, such as corals and mollusks. The offshore habitats of the Hawaiian and Mariana Islands have similar substrate compositions at depths of 984 to 5,249 ft (300 to 1,600 m) and are dominated by silty sands and clay. There is an increasing occurrence of rocky outcrops and coral rubble at shallow depths. More than 50 percent of the nearshore areas of the NWHI are considered soft-bottom (Friedlander et al. 2009).

3.4.5.1.3 Benthic: Hard-Bottom

The principal value of hard-bottom habitat is to provide attachment sites for kelp, corals, and other organisms that create habitat. However, not all hard-bottom substrates can support living communities because low oxygen, swift currents, or other physical or chemical conditions may render some areas unsuitable as habitat even when high quality substrate is available (Levinton 2009a). All live hard-bottom communities depend on dynamic processes to keep them relatively free of sediment that can injure or kill the sessile organisms that are essential for the community (Bertness et al. 2001).

Live hard-bottom is also created by oysters, mussels, and other sessile invertebrates (Table 3-17). Hard substrates support communities of living organisms such as sponges, mussels, hydroids, amphipod tubes, red algae, bryozoans, corals or oysters (Wahl et al. 2009). Features, such as vertical orientation and surface texture, determine which species will attach and persist in a given hard-bottom area. The particular community that develops on a hard surface is shaped by the latitude, water depth, underlying substrate type, light availability, temperature, size, three-dimensional profile, and other characteristics of the surrounding water (Rowe and Kennicutt 2009; Wahl et al. 2009). Hard-bottom habitat is used by many adult members of the Snapper-Grouper Management Unit for feeding, shelter, and spawning (South Atlantic Fishery Management Council 2009).

Most of the rocky subtidal bank habitat of the U.S. Atlantic Coast occurs from Massachusetts northward into the Gulf of Maine (Roman et al. 2000). The Grand Banks and Georges Bank are extremely important habitat for fisheries managed by the New England and Mid-Atlantic FMCs (New England Fisheries Management Council 2016; NMFS 2020a). In the Gulf of Maine, shallow hard-bottom is colonized by kelp and other algae in water less than about 33 ft (10 m) deep. Anemones, bryozoans, mussels, tunicates, and even soft corals attach tightly to the rocky hard-bottom, creating long-lived complex communities. This hard-bottom community is visited by lobsters, crabs, sea stars, snails, sea urchins, and fishes (Tyrrell 2005).

In the southeastern United States, live hard-bottom supporting sea fans, sea whips, hydroids, anemones, sponges, corals, and their associated fish fauna occurs on the Florida-Hatteras shelf south of Cape Hatteras. Live hard-bottom off the Atlantic Coast of Florida is most similar to coral reefs. Underdeveloped coral reefs on the periphery of mature reefs provide live hard-bottom habitat around the Florida Keys. The west-central Florida inner continental shelf coast consists of exposed hard-bottom containing ledges or scarps. These limestone outcroppings support complex live hard-bottom communities on vertical faces up to 13 ft (4 m) above the seafloor (French and Schenk 1997; Hine et al. 2003). In the Gulf of Mexico, many commercially important groups including snappers, groupers, grunts, and porgies, in the Snapper-Grouper and Reef Fish Management Units are associated with hard-bottom habitats (United States Mineral Management Service 2007).

Shallow hard-bottom communities are relatively uncommon and patchy on the Pacific Coast of the United States and have not been mapped extensively (Whitmire and Clarke 2007a). The dominant bottom substrate of the continental shelf and slope in Alaska and the Pacific Northwest is typically covered with silts, clays, and fine sediments; however, there is occasional hard-bottom substratum (e.g., rocky outcroppings, rubble, talus, vertical wall, and seamounts) that supports a diverse assemblage of deep sea invertebrates and fishes. Bottom substrate type governs the abundance and diversity of deep sea organisms. Abundance and diversity are generally higher on hard, irregular substrates than on smooth, hard surfaces (Lissner et al. 1991). Hard-bottom is abundant around Hawaii in the form of basalts and consolidated limestone, although much of it has not been colonized (Friedlander et al. 2009; Locker et al. 2010). Although EFH is no longer designated in Hawaii for the Coral Reef Ecosystem Management Unit, these habitats and species remain important and protected as ecosystem components.

3.4.5.1.4 Shoreline and Submerged Vegetation

Nearshore and submerged vegetation such as salt marshes, mangrove communities, and seagrass beds often form a habitat mosaic in areas of low wave energy. These communities provide valuable ecosystem services and resources by stabilizing the coastline and acting as nurseries for many commercially and recreationally-important species, including menhaden, flounder, sea trout, parrotfish, snapper, spot, striped bass, shrimp, and crab (Coles et al. 2014; Green et al. 2003). These species use shallow, complex habitats as breeding grounds or nursery habitats. In some cases (e.g., PFMC) these habitats are called out and protected directly, and in other cases (e.g., SAFMC's Paneid shrimp EFH), they are protected as part of an individual FMP. Some of these organisms are temporary residents—

adults spawn offshore and their offspring migrate to the salt marsh as juveniles for shelter and food. When the juveniles have matured, they migrate offshore or into estuaries as adults. Others are permanent residents, living their entire lives within these shallow coastal systems (Green et al. 2003; Mitsch et al. 2009). Submerged aquatic vegetation, including seagrasses, kelp, and other macroalgae, are found throughout the proposed action areas. Submerged aquatic vegetation is most prolific in estuarine and nearshore areas, particularly those areas with clear water. While globally distributed, these biomes are only found in shallow waters where sunlight penetrates to the bottom, and thus, would only be encountered in the shallowest portions each proposed action area, or in nearshore areas where OPCs may transit to and from the homeport. For more information on shoreline and submerged vegetation, see Appendix G.

3.4.5.1.5 Biogenic Reefs

Biogenic reefs come in a variety of forms that provide EFH for numerous fish species. The principal reef-creating organisms are bivalves (e.g., oysters, scallops, mussels) and stony corals, though there is substantial variation in the form and function of this type of habitat (Table 3-18). Numerous other invertebrates contribute to the complexity of the biogenic reef ecosystem. Both living organisms and the calcareous remains of dead individuals contribute to the habitat value of biogenic reefs (South Atlantic Fishery Management Council 1998).

Table 3-18. Biogenic Habitat Types Occurring in the Proposed Action Areas

Biogenic Reef Habitat Type	***Description***
Scallop beds	Areas of substrate covered with large aggregations of scallops.
Oyster reefs	Distinct aggregations of oyster shells and live oysters in intertidal and subtidal areas; they often occur in nearshore areas with brackish water.
Shell banks	Distinct aggregations of oyster shells and live oysters in intertidal and subtidal areas.
Shell beds	Areas of substrate covered with large aggregations of shells.
Clam beds	Areas of substrate covered with large aggregations of clams.
Shell patches	Areas of substrate covered with small aggregations of shells.
Mussel beds	Areas of substrate covered with large aggregations of mussels.
Coral	Invertebrate colonies of polyps that secrete calcium carbonate to form a hard exoskeleton.
Hydroids	Invertebrate, filter-feeding, colonial organisms found on hard substrate; some species have polyp and medusa life stages and nematocysts.
Bryozoans	Invertebrate, filter-feeding, mostly colonial organisms with a crown of tentacles found on hard substrate.
Amphipod tubes	Small, flat crustaceans that build tubes out of sand, detritus, and amphipod silk.
Sponge beds	Areas with a dense coverage of sponges.
Live bottom	Low-diversity coral community characterized by a thin veneer of live corals and other sessile biota overlying hard or rocky sediment types.
Coral reefs	Aggregations of stony corals that form three-dimensional habitat with high biodiversity.
Deep water corals	Ivory tree coral (*Oculina varicosa*) and tuft coral (*Lophelia pertusa*) provide habitat for many EFH species offshore of Florida and the Gulf of Mexico.
Sponges	Sessile, filter-feeding organisms with a hollow body; important inhabitant of coral reefs.

Shell beds and reefs create three-dimensional structure and topographic relief that vastly expand the variety of microhabitats available in a given area, providing food and shelter to resident and transient species. The hard structure of the reef provides attachment substrate for larvae of reef-building organisms, causing the reef to grow over time. In some cases (e.g., NEFMC Sea Scallop, SAFMC Coral) the habitat forming species are directly protected as a Management Unit, whereas in other cases (e.g. WPRFMC Bottomfish, GMFMC and CFMC Reef Fish Complex Management Units) the complex habitat of a biogenic reef is protected because it can be markedly more productive than the surrounding mudflat or soft-bottom habitat, and supports management unit species. For example, oyster reefs support clams, mussels, anemones, polychaetes, amphipods, sponges, and many species of crabs, which in turn are preyed upon by management unit species such as red drum (*Sciaenops ocellatus*), black seabass, summer flounder (*Paralichthys dentatus*), and Atlantic cod (*Gadus morhua*).

Oysters, such as the American oyster, create important habitat in nearshore subtidal areas in all marine ecosystems throughout the proposed action areas, though they are most prevalent in the Mid-Atlantic region. Large oyster beds also alter the physical environment where they occur by slowing the currents, leading to sediment deposition (Tyrrell 2005). Although populations have declined appreciably, oysters still provide substantial habitat within the proposed action areas (Eastern Oyster Biological Review Team 2007).

Coral reefs are produced by stony corals (Section 3.4.2.1.1.2) that create rich, three-dimensional habitat with their calcium carbonate skeletons in otherwise low-relief hard-bottom areas (Spalding et al. 2001; Waddell and Clarke 2008). Like oyster reefs, the complex structures of coral reefs have tiny crevices and large holes that serve as shelter sites and breeding areas for invertebrates and fishes. The sharp edges of the reef serve as spawning platforms for animals that broadcast their gametes into the water column; the coral rubble around the perimeter serves as ancillary hard-bottom for non-reef-building organisms that require a stable attachment point. More groups of algae and animals are represented on coral reefs than in any other habitat on Earth (Sheppard et al. 2017). In addition to providing physical structure to the entire reef community, corals are eaten by other animals, including parrotfish, polychaetes, barnacles, crabs, and gastropods (Spalding et al. 2001).

Coral reefs are ecosystems of several linked habitats, including unconsolidated sediment, colonized hard-bottom, and submerged vegetation that are organized around a framework of structural components such as the reef crest, lagoon, and fore reef. A functioning coral reef integrates processes and services from all of these components (Rohmann et al. 2005). The framework of coral reefs is composed of sessile, colonial invertebrates in the phylum Cnidaria, in classes Hydrozoa and Anthozoa. The most well-known corals are the stony corals, in the order Scleractinia (Sheppard et al. 2017). Coral reef ecosystems in the western Atlantic Ocean provide habitat for more than 2,000 species of sponges, gastropods, bivalves, crustaceans, echinoderms, and fish (Spalding et al. 2001).

Coral reefs are the dominant nearshore habitat type throughout the Caribbean and Western Pacific U.S. Territories. Fringing reefs are the most common type of reef. Culebra and Vieques Islands are nearly surrounded by reefs. The islands of Saint Croix, Saint John, and Saint Thomas of the U.S. Virgin Islands have fringing reefs, patch reefs, and spur and groove reefs; St. Croix also has barrier reefs. A survey that included depths to 66 ft (20 m) found approximately 114 mi^2 (296 km^2) of coral reef and hard-bottom habitat (Causey et al. 2002). Coral reefs cover approximately 1,301 mi^2 (3,370 km^2) within 3 nm (5.6 km) of the Puerto Rico coastline (Causey et al. 2002; Wilkinson 2000).

On the Atlantic Coast, shallow water coral reefs are restricted to the Florida Keys and reef patches in the Gulf of Mexico (Flower Garden Banks), and Puerto Rico (Waddell and Clarke 2008; Wilkinson 2000). The coral reefs of the Florida Keys support 64 species of coral, Flower Garden Banks support 21 species of coral, and Puerto Rico supports 117 species of coral (Causey et al. 2002). Corals in the Gulf of Mexico cover approximately 618 mi^2 (1,600 km^2) (Spalding et al. 2001). In the central and eastern part of the Gulf of Mexico, coral reefs occur in Flower Garden Banks (on the Texas shelf), at Pulley Ridge (Ecological Reserve), and around the Dry Tortugas (Ecological Reserve) and the Florida Keys (Florida Reef Tract) (Rohmann et al. 2005; Spalding et al. 2001). The outer bank reefs of the Florida Reef Tract are restricted geographically to the Florida Keys. Approximately 170 mi (270 km) of outer bank reefs occur as a discontinuous arc between Fowey Rocks (near Miami) and the Dry Tortugas. A large portion of the Reef Tract is in the U.S. EEZ (South Atlantic Fishery Management Council 1998, 2009).

Coral reefs occur on the MHI, islets that fringe the MHI, and the NWHI (Maragos et al. 2004b). The geographic extremities of coral occurrence in the Hawaiian archipelago are the island of Hawaii on the southeastern end of the archipelago and Kure Atoll at the northwestern end of the archipelago. Reef habitats include linear reefs, aggregated coral, spur and groove reefs, patch reefs, coral heads, scattered coral/rock in unconsolidated sediments, colonized pavement, and colonized volcanic rocks and boulders (Maragos et al. 2004b). The Hawaiian Islands have 5,100 square nautical miles (nm^2; 17,520 km^2) of coral reef area, representing 84 percent of the coral reef area in the United States (1,021 nm^2 [3,504 km^2] in the MHI and 4,086 nm^2 [14,016 km^2] in the NWHI). The NWHI contain approximately 80 percent of the coral reef habitat in the Hawaiian archipelago (Maragos et al. 2004b).

Coral reefs occur throughout the Mariana Islands (Spalding et al. 2001). Subtidal regions are characterized by limestone pavement interspersed with coral colonies and submerged boulders. The degree of reef development depends on a number of environmental controls including the age of the islands, volcanic activity, availability of favorable substrates and habitats, weathering caused by groundwater discharge, sedimentation and runoff accentuated by land use practices, and varying levels of exposure to wave action, trade winds, and storms (Bearden et al. 2005). In the CNMI, coral growth was reported to be limited by wave energy and exposure to fresh water (Waddell and Clarke 2008).

Deep coral communities inhabit continental shelves, slopes, canyons, and seamounts in waters ranging in depth from 164 ft (50 m) to more than 9,843 ft (3,000 m) (Hourigan et al. 2007). Deep water corals (Section 3.4.2) that inhabit these areas do not form reefs like those in shallow tropical waters. Instead, they often create dense structure- and habitat-forming colonies. Most deep water corals are gorgonians (e.g., horn corals) and antipatharians (black or thorn corals) (Etnoyer and Morgan 2005b; Etnoyer 2010; Hourigan et al. 2007). Biologically-rich and diverse communities of crustaceans, mollusks, echinoderms, polychaetes, sipunculan worms, sponges, and other macrofauna can be associated with the structure-forming corals (Etnoyer and Morgan 2005b).

3.4.5.1.6 Habitat Areas of Particular Concern

FMCs and NMFS may designate Habitat Areas of Particular Concern (HAPC; a subset of designated EFH comprising the habitats that a species is known to occupy) to conserve fish habitat in geographical locations particularly critical to the survival of a species. This subset could include spawning habitat; nursery habitat for larvae, juveniles, and subadults; and some amount of foraging habitat for mature adults. Designation of HAPC helps focus conservation efforts on locations most important to the continued survival of managed species, but these areas do not garner any special regulatory status beyond the associated EFH. HAPC is present within all of the proposed action areas, but constitutes only a very small portion of each proposed action area. In addition, much of the HAPC is designated in shallow coastal areas (e.g., seagrass beds, estuaries, sandy banks) which would only be encountered during transit, if at all.

Deep water coral communities are known from all marine ecosystems in the United States on hard substrates, particularly near the continental shelf break, on the continental slope, on seamounts, and surrounding oceanic islands; however, specific details of their distribution are sparse (Hourigan et al. 2007). The Charleston Bump (off the coast of South Carolina), Blake Plateau (off the coasts of Florida, Georgia, South Carolina, and North Carolina), Oculina Banks (off the coast of Florida), and the Pinnacles (off the coasts of Florida and Alabama) all contain deep water coral habitat (Reed et al. 2006). Although not presently designated, NOAA's Deep Sea Coral Research and Technology Program is investigating deep water corals in these areas to support the potential designation of deep water coral HAPC (Schull et al. 2016). High relief limestone outcrops provide hard bottom habitat for corals, octocorals, and sponges on the Miami and Pourtalès Terraces (off southeastern Florida), and tuft coral banks occur at the base of the Miami Terrace and Escarpment (Reed et al. 2006). Furthermore, most of the deep water HAPC is designated around seamounts and underwater canyons that would be minimally impacted by the Proposed Action. Designated HAPC for each proposed action area, along with the life stages for which it is designated, and the appropriate FMP and FMC is shown in Table 3-19.

Table 3-19. Species or FMPs with HAPC Designated Within the Proposed Action Areas

EFH Species or FMP with HAPC Identified	*HAPC Description*	*Designated Life Stages*	*Proposed Action Areas*	*FMC(s)*
Atlantic cod	Gravel and cobble substrate along the northern edge of Georges Bank (Closed Area II)	Juveniles	NW-ATL	NEFMC
Atlantic salmon	Eleven rivers in Maine	All life stages	NW-ATL	NEFMC
Summer flounder	All native species of macroalgae, seagrass, and freshwater and tidal macrophytes within designated EFH	Juveniles and adults	NW-ATL	MAFMC; ASFMC
Tilefish	Clay outcrop/pueblo habitats within Norfolk, Veatch, Lydonia, and Oceanographer Canyons at the depth range specified for tilefish (also nominated MPAs)	Juveniles and adults	NW-ATL; NW-ATL Florida and the Caribbean	MAFMC; ASMFC
Snapper-Grouper complex	Medium to high profile offshore and nearshore hard-bottom, *Sargassum,* hermatypic coral habitats and reefs; manganese outcroppings on Blake Plateau; artificial reef Special Management Zones; The Point (NC); Ten Fathom Ledge (NC); Big Rock (NC); Charleston Bump (SC); Hoyt Hills; Oculina Banks; seagrass, mangrove, and oyster/shell habitat; coastal inlets and state-designated nursery habitats	All life stages	NW-ATL; NW-ATL Florida and the Caribbean; GoMEX	SAFMC

EFH Species or FMP with HAPC Identified	***HAPC Description***	***Designated Life Stages***	***Proposed Action Areas***	***FMC(s)***
Dolphin- wahoo	The Point (NC); Ten Fathom Ledge (NC); Big Rock (NC); Charleston Bump (SC); Georgetown Hole (SC); Amberjack Lump (FL); the Hump off Islamorada, FL; Marathon Hump, FL; the Wall off the Florida Keys; the Gulf Stream and associated eddies within the U.S. EEZ	All life stages	NW-ATL; NW-ATL Florida and the Caribbean	SAFMC
Spiny lobster	Florida Bay, Biscayne Bay, Card Sound, and coral/hard-bottom habitat from Jupiter Inlet, FL, through the Dry Tortugas, FL	All life stages	NW-ATL Florida and the Caribbean; GoMEX	GMFMC; SAFMC
Coastal Migratory Pelagic Management Unit	Sandy shoals associated with Cape Lookout, Cape Fear, and Cape Hatteras, NC, from shore to the limit of the shoals, but shoreward of the Gulf Stream; The Point (NC); *Sargassum*; Ten Fathom Ledge (NC); Big Rock (NC); Charleston Bump (SC); Hurl Rocks (SC); the Point off Jupiter Inlet, FL; *Phragmatopoma* reefs (central east coast of FL); nearshore hard-bottom south of Cape Canaveral, FL; the Hump off Islamorada, FL; Marathon Hump (FL); the Wall off the Florida Keys.	All life stages	NW-ATL; NW-ATL Florida and the Caribbean; GoMEX	GMFMC; SAFMC

EFH Species or FMP with HAPC Identified	*HAPC Description*	*Designated Life Stages*	*Proposed Action Areas*	*FMC(s)*
Coral, coral reefs, and live/hard-bottom habitat	Ten Fathom Ledge (NC); Big Rock (NC); The Point (NC); Hurl Rock (SC); Charleston Bump (SC); Gray's Reef National Marine Sanctuary (Georgia [GA]); shallow hard-bottom from Palm Beach County to Fowey Rocks, FL, and the Florida Keys National Marine Sanctuary; Oculina Bank; *Phragmatopoma* reefs (central east coast of FL); nearshore hard-bottom from Cape Canaveral, FL, to Broward County, FL; Biscayne Bay, FL; Biscayne National Park, FL; recently defined deep water coral areas (2010), FL	All corals	NW-ATL; NW-ATL Florida and the Caribbean; GoMEX	GMFMC; NMFS
All Gulf of Mexico FMC species with EFH designations	Florida Middle Grounds, Tortugas North and South, Madison-Swanson Marine Reserve, Pulley Ridge (FL); West and East Flower Garden Banks, Stetson Bank, 29 Fathom Bank, MacNeil Bank, Rezak Snider Bank, Rankin Bright Bank, Geyer Bank, McGrail Bank, Bouma Bank, Sonnier Bank, Alderice Bank, Jakkula Bank (TX)	All life stages	GoMEX	GMFMC; SAFMC
Panaeid Shrimp Management Unit	Coastal inlets, state-designated nursery areas, and state identified overwintering areas.	All life stages	NW-ATL Florida and the Caribbean; GoMEX	GMFMC; SAFMC

EFH Species or FMP with HAPC Identified	***HAPC Description***	***Designated Life Stages***	***Proposed Action Areas***	***FMC(s)***
Caribbean FMC species with EFH designations	Altona Lagoon; Bajuras and Tiberones, Isabela; Bioluminescent Bays, Vieques; Boqueron State Forest; Buck Island Reef National Monument; Cabezas de San Juan, Fajardo; Caja de Muertos, Ponce; Cane Bay; Ceiba State Forest; Desecheo Reefs, Desecheo; Frederiksted Reef System; Gramanic Bank Closed Area; Great Pond; Green Cay Wildlife Refuge; Guanica State Forest; Guayama Reefs; Hacienda la Esperanza, Maniti; Hind Marine Conservation Area; Jobannerr, Jobos Bay; La Cordillera, Farjardo; La Parguera, Lajas; Los Corchos Reef, Culebra; Luis Pena Channel, Culebra; Mona/Monito; Mutton Snapper Spawning Aggregation Area; northwest Vieques seagrass west of Mosquito Pier, Vieques; Pantano Cibuco, Vega Baja; Pinones State Forest; Punta Petrona, Santa Isabel; Red Hind Spawning Area/Abrir La Sierra Bank; Red Hind Spawning Area/Bajo de Cico; Red Hind Spawning Area/Lang Bank; Red Hind Spawning Area/Tourmaline Bank; Rio Espiritu Santo, Rio Grande; Saba Island/ Perseverance Bay, Flat Key and Black Point Reef; St. Croix Coral Reef Area/East End Marine Park; Salt River Bay National Historical Park and Ecological Preserve and Marine Sanctuary; Sandy Point National Wildlife Refuge; seagrass beds of Culebra Island; southeast St. Thomas, Cas Key and mangrove lagoon, Great St. James Bay; South Shore Industrial Area; South Shore Industrial Area Patch Reef and Deep Reef System; Steps and Tres Palmas, Rincon; Tourmaline Reef, Vieques, El Seco	All life stages	NW-ATL-Florida and the Caribbean	CFMC

EFH Species or FMP with HAPC Identified	***HAPC Description***	***Designated Life Stages***	***Proposed Action Areas***	***FMC(s)***
Highly migratory species: sandbar shark	Shallow areas at the mouth of Great Bay, New Jersey; lower and middle Delaware Bay; lower Chesapeake Bay; near the Outer Banks, North Carolina, in areas of Pamlico Sound next to Hatteras and Ocracoke Islands to just offshore of these barrier islands.	All life stages	NW-ATL	NMFS
State Waters of Washington (0-3 nm)	Variety of habitats important to groundfish, including other HAPCs such as rocky reef, estuaries, and sandy substrates as well as nearshore coastal areas	N/A	NEPAC-North	PFMC
Estuaries	Includes all subtidal estuarine waters between the upriver extent of saltwater (0.5 ppt) intrusion, and an imaginary line closing the mouth of a river, bay, or sound; and to the seaward limit of wetland emergents, shrubs, or trees occurring beyond the lines closing rivers, bays, or sounds. This HAPC also includes those estuary-influenced offshore areas of continuously diluted seawater.	N/A	NEPAC-North	PFMC
Canopy Kelp	Waters, substrate, and other biogenic habitat associated with canopy-forming kelp species (such as *Macrocystis* spp. and *Nereocystis* sp.)	N/A	NEPAC-North	PFMC
Seagrass	Waters, substrate, and other biogenic features associated with eelgrass species, widgeongrass, or surfgrass	N/A	NEPAC-North	PFMC

EFH Species or FMP with HAPC Identified	*HAPC Description*	*Designated Life Stages*	*Proposed Action Areas*	*FMC(s)*
Rocky Reefs	Waters, substrates and other biogenic features associated with hard substrate (bedrock, boulders, cobble, and gravel) to Mean Higher High Water.	N/A	NEPAC-North	PFMC
Cherry Bank	Discrete areas within the Cowcod Conservation Area, south of Point Conception.	N/A	NEPAC-South	PFMC
Channel Islands National Marine Sanctuary (CINMS)	Anacapa Island, Carrington Point, Footprint, Gulf Island, Harris Point, Judith Rock, Painted Cove, Richardson Rock, Santa Barbara, Scorpion, Skunk Point	N/A	NEPAC-South	PFMC
Cordell Bank	Discrete areas at Cordell Bank	N/A	NEPAC-North	PFMC
Cowcod Conservation Area, East	Discrete areas within the Cowcod Conservation Areas	N/A	NEPAC-South	PFMC
Daisy Bank	Daisy Bank, due west of Newport, Oregon	N/A	NEPAC-North	PFMC
Seamounts	Davidson Seamount, Gumdrop Seamount, Pioneer Seamount, President Jackson Seamount, San Juan Seamount, Taney Seamount, Thompson Seamount	N/A	NEPAC-North; NEPAC-South	PFMC
Hidden Reef/Kidney Bank	Discrete areas at Hidden Reef/Kidney Bank	N/A	NEPAC-South	PFMC
Monterey Canyon	Discrete areas at Monterey Canyon	N/A	NEPAC-North	PFMC

EFH Species or FMP with HAPC Identified	***HAPC Description***	***Designated Life Stages***	***Proposed Action Areas***	***FMC(s)***
Potato Bank	Discrete areas at Potato Bank, offshore of Los Angeles	N/A	NEPAC-South	PFMC
Alaska Seamount Habitat Protection Area	Dickens Seamount, Denson Seamount, Brown Seamount, Welker Seamount, Dall Seamount, Quinn Seamount, Giacomini Seamount, Kodiak Seamount, Odyssey Seamount, Patton Seamount, Chirikof & Marchand Seamounts, Sirius Seamount, Derickson Seamount, Unimak Seamount, Bowers Seamount	N/A	AK	NPFMC
Bowers Ridge Habitat Conservation Zone	Bowers Ridge, Ulm Plateau	N/A	AK	NPFMC
Gulf of Alaska Coral Habitat Protection Area	Cape Ommaney, Fairweather, AK	N/A	AK	NPFMC
WPFMC Bottomfish	All escarpments and slopes between 130 and 920 ft (40 and 280 m) and three known areas of juvenile opakapaka habitat	Adults, juveniles, eggs and larvae	HI-PAC	WPFMC
WPFMC Pelagic	Water column down to 3,280 ft (1,000 m) that lies above seamounts and banks	Adults, juveniles, eggs and larvae	HI-PAC	WPFMC
WPFMC Crustaceans	Lobsters: All banks with summits less than 100 ft (30 m) Deep water shrimp: No HAPC designated	Adults, juveniles, eggs and larvae	HI-PAC	WPFMC

N/A: Not Applicable, The Pacific Fisheries Management Council designates HAPC geographically, rather than by species/life stage.

3.4.5.2 Environmental Consequences to Essential Fish Habitat

As discussed in Section 3.4.4.2, impacts to marine fish from aircraft noise would not be expected due to the low intensity of aircraft noise below the water's surface. As a result, aircraft noise would not diminish the quality or quantity of EFH within the proposed action areas. There would be no impacts to EFH from aircraft noise or gunnery noise associated with the Proposed Action. As such, aircraft noise, and gunnery noise are addressed in Table 3-3 and not analyzed in this PEIS/POEIS. Impacts to EFH would potentially result from fathometer and Doppler speed log noise (Section 3.4.5.2.1), vessel noise (Section 3.4.5.2.2), vessel movement (Section 3.4.5.2.3), and MEM (Section 3.4.5.2.4) associated with the Proposed Action and are discussed in detail below.

3.4.5.2.1 Fathometer and Doppler Speed Log Noise

Fathometer and Doppler speed log noise could impact water column EFH due to the increase in ambient sound (Section 3.3.2) level during the transmissions. However, this potential reduction in the quality of the acoustic habitat would be localized and temporary due to the attenuation of the echosounder and movement of the vessels throughout the proposed action areas. The quality of the water column environment as EFH would be restored to normal levels immediately following the departure of vessels. Secondary effects to federally-managed fish species are considered in Section 3.4.4.2.1. Since the water column would not be altered in any measurable or lasting manner from fathometer and Doppler speed log noise, impacts to EFH would be localized and temporary. There would be no impacts to benthic or biogenic habitat as a result of fathometer and Doppler speed log noise.

3.4.5.2.2 Vessel Noise

Vessel noise could impact water column EFH due to the increase in ambient sound (Section 3.3.2) level during vessel operation. However, this potential reduction in the quality of the acoustic habitat would be localized and temporary due to the movement of the vessels throughout the proposed action areas. Should vessel noise impact the quality of the EFH water column environment, it would be restored to normal levels immediately following the departure of any vessels. Secondary effects to federally-managed fish species are considered in Section 3.4.4.2.2. Since the water column would not be altered in any measurable or lasting manner from vessel noise associated with the Proposed Action, any impacts to EFH would be localized and temporary. There would be no impacts to benthic or biogenic habitat as a result of vessel noise.

3.4.5.2.3 Vessel Movement

Vessels could impact water column EFH from the vessel movement through the water. However, this potential reduction in the quality of the water column would be temporary and in the immediate area of the vessels. Due to the temporary movement of the vessels throughout the proposed action areas, the quality of the EFH water column environment would be restored to normal levels immediately following the departure of any vessels. Secondary effects to federally-managed fish species are considered in Section 3.4.4.2.3.

Anchoring could impact benthic and biogenic habitat EFH when the anchor and chain are placed on the bottom. However, anchoring would only occur in soft-bottom areas designated for this purpose, where bottom disturbance is common. Therefore, anchoring associated with the Proposed Action would not introduce a new or unique threat to benthic or biogenic EFH, if it overlaps with these designated anchorages. There would not be a reduction in the quality or quantity of EFH as a result of anchoring within the proposed action areas.

3.4.5.2.4 Military Expended Materials

Gunnery training may take place in designated ranges within all of the proposed action areas. Inert small caliber (0.50 caliber or MK-38 standard [25 mm]) and large caliber (57 mm) gun rounds, as well as the Nulka round, used in gunnery training may enter the water as MEM during the Proposed Action and would not be recovered. MEM from targets would not present a significant threat to EFH because of the small numbers of these targets used and the large distance which expended material would be dispersed across the proposed action areas. It would be expected that marine microbes and fungi would degrade targets over time (Doi et al. 1992), although potentially at a slow rate (Shah et al. 2008). As a result, targets may cover benthic or biogenic EFH located in offshore areas where gunnery training would occur. This would decrease the quantity of EFH available to fish; however, the density of targets would be very low as compared to the amount of available EFH. In addition, gunnery training, and thus the release of a small number of targets, would occur in areas designated for this purpose. The Coast Guard would attempt to retrieve all targets used in gunnery training, but in the event that a fragment or target cannot be recovered, MEM from a non-recoverable target would not present a significant threat to EFH because of the small number expected.

Small and large caliber practice munitions immediately travel through the water column and settle on the seafloor. The secondary impacts, including the potential for ingestion by fish species, is discussed in Section 3.4.4.2.4. MEM impacts on soft-bottom habitats, which comprise most of this area, would be short term, as sediments are constantly moving and shifting. The movement of sediment would likely cover small caliber rounds that rest on the bottom, where they would then corrode over time and incorporate into the sediment. Due to the low density of rounds expected to be expended (500 per year), the reduction in quantity of benthic EFH in the offshore area would be small in relation to the available EFH within the proposed action areas.

3.4.5.3 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, potential impacts to EFH would be limited to the fathometer and Doppler speed log noise, vessel noise, vessel movement, and MEM associated with the Proposed Action.

The potential reduction in the quality of the acoustic habitat as a result of the fathometer and Doppler Speed log and vessel noise would be localized and temporary. Due to the attenuation of the echosounder and movement of the vessels throughout the proposed action areas, the quality of the water column environment as EFH would be restored to normal levels immediately following the departure of vessels. Additionally, anchoring would likely only occur in soft-bottom areas designated for this purpose.

The potential reduction in the quality of the water column habitat would be temporary and in the immediate area of the vessels. The quality of the EFH water column environment would be restored to normal levels immediately following the departure of any vessels.

Due to the low density of gun rounds expected to be expended (500 per year), the reduction in quantity of benthic EFH in the offshore area as a result of MEM associated with gunnery training would be small in relation to the available EFH within the proposed action areas.

Therefore, Pursuant to the Magnuson-Stevens Fishery Conservation Act (MSA), fathometer and Doppler speed log noise, vessel noise, vessel movement, and MEM associated with Alternative 1 would not adversely affect the quality or quantity of EFH within the proposed action areas.

3.4.5.4 Impacts Under Alternatives 2–3

Under Alternatives 2–3, any potential impacts to EFH would be similar to those discussed for activities under Alternative 1. There could be a potential reduction in the number of vessels conducting the Coast Guard's mission in the proposed action areas. However, the difference would not result in substantive changes to the potential for or types of, impacts to EFH. Therefore, pursuant to the MSA, fathometer and Doppler speed log noise, vessel noise, vessel movement, and MEM associated with Alternatives 2–3 would not adversely affect the quality or quantity of EFH within the proposed action areas.

3.4.5.5 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, the physical and acoustic disturbances associated with the Proposed Action would not be introduced into the marine environment, with the exception of OPCs 1–5. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impact or harm to marine fish with implementation of the No Action Alternative.

3.4.6 Marine Reptiles

3.4.6.1 Affected Environment

All reptiles are cold-blooded animals that have adopted different strategies to use external sources of heat to regulate body temperature. Sea snakes, also known as coral reef snakes, are closely related to terrestrial venomous snakes, but are fully adapted to life in the marine environment. Sea turtles are highly migratory, long-lived reptiles that occur throughout the open ocean and coastal regions of the proposed action areas. The distribution of marine reptiles in the proposed action areas is described in Table 3-20.

Table 3-20. Distribution of Marine Reptiles in the Proposed Action Areas

<table>
<tr><th rowspan="2">Common Name (Scientific name)</th><th colspan="7">Likelihood[1] of Occurrence while OPC is in Transit[2] and/or Conducting Operations[3] in Proposed Action Area(s)</th></tr>
<tr><th>NW-ATL</th><th>NW-ATL-Florida and Caribbean</th><th>GoMEX</th><th>NEPAC-South</th><th>NEPAC-North</th><th>AK</th><th>HI-PAC</th></tr>
<tr><td>Green sea turtle (Chelonia mydas)</td><td colspan="7">T: Present
O: Potentially (juveniles, migrating adults)</td></tr>
<tr><td>Hawksbill sea turtle (Eretmochelys imbricata)</td><td colspan="4">T: Present
O: Potentially (migrating adults)</td><td>-</td><td>-</td><td>T: Likely
O: Potential (migrating adults)</td></tr>
<tr><td>Kemp's ridley sea turtle (Lepidochelys kempii)</td><td colspan="3">T: Present
O: Potentially (migrating adults)</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Leatherback sea turtle (Dermochelys coriacea)</td><td colspan="7">T: Present (adults)
O: Present (juveniles and migrating adults)</td></tr>
<tr><td>Loggerhead sea turtle (Caretta caretta)</td><td colspan="7">T: Present
O: Present</td></tr>
<tr><td>Olive ridley sea turtle (Lepidochelys oliveacea)</td><td>-</td><td>Present, lack of specific data</td><td>-</td><td colspan="2">T: Present (breeding season)
O: Present (non-breeding)</td><td>Rare</td><td>T: Present (breeding season)
O: Present (non-breeding)</td></tr>
<tr><td>Yellow-bellied sea snake (Pelamis platura)</td><td>-</td><td>-</td><td>-</td><td>T: Rare
O: Rare</td><td>-</td><td>-</td><td>T: Rare
O: Rare</td></tr>
</table>

* "Not Present" means occurrence is unlikely based on current distribution information and is shown in the table with a dash and gray cell.

[1] The likelihood of occurrence is designated as "Not Present," "Rare," "Potentially," or "Present". "Rare" means occurrences have been documented but are extremely rare or extralimital. "Potentially" means the species may occur or there is casual occurrence history, and "Present" means there is a strong possibility of occurrence in the proposed action area.

[2] Transit Area (T): coastline to 12 nm from shore.

[3] Operational Area (O): greater than 12 nm from shore.

3.4.6.1.1 Sea Snakes

Sea snakes form a subfamily (Hydrophiinae) of venomous snakes closely related to the cobra and other terrestrial venomous snakes of Australia (Heatwole 1999). Most species of sea snakes are adapted to a fully aquatic life, with few records on land (Udyawer et al. 2013). Most sea snakes are restricted to coastal areas of the Indian and western Pacific oceans. The yellow-bellied sea snake *(Pelamis platura)* can be found in the open ocean and may occur within the NEPAC-South and HI-PAC proposed action areas (Florida Museum 2017; Lillywhite 2018). This species is not managed under any international or U.S. regulatory framework.

The yellow-bellied sea snake is known to passively drift at the surface and is one of the most widely distributed snakes in the world (Rasmussen et al. 2011). Sightings have been documented in Hawaiian and Californian waters; however, these are not thought to be resident breeding populations. Sightings in California have occurred as far north as San Clemente Island and may be associated with El Niño conditions, oceanic temperature warming trends, or dead individuals that have drift and washed ashore (Goldman 2018). Yellow-bellied sea snakes are considered extralimital in California.

Sea snakes rely on visual or chemical cues to hunt (Shine et al. 2004). Yellow-bellied sea snakes likely forage on fish in pelagic environments, at the surface to a depth of 33 ft (10 m) (Brischoux et al. 2016), which is supported by data on diving behavior (Cook et al. 2016).

3.4.6.1.2 ESA-Listed Sea Turtles

Since 1977, NMFS and the USFWS have shared jurisdiction over the recovery and conservation of sea turtles, all of which are listed as endangered or threatened under the ESA (Table 3-26). Six species of sea turtles are found in U.S. waters and all are expected to occur throughout the proposed action areas, as detailed in Table 3-21.

All six sea turtle species, green, hawksbill, leatherback, and loggerhead sea turtles have federally-designated critical habitat within the proposed action areas, as described in Table 3-21. Sea turtles are distributed throughout tropical to subtropical latitudes, with some species extending into temperate seasonal foraging grounds. In general, sea turtles spend most of their time at sea, with only female turtles returning to land to nest. Nesting may occur on beaches adjacent to the OPC transiting area (shoreline to 3 nm) in the NW-ATL, NW-ATL-Florida and Caribbean, and GoMEX proposed action areas. Although the Proposed Action would not overlap with nesting beaches, sea turtles returning to and leaving these beaches may be encountered in the transiting areas. Each species of sea turtle would be distributed within the proposed action areas based on preferred habitat and prey distribution, which would also vary by life stage of the sea turtle. Species specific details are discussed in the sections below.

Table 3-21. ESA-Listed Sea Turtle Species Present in the Proposed Action Areas

Common Name (Scientific Name)	*DPS or Population: ESA-Listing Status*	*Distribution of Population*	*Critical Habitat within Proposed Action Area(s)*
Green sea turtle (*Chelonia mydas)*	East Pacific DPS: Threatened	From Baja California to southern Alaska, most common south of San Diego.	None
	Central North Pacific DPS: Threatened	Throughout the Hawaiian islands, Guam, and the CNMI.	None
	South Atlantic DPS: Threatened	The U.S. Virgin Islands, Puerto Rico, and other Caribbean Islands. Coastal areas by Panama and Columbia.	63 FR 46693; September 2, 1998
	North Atlantic DPS: Threatened	Nearshore waters from Texas to Massachusetts	None
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered (no DPSs)	Most common throughout the Caribbean Sea, the western Atlantic Ocean (especially southern Florida), the Gulf of Mexico (especially Texas), and along the Central American mainland.	63 FR 46693; September 2, 1998
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered (no DPSs)	Primarily found in the Gulf of Mexico, but also inhabit the Western Atlantic Ocean, as far north as Nova Scotia, Canada.	None
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered (no DPSs; however a Northwest Atlantic DPS is under review)	Found in the Pacific from Alaska to the Pacific Islands and South America. Found in the Atlantic from Canada to South America.	43 FR 43688; September 26, 1978; 44 FR 17710; March 23, 1979
Loggerhead sea turtle (*Caretta caretta*)	North Pacific Ocean DPS: Endangered	Range is from the equator (South America and the Pacific Islands) north to 60 °N (Alaska).	None
	South Pacific Ocean DPS: Endangered	Range is from the equator south, especially by Australia.	None
	Northwest Atlantic Ocean DPS: Threatened	Range extends from the equator (Brazil) north to 60 °N (Canada).	79 FR 39855; August 11, 2014; 79 FR 51264; August 28, 2014
Olive ridley sea turtle (*Lepidochelys oliveacea*)	Mexico's pacific coast breeding population: Endangered	In the eastern Pacific, the range extends from Southern California to Chile.	None
	All other populations: Threatened	In the Atlantic, range is mainly in the tropical (southern latitudes) of the Caribbean.	None

3.4.6.1.2.1 Green Sea Turtle

The green sea turtle (*Chelonia mydas*) was first listed under the ESA in 1978 (43 FR 32800; July 28, 1978). In 2016, the species was reclassified into 11 DPSs (81 FR 20057; April 6, 2016). The DPSs of green sea turtles are: North Atlantic, Mediterranean, South Atlantic, Southwest Indian, North Indian, East Indian-West Pacific, Central West Pacific, Southwest Pacific, Central South Pacific, Central North Pacific, and East Pacific. Four DPSs of green sea turtles, all of which are listed as threatened under the ESA, may occur within the proposed action areas and are listed in Table 3-20 and Table 3-21. Designated critical habitat (Section 3.4.8.1.5) only occurs in the waters surrounding Puerto Rico (63 FR 46693; September 2, 1998) in the NW-ATL-Florida and the Caribbean proposed action area (Figure 3-4).

The green sea turtle is distributed worldwide across tropical and subtropical coastal waters generally between 45 °N and 40 degrees South latitude (°S). They are primarily a coastal species, but oceanic areas are used by oceanic-stage juveniles, migrating adults, and, on some occasions, by green turtles that reside in the oceanic zone for foraging (NMFS and USFWS 2015b). After emerging from their nests, green sea turtle hatchlings swim from the beach to offshore areas where they float passively in major current systems; however, some research suggests that dispersal may also be influenced by active swimming (Christiansen et al. 2016b; Putman and Mansfield 2015). Post-hatchling green sea turtles forage and develop in floating *Sargassum* spp. habitats of the open ocean. Juveniles (estimated at five to six years), leave the open ocean habitat and retreat to protected lagoons and open coastal areas that are rich in seagrass or marine algae (Bresette et al. 2006), where they spend most of their lives (Bjorndal and Bolten 1988). The optimal developmental habitats for older juveniles and foraging habitats for adults, are warm shallow waters with abundant submerged aquatic vegetation that are close to nearshore reefs or rocky areas (Holloway-Adkins 2006; Seminoff et al. 2015; Seminoff et al. 2002). In the United States, nesting green sea turtles are primarily found in the Hawaiian Islands, U.S. Pacific Island territories (Guam, the CNMI, and American Samoa), Puerto Rico, the Virgin Islands, and the East Coast of Florida (NMFS 2020c). The highest concentration of nesting is in Tortuguero, Costa Rica and in Mexico, primarily along the Yucatan Peninsula. These nesting beaches may be adjacent to transiting areas of the NW-ATL-Florida and the Caribbean and GoMEX proposed action areas.

In the eastern North Pacific, green turtles have been sighted from Baja California to southern Alaska, but most commonly occur from San Diego, California south. In the Pacific, green sea turtles occur around almost all tropical islands, including Hawaii and U.S. territories of American Samoa, Guam, and the CNMI. The majority of adult green sea turtles that forage around the MHI migrate to French Frigate Shoals in the NWHI to nest. Migratory routes within the open ocean are unknown. The main source of information on distribution in the United States comes from catches in fisheries. About 57 percent of green sea turtles (primarily adults) captured in longline fisheries in the North Pacific are from the Eastern Pacific DPS, while 43 percent are from the North Central Pacific DPS. These findings suggest that green sea turtles found on the High Seas of the western and central Pacific Ocean are from these two populations.

In U.S. Atlantic and Gulf of Mexico waters, green turtles are found in inshore and nearshore waters from Texas to Massachusetts, the U.S. Virgin Islands, and Puerto Rico. Important feeding areas in Florida include the Indian River Lagoon, on the east coast, and the Florida Keys, Florida Bay, Homosassa, Crystal River, Cedar Key, and St. Joseph Bay on the Gulf Coast (NMFS 2020c). In the western North Atlantic, juvenile green sea turtles forage as far north as Cape Cod Bay, Massachusetts; as far east as Bermuda; and throughout the Caribbean. However, foraging adults are only found from the southernmost reach of the Florida peninsula (Witherington and Hirama 2006). In a global assessment of marine turtle takes by Humber et al. (2014), it was found that the highest number of takes of green sea turtles is in the Caribbean, accounting for 34.6 percent of permitted takes[14] (14,640 turtles per year). The bulk of takes occur in the Pacific, but in countries that fall outside the proposed action areas. More on sea turtle subsistence harvest can be found in Section 3.5.9.

[14] The USFWS is authorized to issue permits for the incidental take of endangered and threatened species, allowing permit holders to proceed with a legal activity that may result in the incidental taking of a listed species.

As ocean temperatures increase in the spring, green sea turtles migrate from waters of the southeastern U.S. to the estuarine habitats of Long Island Sound, Peconic Bay, Chesapeake Bay, and possibly Nantucket Sound, where an abundance of algae and eelgrass occurs (Berry et al. 2000). In the northern Gulf of Mexico, green sea turtles prefer the coastal habitats (e.g., lagoons, channels, inlets, bays) of southern Texas where seagrass beds and macroalgae are abundant (Renaud et al. 1995). From April to June, green sea turtle numbers increase in the continental shelf waters of the Gulf of Mexico off Galveston Bay, and in waters associated with the continental shelf break northeast of Corpus Christi. Green sea turtles found in these deeper waters are likely adults migrating from resident foraging grounds to distant nesting grounds (Meylan 1995). The sparse sighting records in Louisiana and Texas waters, as well as nesting records on the southern Texas coast, indicate that green sea turtles are found in the northwestern Gulf of Mexico during spring but in far fewer numbers than in the northeastern Gulf.

In the Caribbean, green sea turtles nest at many of the islands, including Cuba, the Cayman Islands, the U.S. Virgin Islands, the Netherlands Antilles, and Guadalupe. The distribution of green sea turtles in the Caribbean is more prevalent around the coast of Central America and the Yucatan Peninsula than the Caribbean archipelago (State of the World's Sea Turtles 2020). In Costa Rica, in Tortuguero on the Caribbean coast, there are 22,500 females that nest per season on average, one of the largest green turtle nesting populations in the world (NMFS 2020c). In the Gulf of Mexico, they also nest on the Florida Peninsula (State of the World's Sea Turtles 2020).

The green sea turtle is the only species of sea turtle that, as an adult, primarily consumes plants and other types of vegetation (Mortimer 1995; Nagaoka et al. 2012). Because green sea turtles mainly forage on seagrasses and algae, they spend most of their time in shallow waters and lagoons (as compared to other species of sea turtles) (Defenders of Wildlife 2021). While primarily herbivorous, a green sea turtle's diet changes substantially throughout its life—very young green sea turtles are omnivorous (eats both plant and animal) (Bjorndal 1997). Research indicates that, when omnivorous, green sea turtles may also consume jellyfish, sponges, and sea pens (Hatase et al. 2006; Seminoff et al. 2015).

3.4.6.1.2.2 Hawksbill Sea Turtle

The hawksbill sea turtle (*Eretmochelys imbricata*) is listed as a single population and is classified as endangered under the ESA (35 FR 8491; June 2, 1970). Hawksbill sea turtles are the most tropical of all sea turtles, inhabiting tropical and subtropical seas of the Atlantic and Pacific Oceans, rarely occurring above 35 °N or below 30 °S (Seminoff et al. 2003). Designated critical habitat (Section 3.4.8.1.5) only occurs in the waters surrounding Puerto Rico in the Caribbean Sea (63 FR 46693; September 2, 1998), which is within the NW-ATL-Florida and the Caribbean proposed action area (Figure 3-4). This species may occur in all proposed action areas, except NEPAC-North and AK.

While hawksbill sea turtles are known to occasionally migrate long distances in the open ocean, they are primarily found in coastal habitats and use nearshore areas more exclusively than other sea turtles. Hawksbills have a mixed migratory strategy. Some will migrate long distances (up to 1,200 mi [1,931 km]) between nesting beaches and foraging areas, while other hawksbill populations will stay within 50–200 mi (80–322 km) of their rookery (nesting location of populations of sea turtles).

Hatchlings are believed to occupy the oceanic zone where water depths are greater than 656 ft (200 m), associating themselves with surface algal mats of *Sargassum* spp. Juveniles leave the open ocean habitat after three to four years and settle in coastal foraging areas (Mortimer and Donnelly 2008). Van Houtan et al. (2016) suggest that hatchlings within the Pacific Ocean may move to coastal habitats and nearshore foraging grounds more quickly than those in the Atlantic or Gulf or Mexico.

Hawksbill turtles feed on various species of invertebrates, sponges, and algae (National Oceanic and Atmospheric Administration 2015b). Juveniles and adults share the same foraging areas, including tropical nearshore waters associated with coral reefs, hard bottoms, or estuaries with mangroves (Musick and Limpus 1996). Hawksbills are also found around rocky outcrops and high-energy shoals, where sponges are abundant. In nearshore habitats, resting areas for late juvenile and adult hawksbills are typically in deeper waters, such as sandy bottoms at the base of a reef flat (Houghton et al. 2003). Ledges and caves of coral reefs provide shelter for resting hawksbills during both day and night, where an individual often inhabits the same resting spot. As they mature into adults, hawksbills move to deeper habitats and may forage to depths greater than 295 ft (90 m). During this stage, hawksbills are seldom found in waters beyond the continental or insular shelf unless they are in transit between distant foraging and nesting grounds (Renaud et al. 1996).

The greatest quantity of hawksbill sea turtle nests on beaches in the Pacific Ocean (as compared to the Atlantic Ocean), with nesting recorded on the MHI, Guam, and American Samoa. The largest nesting population of hawksbill turtles is believed to be in Australia and Solomon Islands (USFWS 2018a). No nesting occurs on the West Coast of the United States, but does occur further south, in Mexico and Peru. Hawksbill sea turtles are only occasionally seen off the southern coast of California, as this is their northernmost extent in the Pacific. The species is widely distributed in the Caribbean Sea and western Atlantic Ocean, with hawksbill sea turtles nesting in low densities on many islands and Florida. Roughly 20–30 percent of the world's population nests in the Caribbean with the greatest numbers nesting at locations in Cuba and the Yucatan Peninsula (USFWS 2018a). In the Gulf of Mexico, rare hawksbill sea turtle sightings occur in waters off the Florida Panhandle, Alabama, Mississippi, Louisiana, and Texas (Rester and Condrey 1996; Seminoff et al. 2003); these individuals are more likely to be early juveniles born on nesting beaches in Mexico that have drifted north with the dominant currents (NMFS and USFWS 1993).

3.4.6.1.2.3 Kemp's Ridley Sea Turtle

The Kemp's ridley sea turtle (*Lepidochelys kempii*) is listed as a single population and is listed as endangered under the ESA (35 FR 18319; December 2, 1970).There is no critical habitat designated for this species. This species may occur in the NW-ATL, NW-ATL-Florida and the Caribbean, and GoMEX proposed action areas.

Kemp's ridley sea turtle occurs primarily in the Gulf of Mexico and Atlantic Ocean, ranging as far north as Nova Scotia, Canada. As adults, this species remains in the Gulf of Mexico, with only occasional occurrence in the Atlantic Ocean. In the Gulf of Mexico, the Kemp's ridley sea turtle occurs year-round in the coastal waters from the Yucatán peninsula to south Florida (Lazell 1980; Morreale et al. 1992). Habitats frequently used by Kemp's ridley sea turtles in U.S. waters are warm-temperate to subtropical sounds, bays, estuaries, tidal passes, shipping channels, and beachfront waters where their preferred food, the blue crab, is abundant (Lutcavage and Musick 1985; Seney and Musick 2005). Waters off the upper Texas coast through Mississippi, especially off Louisiana, appear to be "hotspots," areas where Kemp's ridley sea turtles return to forage over multiple years (NMFS and USFWS 2015a). Coastal waters off western Louisiana and eastern Texas also provide adequate habitats for bottom feeding. Key foraging sites on the Gulf Coast of Florida include Charlotte Harbor and Gullivan Bay (Witzell and Schmid 2005).

The entire population nests in the Gulf of Mexico, along a stretch of beaches from southern Texas to the Yucatan peninsula; the nesting season in the western North Atlantic and Gulf of Mexico occurs from April through July. From late May through August (with a peak in June), Kemp's ridley sea turtles leave their nesting beaches in the Gulf of Mexico and traverse a migratory corridor across neritic zones (shallow water 683 ft [200 m] deep) of the Mexico and U.S. Gulf Coasts. The migratory corridor typically has a mean water depth of 85 ft (26 m) and is approximately 12 mi (20 km) from the coast (Shaver et al. 2016).

Kemp's ridley sea turtles primarily feed on crabs, but they are also known to prey on mollusks, shrimp, fish, jellyfish, and plant material (Frick et al. 1999; Márquez-Millán 1994; Seney 2016). Plant material, primarily macroalgae, is likely consumed incidentally with invertebrate prey items (Seney 2016). Servis et al. (2015) noted instances of Kemp's ridley sea turtles predating upon fish and horseshoe crabs, indicating that they may opportunistically feed to supplement their diet.

3.4.6.1.2.4 Leatherback Sea Turtle

The leatherback sea turtle (*Dermochelys coriacea*) is listed as endangered under the ESA (35 FR 8491; June 2, 1970) and may occur in all proposed action areas. Critical habitat (Section 3.4.8.1.5) for leatherback sea turtles is designated in the Atlantic Ocean off of the U.S. Virgin Islands (43 FR 43688; September 26, 1978; 44 FR 17710; March 23, 1979), which is within the NW-ATL-Florida and the Caribbean proposed action area (Figure 3-4), and in the Pacific Ocean off the coasts of California, Oregon, and Washington (77 FR 4169; January 26; 2012), within the NEPAC-North proposed action area (Figure 3-8).

The leatherback sea turtle is the most widely distributed of all sea turtles, found from tropical to subpolar oceans from 71 °N to 47 °S (Eckert 2002). They are distributed worldwide in tropical and temperate waters of the Atlantic, Pacific, and Indian Oceans. Adult leatherback turtles forage in temperate and subpolar regions in all oceans and migrate to tropical nesting beaches between 30 °N and 20 °S (Gilman et al. 2006; Myers and Hays 2006; NMFS and USFWS 1992). The evidence currently available from tag returns and strandings in the western Atlantic suggests that adults engage in routine migrations between boreal, temperate, and tropical waters, presumably to optimize both foraging and nesting (Eckert et al. 2006; James et al. 2006; Keinath and Musick 1993). Migrations of leatherbacks between nesting seasons were typically to the north towards more temperate latitudes, which support high densities of jellyfish, their preferred prey, in the summer (James et al. 2005a). In the fall, the leatherback sea turtles move further offshore and begin their migration south for the winter (Payne and Selzer 1986).

After two to seven years at sea, leatherback sea turtles move into more coastal, nearshore habitats. Late juvenile and adult leatherback sea turtles are known to range from mid-ocean to the continental shelf and nearshore waters (Barco and Lockhart 2015; Grant and Ferrell 1993; Schroeder and Thompson 1987; Shoop and Kenney 1992). Adult leatherback sea turtles migrate farther and venture into colder water more so than any other sea turtle (Goff and Lien 1988). In general, leatherback sea turtles spend most of their time out at sea, but are occasionally found in shallow coastal waters (Defenders of Wildlife 2021).

Pacific leatherbacks are divided into western and eastern Pacific DPSs based on their distribution and biological and genetic characteristics. Eastern Pacific leatherbacks nest along the Pacific Coast of the Americas, primarily in Mexico and Costa Rica, and forage throughout coastal and pelagic habitats of the eastern tropical Pacific. Western Pacific leatherbacks nest in the Indo-Pacific, primarily in Indonesia, Papua New Guinea, and the Solomon Islands. A proportion of this population migrates north across the Pacific (past Hawaii) to feeding areas off the West Coast of North America. Another segment of the Western Pacific DPS migrates into the southern hemisphere, into waters of the western South Pacific Ocean (NMFS 2016).

Leatherback sea turtles are regularly sighted by fishermen in offshore waters surrounding the Hawaiian Islands, generally beyond the 3,800-ft (1,158-m) depth contour. Sightings and reported interactions with the Hawaii longline fishery also commonly occur around seamount habitats north of the NWHI (Skillman and Balazs 1992; Skillman and Kleiber 1998). Leatherbacks rarely occur inshore of the 328-ft (100-m) isobath. Aerial and shipboard surveys in nearshore Hawaiian waters also suggest that nearshore occurrences in this region are extremely rare (NMFS and USFWS 2013). Leatherback sea turtles are regularly seen off the U.S. West Coast, with the greatest densities found in waters of central California, where surface temperatures are highest during the summer and fall, creating favorable habitat for jellyfish—the preferred leatherback sea turtle prey. Satellite telemetry studies link leatherback sea turtles off the U.S. West Coast to one of the two largest remaining Pacific Ocean breeding populations in Indonesia. Thus, nearshore waters off central California represent an important foraging region for the western Pacific subpopulation critically endangered Pacific Ocean leatherback sea turtle.

The status of Atlantic leatherback sea turtle populations are less known than Pacific populations (Center for Biological Diversity 2020; Sea Turtle Conservancy 2020). In this region, the most important nesting areas are in Florida, St. Croix, Puerto Rico, Costa Rica, Panama, Colombia, Trinidad and Tobago, Guyana, Suriname, French Guiana, and southern Brazil (Bräutigam et al. 2006; Márquez-Millán 1990; NMFS 2020d; Spotila et al. 1996). Canada supports one of the largest seasonal foraging populations of leatherbacks in the Atlantic (NMFS 2020d). Leatherback nesting season begins in March in the more northern nesting habitats (e.g., Florida) and continues through July or August in the more southern nesting habitats (e.g., Puerto Rico).

Leatherbacks have pointed tooth-like cusps and sharp-edged jaws that are adapted for a diet of soft-bodied open ocean prey such as jellyfish and salps (Bjorndal 1997; James and Herman 2001; Salmon et al. 2004). Leatherback sea turtles feed throughout the water column (Davenport 1988; Eckert et al. 1989; Eisenberg and Frazier 1983; Grant and Ferrell 1993; James et al. 2005b; Salmon et al. 2004).

3.4.6.1.2.5 Loggerhead Sea Turtle

The loggerhead sea turtle (*Caretta caretta*) was first listed under the ESA in 1978 (43 FR 32800; July 28, 1978). In 2009, the species was reclassified into nine DPSs (Conant et al. 2009) which were then listed separately in 2011 (76 FR 58868; September 22, 2011). The DPSs of loggerhead sea turtles are: the Northeast Atlantic Ocean, Mediterranean Sea, North Pacific Ocean, South Pacific Ocean, North Indian Ocean, Northwest Atlantic Ocean, South Atlantic Ocean, Southwest Indian Ocean, Southeast Indo-Pacific Ocean, and South Atlantic Ocean. Three DPSs (North Pacific [endangered], South Pacific [endangered], and Northwest Atlantic [threatened]) overlap with the proposed action areas, as described in Table 3-20 and Table 3-21. The Northwest Atlantic Ocean DPS is the only DPS that has designated critical habitat (79 FR 39855; August 11, 2014 and 79 FR 51264; August 28, 2014; Section 3.4.8.1.5) which is within the NW-ATL (Figure 3-3), NW-ATL-Florida and the Caribbean (Figure 3-4), and GoMEX proposed action areas (Figure 3-6). Loggerhead sea turtles may be present in all of the proposed action areas.

Loggerhead sea turtles primarily occupy areas where the sea surface temperature is between 59 °F and 77°F (15°C and 25 °C). Loggerheads are generally not found in waters colder than 60.8 °F (16 °C), so the area north of the 60.8 °F (16 °C) isotherm is depicted as an area of rare occurrence. Loggerhead sea turtles occur in U.S. waters in habitats ranging from coastal estuaries to far beyond the continental shelf (Dodd Jr. 1988). Migration between oceanic and nearshore habitats occurs during the juvenile stage as turtles move seasonally from open ocean current systems to nearshore foraging areas (Bolten 2003; Mansfield 2006). As adults, loggerhead sea turtles continue to migrate seasonally from feeding areas to mating areas and, for females, to nesting areas (Bolten 2003). Migratory routes can be coastal or can involve crossing deep ocean waters (Schroeder 2003). The species can be found hundreds of kilometers out to sea, as well as in inshore areas, such as bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers. Coral reefs, rocky areas, and shipwrecks are often used as feeding areas. The nearshore zone provides crucial foraging habitat, as well as habitat during nesting season and overwintering habitat.

Pacific Ocean loggerheads appear to use the entire North Pacific Ocean during development. There is substantial evidence that the North Pacific Ocean DPS makes two transoceanic crossings. The first crossing (west to east) is made immediately after they hatch from the nesting beach in Japan, while the second (east to west) is made when they reach either the late juvenile or adult life stage at the foraging grounds in Mexico. In the Pacific, the loggerhead has been reported as far north as Alaska and as far south as Chile. Offshore, juvenile loggerheads forage in or migrate through the North Pacific Subtropical Gyre as they move between North American developmental habitats (such as important foraging habitats in Baja California) and nesting beaches in Japan (Bowen et al. 1995). The waters off of the southern Baja Peninsula support a high abundance of loggerheads that originate from the Japanese nesting grounds (Conant et al. 2009; Seminoff et al. 2014), while Australian stocks appear to migrate to foraging grounds off the coasts of Peru and Chile (Alfaro-Shigueto et al. 2004). The highest densities of loggerheads can be found just north of Hawaii in the North Pacific Transition Zone, a convergence zone of high productivity that stretches across the entire northern Pacific Ocean from Japan to California (Polovina et al. 2001), though they also commonly occur in the nearshore waters of Southern California. Loggerhead sea turtle sightings increase during the summer, peaking from July to September off Southern California and southwestern Baja California.

Along the U.S. Atlantic and Gulf Coasts, as older juveniles and adults, loggerhead sea turtles most often occur on the continental shelf and along the shelf break, as well as in coastal estuaries and bays (Besseling et al. 2015; Putman et al. 2015; Rice et al. 1984). Many loggerhead hatchlings in the Atlantic are pelagic in the North Atlantic gyre (USFWS 2020a) where, as juveniles, they associate with mats of *Sargassum* spp. for years before returning back to nearshore areas such as lagoons, estuaries, bays, river mouths, and other shallow coastal waters (The State of the World's Sea Turtles 2020; USFWS 2020a). Hawkes et al. (2006) found that adult females forage predominantly in shallow coastal waters along U.S. Atlantic Coast less than 328 ft (100 m) deep, likely exploiting bottom-dwelling prey. In the Gulf of Mexico, loggerhead sea turtles can be found during all seasons in both continental shelf and slope waters (Davis et al. 2000; Fritts et al. 1983). In the Northwest Atlantic, the majority of loggerhead sea turtle nesting is concentrated along the coast from southern Virginia through Alabama. Additional nesting beaches are located along the northern and western Gulf of Mexico, eastern Yucatan Peninsula, at Cay Sal Bank in the eastern Bahamas (Addison 1997; Addison and Morford 1996), on the southwestern coast of Cuba (F. Moncada-Gavilan, personal communication, cited in (Ehrhart et al. 2003)), and along the coasts of Central America, Colombia, Venezuela, and the eastern Caribbean Islands. In the southwest Atlantic, loggerheads nest in significant numbers only in Brazil.

Both juveniles and adults forage in coastal habitats, where they feed primarily on the bottom, although they also capture prey throughout the water column (Bjorndal 2003). Loggerhead sea turtles are primarily carnivorous in both open ocean and nearshore habitats, feeding on hard-shelled mollusks, such as whelks and conches (National Oceanic and Atmospheric Administration 2014c). Prey of adult loggerheads may include a variety of bottom-dwelling animals, such as crabs, shrimp, sea urchins, sponges, and fish. During migration through the open ocean, they have been known to eat jellyfish, mollusks, flying fish, and squid (Atlas of Living Australia 2020).

3.4.6.1.2.6 Olive Ridley Sea Turtle

There are two olive ridley sea turtle (*Lepidochelys olivacea*) DPSs listed under the ESA: the Mexico's Pacific Coast breeding population (endangered) and all other populations (threatened) (43 FR 32800; July 28, 1978). Only the Mexico's Pacific Coast breeding population may occur in the NW-ATL-Florida and the Caribbean, NEPAC-South, NEPAC-North, AK, and HI-PAC proposed action areas. There is no critical habitat designated for this species.

Olive ridley sea turtles are mainly pelagic and have a circumtropical distribution in the Atlantic, Pacific, and Indian Oceans (NMFS 2020f; NMFS and USFWS 2014). They migrate each year between their pelagic foraging areas and coastal breeding and nesting grounds (Alaska Department of Fish and Game 2020b). Despite the fact that the olive ridley is the most abundant sea turtle in the world, the number of olive ridley sea turtles occurring in U.S. territorial waters is believed to be small (NMFS and USFWS 1998, 2014).

In Hawaiian waters, most olive ridley sea turtles are from the eastern Pacific Ocean, with about a third from the Indo-Western Pacific. Off of California, olive ridleys are thought to be from the eastern Pacific Ocean (NMFS and USFWS 2014). In the eastern Pacific, olive ridleys typically occur in tropical and subtropical waters, as far south as Peru and as far north as California, but occasionally have been documented as far north as Alaska. Though not common, they have been reported in Alaska three times between 1960 and 2007 (Alaska Department of Fish and Game 2020b). In the eastern Pacific, olive ridley sea turtles are highly migratory and appear to spend most of their non-breeding life cycle in the oceanic zone (Arenas and Hall 1992; Beavers and Cassano 1996; Cornelius and Robinson-Clark 1986; Pitman 1991, 1993; Plotkin 1994; Plotkin 2010; Plotkin et al. 1995) and spend the breeding season in the coastal zone.

In the western Atlantic, olive ridley sea turtles do not nest in the United States, but rather in French Guiana and Brazil (NMFS 2020f). Western Atlantic nesting populations are very small while in the eastern Atlantic, long-term data is not available and therefore abundance and trends are not well assessed (USFWS 2018c). The range of olive ridley sea turtles in the Atlantic is the tropical, southern latitudes of the Caribbean and the Atlantic Coast of South America.

Olive ridley sea turtles are primarily carnivorous. They consume a variety of prey in the water column and on the seafloor, including snails, clams, tunicates, fish, fish eggs, crabs, oysters, sea urchins, shrimp, and jellyfish (Polovina et al. 2004).

3.4.6.2 Environmental Consequences to Marine Reptiles

Impacts to marine reptiles would potentially result from vessel noise, vessel movement, and MEM associated with the Proposed Action and are discussed in detail in Sections 3.4.6.2.1, 3.4.6.2.2, and 3.4.6.2.3, respectively. No marine reptiles would experience levels of noise from any acoustic sources that would cause a hearing threshold shift. As a result, there would be no population level impacts to marine reptiles from acoustic stressors associated with the Proposed Action. Potential impacts to marine reptiles from aircraft noise, gunnery training, gunnery noise, and aircraft movement are discussed Table 3-3, and are not further analyzed in this PEIS/POEIS.

There would be no effect to the PBFs of designated critical habitat (Section 3.4.8.1.5) of green, hawksbill, leatherback, and loggerhead sea turtles as a result of the Proposed Action. The only stressors likely to overlap with designated critical habitat are vessel noise and vessel movement, which would not affect the PBFs essential for sea turtle populations or cause the destruction or adverse modification of critical habitat.

3.4.6.2.1 Vessel Noise

Marine reptiles in the proposed action areas may be exposed to vessel noise during the Proposed Action. As discussed in Appendix F, marine reptiles hear best below 400 Hz. The noise created by vessels is detailed in Table 2-2. In general, small vessel noise (e.g., OTH boat noise) would be expected to range from 1–7 kHz and large vessel (e.g., OPC vessel noise) would be expected to range from 20–300 Hz; therefore marine reptiles may be able to detect vessel noise from the OPC, but may not be able to detect the higher frequencies of the OTH boat noise. Marine reptiles at the surface could detect approaching vessels by sight rather than by sound, but it is often difficult to distinguish what cure may cause the detection (Bartol and Ketten 2006b; Hazel et al. 2007). Potential impacts to marine reptiles from vessel noise include masking and behavioral reactions.

Sea snakes and sea turtles may use sound for navigation, locating prey, avoiding predators, and general environmental awareness. Sea turtles do not appear to use sound for communication and little is known about how sea turtles use sound in their environment. If turtles do use sound for navigation (e.g., (Lohmann and Lohmann 2019)), feeding, or other behaviors, then some auditory masking from vessel noise may occur. Intermittent, short-duration sound sources with low-frequency components would have a more limited potential for masking. Any effect of masking may be mitigated by reliance on other environmental inputs such as vision and sensing magnetic fields.

When presented with acoustic stimuli at 430 Hz and 1.5 dB re 1 μPa, sea turtles placed in 50-gallon (0.19 m^3) tanks responded with abrupt body movements, such as blinking, head retraction, and flipper movement, all of which were interpreted as startle responses (Lenhardt et al. 1996). While more severe responses, such as changes in swimming patterns and orientation, were observed when sea turtles were in a confined canal and exposed to high-pressure air gun pulses (120 dB re 1 mbar at 1 m) with frequencies ranging from 25 to 750 Hz (O'Hara and Wilcox 1990), vessel noise would be below the intensity of the noise in this study. Therefore, vessel noise in the open ocean may cause a startle response in marine reptiles, but any response is expected to be short term and temporary as the vessel moves through proposed action areas.

3.4.6.2.2 Vessel Movement

Marine reptiles in the proposed action areas may be exposed to vessel movement during the Proposed Action. The expected operational speeds of the OPC vessels and OTH boats are discussed in Sections 2-15 and 2.2.3.1 and in Table 3-2. In general, all vessels would operate at speeds of 12–15 knots. Marine reptiles within the proposed action areas may be exposed to vessel movement associated with the Proposed Action, including towing and anchoring. Vessels have the potential to impact or harm marine reptiles by disturbing them in the water column or causing mortality or serious injury from vessel collisions.

Marine reptiles at the surface could detect approaching vessels by sight rather than by sound (Bartol and Ketten 2006b; Hazel et al. 2007). Sea turtles have been observed to exhibit short-term responses (e.g., diving, swimming away) with a reaction time dependent on the speed of the vessel (Hazel et al. 2007). Sea turtles have been documented to flee frequently when encountering a slow-moving (e.g., 2 knots) vessel, but infrequently when encountering a moderate-moving (e.g., 6 knots) vessel, and only rarely when encountering a faster-moving (e.g., 10 knots) vessel. Given the speed of vessels associated with the Proposed Action (12–15 knots), a risk of a vessel collision with a sea turtle exists even if the sea turtle can see and hear the approaching vessel. A higher risk of physical disturbance and collision are more likely to occur where there is a co-occurrence of sea turtles and vessels, especially in high densities. However, sea turtles are only at the surface (and therefore susceptible to vessel strike) when coming up to breathe, feed, or bask. A large portion of their time is spent within the water column or near the benthic habitat (Renaud and Carpenter 1994; Sasso and Witzell 2006). There would be a reduced risk of a vessel collision in areas with a low density of sea turtles and a low density of OPCs or OTHs. Coast Guard's SOPs (Appendix C) would minimize potential impacts from vessel movement; therefore, the likelihood of a collision with a sea turtle would be low.

Anchoring, which is considered in this PEIS/POEIS to be a part of vessel movement, would occur in designated anchorages, which are usually soft-bottom areas with routine bottom disturbance. If marine reptiles are found in these designated anchorages, then anchoring may disturb marine reptiles feeding in the benthic zone and would likely cause a behavioral response, such as diving or swimming away from the disturbance. However, any response expected to be temporary and any individual animal would be expected to return to their normal activity. Anchoring would not be expected to strike, injure, or kill any marine reptile found in the proposed action area.

As part of the Proposed Action, the OPC would tow a vessel using towing lines/cables at a typical speed of approximately 5 knots. Although a towed vessel may impact or harm a marine reptile via collision, the chance that such an encounter would result in serious injury is extremely remote because of the low probability that a marine reptile would overlap with infrequent towing events associated with the Proposed Action. Although a risk of entanglement with tow lines is present when a tow line is partially submerged, in order for an organism to become entangled in a line, the materials must have certain properties, such as the ability to form loops and a high breaking strength. Since tow lines would not be expected to have any loops or slack and would be taut, Coast Guard would have a lookout present, and because marine reptiles are a highly mobile species, the risk of entanglement to marine reptiles would be negligible. There would be no population level impacts on any marine reptile species as a result of anchoring or towing because the number of individuals impacted would be few, if any.

The most likely response of a marine reptile to vessel movement is a behavioral reaction such as changes in general activity (e.g., from resting or feeding to active avoidance) and changes in speed and direction of movement. Short-term behavioral reactions to vessel movement are not expected to result in long-term impacts to individuals (such as chronic stress). Avoidance of a vessel as it moves through the proposed action areas is unlikely to cause abandonment or significant alteration of behavioral patterns, including breeding, feeding, or sheltering. Marine reptiles would be expected to return to their normal behavior once the vessel has moved through the area. There would not be population level impacts to marine reptiles as a result of vessel movement associated with the Proposed Action.

3.4.6.2.3 Military Expended Materials

Marine reptiles in the proposed action areas may be exposed to MEM during the Proposed Action. Inert small caliber (0.50 caliber or MK-38 standard [25 mm]) and large caliber (57 mm) gun rounds, as well as the Nulka round, used in gunnery training may enter the water as MEM during the Proposed Action and would not be recovered. As discussed in Section 3.4.3.2.3, gunnery training would occur far from shore is designated areas. Therefore, marine reptiles that forage or migrate greater than 3 nm (6 km) offshore could overlap with MEM associated with gunnery training. Impacts to sea turtle nesting areas are not expected because gunnery training would not occur close to shore where sea turtle nests are located nor would it be expected that MEM would drift to areas where sea turtle nests are located. Impacts to breeding adults and hatchlings associated with these nesting areas are also not expected as a result from MEM. The potential impact to marine reptiles from MEM is ingestion, which may result in injury or death.

MEM from targets would not present a significant threat to sea snake or sea turtle populations because of the small numbers of these targets used and the large distance in which expended material would be dispersed across the proposed action areas. Additionally, sea snakes are a rare occurrence in the HI-PAC and NEPAC-South proposed action areas; therefore, overlap of MEM and sea snakes would be extremely unlikely.

Since gunnery training would occur more than 3 nm (6 km) from shore, it is extremely unlikely that there would be overlap between foraging green, hawksbill, and Kemp's ridley sea turtles (which prefer seagrass, reef, and mangrove habitats), as these species mostly forage in coastal habitats. Therefore, MEM associated with the Proposed Action would pose a negligible ingestion risk to green, hawksbill, and Kemp's ridley sea turtles.

Leatherback sea turtles feed throughout the water column, primarily on jellyfish, their preferred prey (Davenport 1988; Eckert et al. 1989; Eisenberg and Frazier 1983; Grant and Ferrell 1993; James et al. 2005b; Salmon et al. 2004). The pelagic feeding behavior may overlap with MEM at the surface (i.e., targets); however, the risk of ingestion by leatherback sea turtles would be minimal as MEM associated with the Proposed Action would likely sink quickly. In addition, gunnery training would infrequent, in conducted in established areas, and coordinated with NMFS to avoid sensitive locations (e.g., critical habitat) for all sea turtle species.

Both juveniles and adult loggerhead sea turtles forage on the bottom in coastal habitats, where they would not be likely to encounter MEM. Although they also capture prey throughout the water column (Bjorndal 2003), MEM would most likely sink to the bottom, away from foraging loggerhead sea turtles.

Olive ridley sea turtles are mainly pelagic and have a circumtropical distribution in the Atlantic, Pacific, and Indian Oceans, however, the number of olive ridley sea turtles occurring in U.S. territorial waters is believed to be small (NMFS and USFWS 1998, 2014). Although they feed offshore, both on the seafloor and in the water column, overlap with MEM associated with the Proposed Action would be unlikely, due to their global distribution, the intermittent occurrence of gunnery training, and MEM would likely be covered by sediment and not available for ingestion if the sea turtle is feeding on the bottom. Therefore, because gunnery training would occur intermittently and offshore in established areas, overlap with MEM associated with the Proposed Action and foraging sea turtles is unlikely.

3.4.6.2.4 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, any potential impacts to marine reptiles would be limited to vessel noise, vessel movement, and MEM associated with gunnery training from the Proposed Action. Most vessel use associated with the Proposed Action would occur in waters primarily between 12 nm (22 km) from shore and inside 200 nm (370 km) and would be widely distributed throughout the proposed action areas. Vessel use in inshore waters would limited to transit to and from the vessel's homeport. As discussed in Sections 3.4.6.2.1and 3.4.6.2.2, respectively, the area exposed to noise and disturbance from vessels would be a small portion of the proposed action areas, and only a small number of individuals would be affected compared to overall abundance. Therefore, the impact of vessel noise and vessel movement on marine reptiles would be inconsequential and would not result in significant impact or harm to marine reptiles.

Additionally, as discussed in Section 3.4.6.2.3, due to the infrequent occurrence and the offshore location of gunnery training, MEM would not present a significant threat to marine reptile populations.

Pursuant to the ESA, there would be no effect to ESA-listed sea turtles (Table 3-21) from fathometer and Doppler speed log noise or aircraft movement, as fathometer and Doppler speed log noise is outside of the range of hearing for marine reptiles. Vessel noise, aircraft noise, gunnery noise, vessel movement, and MEM associated with the Proposed Action may affect, but are not likely to adversely affect ESA-listed sea turtles (Table 3-21) under Alternative 1.

3.4.6.2.5 Impacts Under Alternatives 2–3

Under Alternatives 2–3, any potential impacts to marine reptiles would be similar to those discussed for activities under Alternative 1. There could be a potential reduction in the number of vessels conducting the Coast Guard's mission in the proposed action areas. However, the difference would not result in substantive changes to the potential for or types of, impacts to marine reptiles. Therefore, there would be no significant impact or harm to marine reptiles under Alternatives 2–3.

As discussed above, vessel noise, vessel movement, and MEM associated with the Proposed Action would not result in significant impact or harm to marine reptiles. Pursuant to the ESA, there would be no effect to ESA-listed sea turtles (Table 3-21) from fathometer and Doppler speed log noise or aircraft movement, as fathometer and Doppler speed log noise is outside of the range of hearing for marine reptiles. Vessel noise, aircraft noise, gunnery noise, vessel movement, and MEM associated with the Proposed Action may affect, but are not likely to adversely affect ESA-listed sea turtles (Table 3-21) under Alternatives 2–3.

3.4.6.2.6 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, the physical and acoustic disturbances associated with the Proposed Action would not be introduced into the marine environment, with the exception of OPCs 1–5. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impact or harm to marine reptiles with implementation of the No Action Alternative.

3.4.7 Marine Mammals

3.4.7.1 Affected Environment

Marine mammals are a diverse group of approximately 130 species. Most live predominantly in the marine habitat, although some species (e.g., seals, sea lions, walruses, and polar bears) spend time in terrestrial habitats and other marine mammals (e.g., certain species of dolphin) spend time in freshwater environments. The exact number of formally recognized marine mammal species changes periodically with new scientific information. The Society of Marine Mammalogy[15] maintains the most current species and subspecies list.

In the United States, all marine mammals are protected under the MMPA, and some are offered additional protection under the ESA. The MMPA defines a marine mammal "stock" as "a group of marine mammals of the same species or smaller taxon in a common spatial arrangement that interbreed when mature." For management purposes under the MMPA, a stock is considered an isolated population or group of individuals within a whole species that is found in the same area. However, generally due to a lack of sufficient information, management stocks defined by NMFS may include groups of multiple species, such as the six species grouped together as the Mesoplodon beaked whales management unit for the Pacific U.S. West Coast region (Carretta et al. 2020). In other cases, a single species may include multiple stocks recognized for management purposes (e.g., harbor porpoise (*Phocoena phocoena*) in Alaska; see Muto et al. (2020)). NMFS maintains jurisdiction over whales, dolphins, porpoises, seals, and sea lions. The USFWS maintains jurisdiction over certain other marine

[15] Society of Marine Mammalogy website: https://marinemammalscience.org/species-information/list-marine-mammal-species-subspecies/

mammal species, including walruses (*Odobenus rosmarus*), polar bears (*Ursus maritimus*), dugongs (*Dugong dugon*), sea otters (*Enhydra lutris*), and manatees (*Trichechus manatus*).

3.4.7.1.1 Major Groups of Marine Mammals

Cetaceans (suborder Mysticeti and Odontoceti) and carnivores (including suborder Pinnipedia, Mustelidea, and Ursidae) may occur in the proposed action areas. This PEIS/POEIS covers all marine mammals under both NMFS' and the USFWS' jurisdiction. Descriptions of ESA-listed marine mammals are discussed in Section 3.4.7.1.3. Any non-ESA listed species, including a non-ESA listed stock or DPS of an ESA-listed marine mammal is included in Section 3.4.7.1.4 with more species specific information provided in Appendix G. However, the analyses under Section 3.4.7.2 would be applicable to both, ESA or non-ESA-listed, marine mammals. General information on marine mammal hearing and vocalization is discussed in Appendix F. This PEIS/POEIS also presents information, when applicable, regarding subsistence hunting and whaling.

Several terms are used to describe different types of marine mammal distribution. Animals with a cosmopolitan distribution are those that are found all over the world, like many of the great whales. Circumpolar refers to a distribution in high latitudes around one of the poles. Some cetaceans have circumpolar distribution during only part of the year—these include populations of humpback whales (*Megaptera novaeangliae*), fin whales (*Balaenoptera physalus*), killer whales, and male sperm whales (*Physeter macrocephalus*). Only those cetaceans with a circumpolar distribution in the Northern Hemisphere are discussed in this PEIS/POEIS.

A coastal distribution denotes an occurrence close to the coast and often includes adjacent waters over the continental shelf. Many marine mammals have a coastal distribution for part of all of their lives—these include many species of dolphins, porpoises, and some pinnipeds, as well as some baleen whales. The sea otter occurs almost exclusively in coastal waters.

Species that occur in the open ocean, either year-round or for only a portion of the year, are pelagic. The sperm whale and many beaked whales are truly pelagic species, rarely coming near land except in places where the continental shelf is narrow and deep waters about the coastline. Any marine mammal whose distribution is partly to exclusively tied to ice is said to be pagophilic, or "ice-loving." Many of the pinnipeds breed and feed on or around ice. Bowhead whales spend much of their lives in partly frozen waters and can travel considerable distances under ice. The beluga and narwhal also spend much time in ice. It is also common to find aggregations of polar species in semi-permanent areas of open water, known as polynyas. The polar bear spends much of its life on sea ice and swims considerable distances between ice floes.

The entire list of marine mammal species, including a description of distribution and seasonality, is provided in Appendix H, and includes those species that would only be encountered during transit, identified as "Transit Only[16]." If a species is expected to be present in a proposed action area, it is identified by the DPS or MMPA stock expected in that geographic location. The term "NA" means that the geographic location is "not applicable" for that species—the species is not expected to be found in that geographic location where the activity specified above is likely to occur (e.g., species is not expected to be present in the NW-ATL proposed action area where gunnery training is proposed), but is included for consistency.

[16] The term "Transit Only" indicates that the species would be encountered only during vessel noise and movement between ports to 12 nm from shore, and not expected between 12–200 nm. More information on these "Transit Only" species can be found in Appendix H.

3.4.7.1.2 Habitat Use

Many factors influence the distribution of marine mammals in the proposed action areas, primarily patterns of major ocean currents, bottom relief, and water temperature, which, in turn, affect prey distribution and productivity. The continuous movement of water from the ocean bottom to the surface creates a nutrient-rich, highly productive environment for marine mammal prey in upwelling zones (Jefferson et al. 2015); the equatorial upwelling in the western Pacific is one such area (Di Lorenzo et al. 2010; Helber and Weisberg 2001). While most baleen whales are migratory, some species have a year-round presence in certain proposed action areas (e.g., Rice's whales in the GoMEX proposed action area). Many of the toothed whales do not migrate in the strictest sense, but some do undergo seasonal shifts in distribution. In general, seals, sea lions, sea otters, manatees, and polar bears also don't migrate, but their distribution is influenced by prey availability and for those that require access to terrestrial habitats (e.g., haul out sites).

3.4.7.1.3 ESA-Listed Marine Mammals Potentially Present in the Proposed Action Areas

3.4.7.1.3.1 ESA-Listed Mysticetes

This section describes the status and management including critical habitat designations, geographic range and distribution, population abundance, and prey interactions of ESA-listed mysticete species or baleen whales that are expected to occur in the proposed action areas (Table 3-22). MMPA stock information is provided to establish distribution in proposed action areas.

Table 3-22. ESA-Listed Mysticetes in the Proposed Action Areas

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status*[1]	*Distribution of the Stock/DPS*	*Proposed Action Area(s)*	*Critical Habitat within Proposed Action Area(s)*
Blue whale (*Balaenoptera musculus*)	Western North Atlantic Endangered	Western North Atlantic from Arctic to mid-latitude waters; Rare occurrences in Florida and Gulf of Mexico waters	NW-ATL; NW-ATL-Florida and the Caribbean; GoMEX	None
	Central North Pacific **Endangered**	Migrate between waters south of the Aleutian Islands and Gulf of Alaska (summer) and Hawaii (winter)	HI-PAC; AK	None
	Eastern North Pacific **Endangered**	Migrate between waters of Baja California, Gulf of California and Costa Rica Dome and California Coast.	NEPAC-South; NEPAC-North	None
Bowhead whale (*Balaena mysticetus*)	Western Arctic **Endangered**	Seasonally ice-covered waters of Arctic and near-Artic, north of 60˚N and South of 75˚N in western Arctic Basin.	AK	None
Bryde's whale [Rice's whale] (*Balaenoptera edeni*)	Northern Gulf of Mexico, Gulf of Mexico DPS[17] Endangered	Northeastern Gulf of Mexico in the De Soto canyon, along continental shelf break between 100 m and 400 m depth.	GoMEX	None
Fin whale (*Balaenoptera physalus*)	Western North Atlantic Endangered	Offshore waters of Cape Hatteras north to Nova Scotia.	NW-ATL; NW-ATL-Florida and the Caribbean	None
	Northeast Pacific Endangered	Alaskan waters, including the Bering Sea and Gulf of Alaska (Central Alaskan Coast, Aleutian Islands).	AK	None
	California/ Oregon/ Washington **Endangered**	Primarily throughout the Southern California Bight, but can range as far north as Alaska and far south as Gulf of California.	NEPAC-South; NEPAC-North	None
	Hawaii Endangered	US EEZ water of Hawaiian Island and adjacent High Seas.	HI-PAC	None
Gray whale (*Eschrichtius robustus*)	Western North Pacific DPS Endangered	Okhotsk Sea, Russia and Bering Sea (summer) and eastern Asia (winter).	AK	None
Humpback whale[2]	Western North Pacific stock (Hawaii DPS);	Migrate between feeding grounds in Alaska (Gulf of Alaska, Bering Sea, west along the Aleutian Islands	HI-PAC; AK	Proposed Rule: 84 FR 54354;

17 Rosel, P.E. et al. 2021. Supports the existence of an undescribed species of Balaenoptera from the Gulf of Mexico, called Rice's whale. Should the Society for Marine Mammalogy Committee of Taxonomy accepts the new name of Rice's whale, then NOAA will update the listing and change this listing status from the Bryde's whale Gulf of Mexico subspecies. At the time of the writing of this PEIS/POEIS, this change has not been made, so the ESA-listed species will be referred to as the Bryde's whale subpopulation in the Gulf of Mexico.

Common Name (Scientific Name)	***MMPA Stock, DPS and ESA-Listing Status[1]***	***Distribution of the Stock/DPS***	***Proposed Action Area(s)***	***Critical Habitat within Proposed Action Area(s)***
(*Megaptera novaeangliae*)	Western North Pacific DPS- **Endangered**	to the Kamchatka Peninsula) and wintering grounds in Hawaii and Asia.		October 9, 2019
	Central North Pacific stock (Hawaii DPS; Mexico DPS- **Threatened** Central American DPS- **Endangered**)	Feeding areas of this stock overlap with Western North Pacific stock in British Columbia to Bering Sea. Dispersed between Alaskan and Hawaiian waters.	HI-PAC; AK	Proposed Rule: 84 FR 54354; October 9, 2019
	California/ Oregon/ Washington stock (Mexico DPS- **Threatened;** Central American DPS- **Endangered**)	Most animals from this stock migrate between feeding areas off of the U.S. West Coast to Mexican waters (Mexican DPS, some Central American DPS).	NEPAC-South; NEPAC-North	Proposed Rule: 84 FR 54354; October 9, 2019
North Atlantic right whale (*Eubalaena glacialis*)	Western stock Endangered	Coastal waters of southeastern U.S. to New England waters and the Canadian Bay of Fundy, Scotian Shelf and Gulf of St. Lawrence.	NW-ATL; NW-ATL-Florida and the Caribbean	81 FR 4837; January 27, 2016
North Pacific right whale (*Eubalaena japonica*)	Eastern North Pacific **Endangered**	Gulf of Alaska and Bering Sea, along the California coast to Baja California, Mexico.	NEPA-South; NEPA-North; AK	73 FR 19000; April 8, 2008
Sei whale (*Balaenoptera borealis*)	Nova Scotia Endangered	Continental shelf waters of the northeastern U.S. and extends northwestward to south of Newfoundland, Canada.	NW-ATL	None
	Eastern North Pacific **Endangered**	Offshore waters of California, Oregon, and Washington	NEPAC-South; NEPAC-North	None
	Hawaiian Endangered	Offshore waters of U.S. EEZ surround Hawaiian Islands.	HI-PAC	None

[1] All marine mammals in the United States are offered protection under the MMPA. Some species are offered further protection under the ESA.

3.4.7.1.3.1.1 Blue Whale

The blue whale (*Balaenoptera musculus*) was listed as endangered under the Endangered Species Preservation Act of 1969 (35 FR 18319; December 2, 1970), the predecessor to the ESA. When the ESA was passed in 1973, the blue whale was listed as endangered throughout its range. It is also designated as "depleted" and classified as a strategic stock under the MMPA. No critical habitat is currently designated for this species. Blue whales occur worldwide in all major oceans, except the Arctic. Blue whales may be found in all of the proposed action areas and would be expected to be encountered in transit in all proposed action areas, although considered extremely rare in the GoMEX proposed action area.

In general, blue whales are found in the open ocean, but they do come close to shore to feed and possibly to mate and breed. Blue whales feed primarily on various species of krill (euphausiids). They are observed from tropical waters to pack ice edges in both hemispheres, but are believed to avoid equatorial waters. Calves are born in winter, apparently in tropical/subtropical breeding areas (the specific locations of which are not known for most populations). For the MMPA, the Western North Atlantic stock, the Eastern North Pacific (ENP) stock, and the Central North Pacific (CNP) stock would overlap with the proposed action areas and therefore may be encountered during OPC operations or while the vessel is in transit to and from its respective homeport. Information on each MMPA stock is provided below.

North Atlantic stock

The distribution of the blue whale in the western North Atlantic generally extends from the Arctic to at least mid-latitude waters. They are most frequently sighted in waters off eastern Canada, with the majority of records from the Gulf of St. Lawrence (Sears et al. 1987). The blue whale considered to be an occasional visitor to the U.S. Atlantic EEZ waters, which may represent the southern limit of its feeding range (CETAP 1982; Wenzel et al. 1988). Yochem and Leatherwood (1985) summarized records that suggested an occurrence of this species south to Florida and Gulf of Mexico, although the actual southern limit of the species' range is unknown. Using the U.S. Navy's Sound Surveillance System (SOSUS) program, blue whales have been detected and tracked acoustically in much of the North Atlantic, including in subtropical waters north of the West Indies and in deep water east of the U.S. Atlantic EEZ, indicating the potential for long-distance movements (Clark 1995b). Most of the acoustic detections were around the Grand Banks area of Newfoundland and west of the British Isles, but recordings in the Gully Marine Protected Area at the outer edge of the Scotian Shelf had a higher percentage of blue whale vocalizations in the summer than in the winter (Marotte and Moors-Murphy 2015). Blue whale vocalizations in offshore areas of the New York Bight were recorded mostly during winter (Muirhead et al. 2018). Historical blue whale observations collected by Reeves et al. (2004) show a broad longitudinal distribution in tropical and warm temperate latitudes during the winter months, with a narrower, more northerly distribution in summer.

Pacific Ocean – Eastern North Pacific stock

North Pacific blue whales were once thought to belong to as many as five separate populations (Reeves et al. 1998), but acoustic evidence suggests only two populations occur, in the eastern and western north Pacific (McDonald and 2006; Monnahan 2014; Stafford 2003; Stafford et al. 2001). North Pacific blue whales produce two distinct acoustic calls, referred to as "northwestern" and "northeastern" types. It has been proposed that these represent distinct populations with some degree of geographic overlap (Monnahan 2014; Stafford 2003; Stafford et al. 2001). The northeastern call predominates in the Gulf of Alaska, the U.S. West Coast, and the eastern tropical Pacific, while the northwestern call predominates from south of the Aleutian Islands to the Kamchatka Peninsula in Russia, though both call types have been recorded concurrently in the Gulf of Alaska (Stafford 2003; Stafford et al. 2001). Photographs of blue whales in California have also been matched to individuals photographed off the Queen Charlotte Islands in northern British Columbia and to one individual photographed in the northern Gulf of Alaska (Calambokidis et al. 2009a). Gilpatrick and Perryman (2008) showed that blue whales from California to Central America (the Eastern North Pacific [ENP] stock) are on average, 7 ft (2 m) shorter than blue whales measured from historic whaling records in the central and western north Pacific. Based on northeastern call type locations, some whales in the ENP stock may range as far west as Wake Island and as far south as the equator (Stafford et al. 2001; Stafford 1999).

The U.S. West Coast is certainly one of the most important feeding areas in summer and fall (Bailey et al. 2009; Calambokidis et al. 2009a; Calambokidis et al. 2015; Mate et al. 2015), but increasingly, blue whales from the ENP stock have been found feeding to the north and south of this area during summer and fall. Nine 'biologically important areas' (BIAs) for blue whale feeding are identified, but all are off the California Coast (Calambokidis et al. 2015). Most of this stock is believed to migrate south to spend the winter and spring in high productivity areas off Baja California, in the Gulf of California, and on the Costa Rica Dome (Calambokidis et al. 2009a). Satellite telemetry deployments (Hazen et al. 2016) indicate that most blue whales are outside U.S. West Coast waters from about November to March. Blue whales observed in the spring, summer, and fall off California, Washington, and British Columbia are known to be part of a group that returns to feeding areas off British Columbia and Alaska (Calambokidis 2004; Calambokidis et al. 2009b; Gregr et al. 2000; Mate et al. 1999; Stafford 1999). Given that these migratory destinations are areas of high productivity and observations of feeding in these areas, blue whales can be assumed to feed year-round. Some individuals from this stock may be present year-round on the Costa Rica Dome (Reilly and Thayer 1990). However, it is also possible that some Southern Hemisphere blue whales will occur north of the equator during the austral winter.

Pacific Ocean- Central North Pacific stock

Blue whale feeding aggregations have not been found in Alaska despite several surveys (Forney and Brownell 1996; Leatherwood 1988; Stewart et al. 1987). However, as mentioned above, acoustic data obtained throughout the North Pacific (Stafford 2003; Stafford et al. 2001) have revealed two distinct blue whale call types, suggesting two North Pacific stocks: eastern and central. Blue whales from the CNP stock feed in summer off Kamchatka, the Aleutians, and in the Gulf of Alaska, and migrate to lower latitudes in the winter, including the Western Pacific and to a lesser degree the Central Pacific, including Hawaii (Stafford 2003; Stafford et al. 2001). Based on a photo-identification match Rone et al. (2014) determined the blue whale had been previously identified in Mexican waters off Baja California 8 years before. There were no blue whale sightings south of the Aleutian Islands that covered waters over the continental shelf, the Aleutian Trench, and the northern portion of the abyssal plains of the Gulf of Alaska (Forney and Brownell 1996) and covering all seasons and including waters of all depths in the North Pacific Ocean and southern Bering sea, but no blue whales were seen (Sydeman 2004).

Berzin and Rovnin (1966) published the first record of blue whales near Hawaii; however, in November 2010, blue whales were observed in U.S. Hawaiian EEZ waters (Bradford et al. 2017b). The acoustic recordings made off Hawaii showed bimodal peaks throughout the year (Stafford et al. 2001), with central Pacific call types heard during winter and eastern calls heard during summer.

Subsistence or Whaling

There are no reported takes of blue whales by Native subsistence hunters in the proposed action areas. There are also no known takes of blue whales from current whaling practices.

3.4.7.1.3.1.2 Bowhead Whale

Bowhead whales (*Balaena mysticetus*) were protected at different times under the 1931 League of Nations Convention, the Endangered Species Preservation Act of 1966, and the Endangered Species Conservation Act of 1969 on December 2, 1970 (35 FR 18319). The Endangered Species Conservation Act ended commercial whaling in the United States. Bowhead whales were also listed in Appendix 1 of The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) of 1973. When the ESA was passed in 1973, the bowhead was listed as endangered throughout its range. It is also designated as “depleted” and classified as a strategic stock under the MMPA. No critical habitat is currently designated for this species. The only bowhead whale stock found in U.S. waters is the Western Arctic stock (also designated as the Western Arctic stock under the MMPA), also known as the Bering-Chukchi-Beaufort stock (Rugh et al. 2003) or Bering Sea stock (Burns 1993), which could overlap with the AK proposed action area and therefore may be encountered during OPC operations or while the vessel is in transit to and from its respective homeport.

Bowhead whales are found only in Arctic and subarctic regions near sea ice and generally between 55° N and 85° N (Braham and Rice 1984; Moore and Reeves 1993) of the North Atlantic and North Pacific Oceans (Rice 1998). They migrate to the high arctic in the summer and retreat southward in fall with the advancing ice edge. Their range can expand and contract depending on ice cover and access to Arctic straits (Rugh et al. 2003). Bowhead whales are found in the Bering, Beaufort, and Chukchi Seas, Russia, the northern parts of Hudson Bay, Canada (Wiig et al. 2007), and in western Greenland (Hudson Bay and Foxe Basin) and eastern Canada (Baffin Bay and Davis Strait).

During winter and spring in Alaska, bowhead whales are closely associated with sea ice (Citta et al. 2015; Moore and Reeves 1993; Quakenbush et al. 2010). Western Arctic bowhead whales are distributed in seasonally ice-covered waters of the Arctic and near-Arctic, generally north of 60° N and south of 75° N in the western Arctic Basin (Braham and Rice 1984; Moore and Reeves 1993). The majority of the Western Arctic stock migrates annually from wintering areas (December to March) in the northern Bering Sea, through the Chukchi Sea in the spring (April through May) to the eastern Beaufort Sea in relatively ice free waters (Citta et al. 2015), where they spend much of the summer (June through early to mid-October) before returning again to the Bering Sea in the fall (September through December) to overwinter in select shelf waters in all but heavy ice conditions (Braham et al. 1980; Citta et al. 2015; Moore and Reeves 1993; Moore et al. 2000; Quakenbush et al. 2010).

The bowhead spring migration follows fractures in the sea ice around the coast of Alaska, generally in the shear zone between the shorefast ice and the mobile pack ice. Bowheads are one of the most commonly sighted cetaceans in the Chukchi Sea when the ice has receded during warm seasons (Aerts et al. 2013). Some bowhead whales are found in the western Beaufort, Chukchi, and Bering Seas in summer, and these are thought to be a part of the expanding Western Arctic stock (Citta et al. 2015; Clarke et al. 2013; Clarke et al. 2014; Clarke et al. 2015; Rugh et al. 2003). Surveys conducted in the western Beaufort Sea during July and August have had relatively high sighting rates of bowhead whales, including cows with calves and feeding animals (Clarke et al. 2014; Muto et al. 2017). During the autumn migration through the Beaufort Sea, bowhead whales select shelf waters in all but “heavy ice” conditions, when they select slope habitat (Moore et al. 2000). In winter in the Bering Sea, bowheads often use areas with approximately 90 to 100 percent sea ice cover (Citta et al. 2015; Quakenbush et al. 2010), even when polynyas are available (Quakenbush et al. 2010). Bowheads are known to break through ice as thick as 24 in (60 cm). Heavy ice years in the autumn in the Beaufort Sea are becoming less common because of climate change, the resulting trend of delayed seasonal sea ice formation, and the dramatic reduction in volume of multi-year ice.

Mating occurs from late winter to spring, and calving occurs from April to June, both in the Bering Sea (Quakenbush et al. 2008). Several areas within the Chukchi and Beaufort Seas along the northern coast of Alaska are important to bowhead whales. In the Alaskan Beaufort Sea and northeastern Chukchi Sea, a reproductive area is in use during the month of October. Near Barrow Canyon, there is another area used from April to June for reproduction. In the eastern Chukchi and Alaskan Beaufort Sea, there is a migration area used from April to May.

Evidence suggests that bowhead whales feed on concentrations of zooplankton throughout their range. However, prey includes various species of copepods, zooplankton, euphausiids, mysids, invertebrates, and fish (Budge et al. 2008; Rugh and Shelden 2009; Wiig et al. 2007). Likely or confirmed feeding areas include Amundsen Gulf and the eastern Canadian Beaufort Sea; the central and western U.S. Beaufort Sea; Wrangel Island; and the coast of Chukotka, between Wrangel Island and the Bering Strait (Ashjian et al. 2010; Clarke et al. 2013; Clarke et al. 2014; Clarke et al. 2012; Clarke et al. 2015; Lowry et al. 2004; Muto et al. 2016; Okkonen et al. 2011; Quakenbush et al. 2010). Clarke and Ferguson (2010) also observed bowhead whales feeding during the summer in the northeastern Chukchi Sea. Large groups of bowhead whales have been documented feeding in the western Alaskan Beaufort Sea as early as July and continuing into October (Clarke et al. 2014; Ferguson et al. 2015).

Subsistence or Whaling

Bowhead whales have been taken for subsistence purposes for at least 2,000 years (Marquette and Bockstoce 1980; Stoker and Krupnik 1993). Subsistence takes have been regulated by a quota system under the authority of the International Whaling Commission (IWC) since 1977. Since the exact location of the bowhead hunting area is dependent on where bowheads are located, which varies annually, the hunting grounds could overlap with the AK proposed action area. In 1986, the IWC banned commercial whaling; however, there are still some countries that do whale, particularly in the Southern Ocean, but bowhead whales are not found in the Southern Ocean. Therefore, there are no known takes of bowhead whales from current whaling practices.

3.4.7.1.3.1.3 Bryde's Whale

All Bryde's whales (*Balaenoptera edeni*) are protected under the MMPA, including the Gulf of Mexico subspecies[18]. In 2019, the Gulf of Mexico Bryde's whale was listed as endangered under the ESA (84 FR 15446; April 15, 2019). This stock is also designated as "depleted" and classified as a strategic stock under the MMPA. No critical habitat is currently designated for the Gulf of Mexico subspecies. The following description includes some general information about Bryde's whales and specific information relevant to the Gulf of Mexico subspecies, since it would be expected to overlap with the GoMEX proposed action area and therefore may be encountered during OPC operations or while the vessel is in transit to and from its respective homeport.

Bryde's whales are found in warm, temperate oceans from 40° S to 40° N. Some populations of Bryde's whales undertake seasonal migrations, while others do not migrate. They are typically observed in alone or in small numbers, although there have been reports of up to 20 whales loosely grouped together in feeding areas. Their diet consists of krill, copepods, red crabs, shrimp, and schooling fish. Research suggests that Bryde's whales likely spend the majority of their time within 50 ft (15 m) of the water's

[18] Rosel, P.E. et al. (2021). Supports the existence of an undescribed species of *Balaenoptera* from the Gulf of Mexico, called Rice's whale. Should the Society for Marine Mammalogy Committee of Taxonomy accepts the new name of Rice's whale, then NOAA will update the listing and change this listing status from the Bryde's whale Gulf of Mexico subspecies. At the time of the writing of this PEIS/POEIS, this change has not been made, so the ESA-listed species will be referred to as the Bryde's whale subpopulation in the Gulf of Mexico.

surface. The peak of breeding and calving season occurs in autumn, and females give birth to a single calf every two to three years.

Sighting records and acoustic detections of Bryde's whales in the U.S. Gulf of Mexico occur almost exclusively in the northeastern Gulf in the De Soto Canyon area, along the continental shelf break between 328 and 1,313 ft (100 and 400 m) depth (Hansen and Windsor 2006; Maze-Foley and Mullin 2006; Mullin and Hoggard 2000; Mullin and Fulling 2004; Rice et al. 2014; Rosel et al. 2016; Rosel and Wilcox 2014; Širović et al. 2014; Soldevilla et al. 2017). Bryde's whales have been sighted in all seasons within the De Soto Canyon area (Maze-Foley and Mullin 2006; MMIQT 2015; Mullin 2007; Mullin and Hoggard 2000). However, the geographic extent for this stock has not been fully identified. Historical whaling records from the 1800s suggest Bryde's whales may have been more common in the U.S. waters of the north central Gulf of Mexico and in the southern Gulf of Mexico in the Bay of Campeche (Reeves et al. 2011). However, there have yet to be any confirmed sightings in the north central or western Gulf (Hansen et al. 1996; Maze-Foley and Mullin 2006; Mullin and Hoggard 2000; Mullin and Fulling 2004).

Subsistence or Whaling

No subsistence or hunting of Bryde's whales occurs in the United States. Whalers have recently hunted Bryde's whales off the coasts of Indonesia and the Philippines. Additionally, some hunters in Japan continue to take Bryde's whales.

3.4.7.1.3.1.4 Fin Whale

The fin whale (*Balaenoptera physalus*) was listed as endangered under the Endangered Species Preservation Act of 1969 on December 2, 1970 (35 FR 18319), the predecessor to the ESA. When the ESA was passed in 1973, the fin whale was listed as endangered throughout its range. It is also designated as "depleted" and classified as a strategic stock under the MMPA. No critical habitat is currently designated for the fin whale. The fin whale is a cosmopolitan species with a generally anti-tropical distribution centered in the temperate zones and inhabiting oceanic waters. Locations of breeding and calving grounds for the fin whale are largely unknown, but they typically migrate seasonally to higher latitudes to feed and migrate to lower latitudes to breed (Campbell et al. 2015; Kjeld et al. 2006; Macleod et al. 2006; Mizroch et al. 2009). The Western North Atlantic, the Northeast Pacific, and the Hawaii fin whale stocks designated under the MMPA would overlap with all of the proposed action areas, although rare in the HI-PAC proposed action area; and therefore may be encountered during OPC operations or while the vessel is in transit to and from its respective homeport.

Three subspecies of fin whales (*Balaenoptera physalus*) are currently recognized, including the northern fin whale (*B.p. physalus*), the southern fin whale (*B.p. quoyi*), and the pygmy fin whale (*B.p. patachonica*). Results from Archer et al. (2019) indicated that North Pacific fin whales should be further separated and recognized as a separate subspecies with the name *B. p. velifera*.

Fin whale populations exhibit differing degrees of mobility, presumably depending on the stability of access to sufficient prey resources throughout the year. Most groups are thought to migrate seasonally, in some cases over distances of thousands of kilometers. They feed intensively at high latitudes in summer and fast, or at least greatly reduce their food intake, at lower latitudes in winter. Some groups apparently move over shorter distances and can be considered resident in areas with a year-round supply of adequate prey. They are relatively rare in tropical waters or near pack ice in the polar seas. Fin whales typically, if observed nearshore, are in deeper water as they approach the coast. They exhibit a poleward shift to feeding areas in the summer and towards the tropics in the winter for breeding. Calving does not appear to take place in distinct nearshore areas and not much is known of the social or mating system of fin whales. However, there are some resident groups observed in specific geographic areas (Jefferson et al. 2014). Fin whales feed on small invertebrates (euphausiids and copepods), schooling fish (capelin [*Mallotus villosus*], herring, mackerel, sandlance, and blue whiting [*Micromesistius poutassou*]), and squid.

Western North Atlantic stock

Fin whales are common in waters of the U.S. Atlantic EEZ, principally from Cape Hatteras, North Carolina northward to Cape Cod, Massachusetts. Edwards et al. (2015) found evidence to confirm the presence of fin whales in every season throughout much of the U.S. EEZ north of 35° N; however, densities vary seasonally. Acoustic detections of fin whale "singers" augment and confirm these visual sighting conclusions for males. Recordings from Massachusetts Bay, New York Bight, and deep ocean areas detected some level of fin whale singing from September through June (Clark and Gagnon 2002; Morano et al. 2012b; Watkins et al. 1987). These acoustic observations from both coastal and deep ocean regions support the conclusion that male fin whales are broadly distributed throughout the western North Atlantic for most of the year.

New England waters represent a major feeding ground for fin whales. There is evidence of site fidelity by females, and perhaps some segregation by sexual, maturational, or reproductive class in the feeding area (Agler et al. 1993). The authors suggested that fin whales on these grounds exhibited patterns of seasonal occurrence and annual return. This was reinforced by Clapham and Seipt (1991), who showed maternally-directed site fidelity for fin whales in the Gulf of Maine.

Hain et al. (1992) suggested that calving takes place from October to January in latitudes of the U.S. mid-Atlantic region; however, it is unknown where calving, mating, and wintering occur for most of the population. Results from the Navy's Sound Surveillance System or SOSUS program (Clark and Gagnon 2002; Clark 1995a) indicated a substantial deep ocean distribution of fin whales. It is likely that fin whales occurring in the U.S. Atlantic EEZ undergo migrations into Canadian waters, open ocean areas, and perhaps even subtropical or tropical regions (Edwards et al. 2015).

Pacific Ocean-Northeast Pacific stock

Within the U.S. waters of the Pacific Ocean, fin whales are found seasonally off the coast of North America and in the Bering Sea during the summer. Information on seasonal fin whale distribution has been assembled from the acoustic detection of fin whale calls along the U.S. Pacific Coast, in the central North Pacific, and in the western Aleutian Islands (Moore et al. 1998; Moore et al. 2006; Širović et al. 2013; Soule and Wilcock 2013; Stafford et al. 2007; Watkins et al. 2000). Moore et al. (Moore et al. 1998; 2006), Watkins et al. (2000), and Stafford et al. (2007) documented a higher rate of fin whale calls from August/September through February along the U.S. Pacific Coast, suggesting that these may be important feeding areas during the winter. While peaks in call rates occurred during late summer, fall, and winter in the central North Pacific and the Aleutian Islands, there were only occasional acoustic detections during summer months. Fin whales have been acoustically detected in the Gulf of Alaska year-round, with highest occurrence rates from August to December and lowest call rates from February through July (Moore et al. 2006; Stafford et al. 2007). Fin whale calls were recorded in the shelf and slope regions of the north-central Gulf of Alaska during all months, with a peak in calling occurrence from late August until the end of December (Baumann-Pickering et al. 2012).

There have been acoustic detections of fin whales in the southeast Bering Sea with peaks from September through November and in February and March (Stafford et al. 2010). Acoustic detection data collected from the Bering Sea suggest that several putative fin whale stocks may feed in the Bering Sea; however, only one of these likely migrates into the Chukchi Sea to feed (Delarue et al. 2013). Fin whale calls were detected and sightings have been increasing in the U.S. portion of the northern Chukchi Sea from July to October (Aerts et al. 2012; Brower et al. 2018; Clarke et al. 2013; Delarue et al. 2013; Funk et al. 2010); fin whale calls were also recorded in August and September in the northeastern Chukchi Sea (Delarue et al. 2013); and, August to October just north of the Bering Strait (Tsujii et al. 2016).

Fin whales were consistently distributed both in an area of high productivity along the edge of the eastern Bering Sea continental shelf (Springer et al. 1996) and, at a lower frequency, in the middle shelf. Abundance estimates for fin whales in the Bering Sea were consistently higher in cold years than in warm years (Friday et al. 2012; Friday et al. 2013), indicating a shift in distribution. Cold years are known to be more favorable for large copepods and euphausiids over the Bering Sea shelf (Stabeno et al. 2012) and fin whale distributions are likely driven by the availability of preferred prey. Year-round fin whale occurrence in the AK proposed action area is likely, although the abundance and distribution of animals both inshore and offshore would be seasonal and in response to prey availability.

Pacific Ocean-California/Oregon/Washington stock

Fin whales occur year-round in California (Dohl et al. 1983), Oregon, and Washington (Moore et al. 1998). Fin whales satellite-tagged in the Southern California Bight (SCB) use the region year-round, although they seasonally range to central California and Baja California before returning to the SCB (Falcone and Schorr 2013). The longest satellite track reported by Falcone and Schorr (2013) was a fin whale tagged in the SCB in January of 2014, with the whale moving south to central Baja California by February and north to the Monterey area by late June. Because fin whale abundance appears lower in the winter/spring in California (Dohl et al. 1983; Forney et al. 1995) and Oregon (Green et al. 1992), it is likely that the distribution of this stock extends seasonally outside of these coastal waters. Archer et al. (2013) present evidence for geographic separation of fin whale mitochondrial DNA clades near Point Conception, California.

Pacific Ocean-Hawaii stock

Fin whales are considered rare in Hawaiian waters and are absent to rare in eastern tropical Pacific waters (Hamilton et al. 2009). Thompson and Friedl (1982) and Northrop et al. (1968) suggested that fin whales migrate into Hawaiian waters mainly in fall and winter, based on acoustic recordings off Oahu and Midway Islands. Although the exact positions of the whales producing the sounds could not be determined, at least some of them were almost certainly within the U.S. EEZ. McDonald and Fox (1999) reported calling fin whales using passive acoustic recordings within about 9 nm (16 km) of the north shore of Oahu.

Subsistence or Whaling

No subsistence or hunting of fin whales occurs in the United States. Although the IWC banned commercial whaling, there are still some countries that do whale, particularly in the Southern Ocean. A certain number of fin whales are killed each year from current whaling practices.

3.4.7.1.3.1.5 Gray Whale

Two genetically distinct population segments of gray whales (*Eschrichtius robustus*) are currently recognized (Reilly et al. 2008): (1) the ENP DPS and (2) the Western North Pacific (WNP) DPS (Bonner 1986; LeDuc et al. 2002; Weller et al. 2013). The ENP gray whale was delisted from the ESA in 1994 (59 FR 31094; June 16, 1994). The WNP DPS is listed as endangered under the ESA and is also designated as “depleted” and classified as a strategic stock under the MMPA. The WNP DPS is the only ESA-listed gray whale population with the potential to occur and encountered when the OPC is in transit to and from its respective homeports and the AK, NEPAC-North, and NEPAC-South proposed action areas. OPC operational activities would occur beyond the gray whale's typical migration and feeding areas. No critical habitat is currently designated for the WNP gray whale.

Gray whales occur along the eastern and western margins of the North Pacific and are restricted to shallow continental shelf waters for feeding, living most of their lives within a few tens of kilometers of shore. In the western North Pacific, gray whales feed during summer and fall in the Okhotsk Sea off northeast Sakhalin Island, Russia, and off southeastern Kamchatka in the Bering Sea (Burdin et al. 2017; Tyurneva et al. 2010; Vertyankin et al. 2004; Weller et al. 2012; Weller et al. 1999). Information from tagging, photo-identification, and genetic studies show that some whales identified in the WNP off Russia have been observed in the eastern North Pacific, including coastal waters of Canada, the United States, and Mexico (Lang 2010; Mate et al. 2015; Urbán et al. 2013; Weller et al. 2012). Some whales that feed off Sakhalin Island in summer migrate east across the Pacific to the West Coast of North America in winter, while others migrate south to waters off Japan and China (Weller et al. 2016). Observations indicate that not all gray whales in the WNP share a common wintering ground (Cooke et al. 2015, 2017; IUCN 2018; Lang et al. 2011; LeDuc et al. 2002; Weller et al. 2016). Brüniche-Olsen et al. (2018) reassessed the genetic differentiation of gray whales feeding off Sakhalin and ENP whales from the Mexican breeding lagoons and suggested that gray whale population structure is not currently determined by simple geography and may be in flux as a result of emerging migratory dynamics.

Subsistence or Whaling

Subsistence hunters in Russia and the United States have traditionally harvested whales from the ENP gray whale stock in the Bering Sea; however, only the Russian hunt has persisted in recent years (Huelsbeck 1988; Reeves 2002). In 2005, the Makah Indian Tribe requested authorization from NOAA/NMFS under the MMPA and the Whaling Convention Act to resume limited hunting of gray whales for ceremonial and subsistence purposes in the coastal portion of their usual and accustomed fishing grounds off Washington State (73 FR 26375; May 9, 2008). The Makah Tribe hunting area is outside of the NEPAC-North proposed action area and, therefore, no subsistence hunting of WNP gray whales is expected in the NEPAC-North proposed action area.

3.4.7.1.3.1.6 Humpback Whale

The humpback whale (*Megaptera novaeangliae*) was originally listed as endangered under the Endangered Species Preservation Act of 1969 on December 2, 1970 (35 FR 18319), the predecessor to the ESA. When the ESA was passed in 1973, the humpback whale was listed as endangered throughout its range. Since then, NMFS published a final rule designating fourteen DPSs (Figure 3-2) with four identified as endangered (Cape Verde Islands/Northwest Africa, Western North Pacific, Central America, and Arabian Sea) and one as threatened (Mexico) (81 FR 62260; September 8, 2016). Three ESA-listed DPSs of humpback whales have ranges that extend into U.S. waters—the threatened Mexico DPS, the endangered Central America DPS, and the endangered Western North Pacific DPS. All three DPSs maybe be found in the NEPAC-North and NEPAC-South proposed action areas. NMFS is evaluating the stock structure of humpback whales under the MMPA, but no changes to current stock structure are presented at this time. Along the U.S. West Coast, NMFS currently recognizes one humpback whale stock that includes two separate feeding groups: (1) a California and Oregon feeding group of whales that includes whales from the endangered Central America and threatened Mexico DPSs, and (2) a northern Washington and southern British Columbia feeding group that primarily includes whales from the threatened Mexico DPS, but also small numbers of whales from the non-ESA-listed Hawaii and endangered Central America DPSs (Barlow et al. 2011; Calambokidis et al. 2008; Wade et al. 2016; Wade 2017). The MMPA stocks that may overlap with the ESA-listed DPSs and the proposed action areas include the Western North Pacific stock, Central North Pacific stock, and the CA/OR/WA stock. Seven 'biologically important areas' for humpback whale feeding are identified off the U.S. West Coast by Calambokidis et al. (2015), including five in California, one in Oregon, and one in Washington. Critical habitat has been proposed for all three of the DPSs (Section 3.4.8.1.6). Humpback whales (ESA-listed and non-ESA listed) may be found in all proposed action areas and therefore may be encountered during OPC operations or while the vessel is in transit to and from its respective homeport.

Humpbacks mostly inhabit coastal and continental shelf waters. They winter at low latitudes, where they calve and nurse, and summer at high latitudes, where they feed. Humpbacks exhibit a wide range of foraging behaviors and feed on a range of prey types including small schooling fishes, euphausiids, and other large zooplankton (Bettridge et al. 2015).

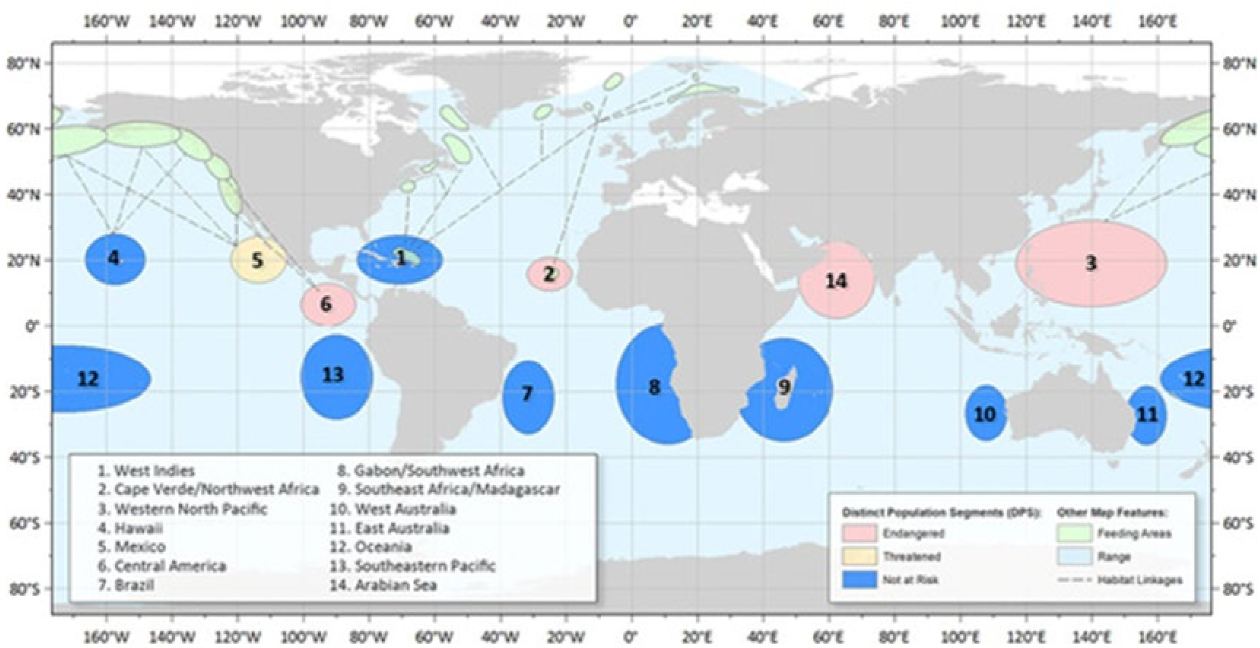


Figure 3-2. 14 DPSs of Humpback Whales, Based on Breeding, Range, and Feeding Areas

Source: (Bettridge et al. 2015)

Western North Pacific DPS

NMFS concluded that combining the two putative DPSs (Okinawa/Philippines and Second West Pacific (Bettridge et al. 2015) into one DPS (Western North Pacific) was the most consistent with the best available scientific and commercial information (81 FR 62259; September 8, 2016). It is not known where the ''Second West Pacific'' population breeds; however, the existence of this breeding population is inferred from sightings of whales in Aleutian Islands area feeding grounds (Bettridge et al. 2015). Some of these humpback whales may transit the Ogasawara area en route to unknown breeding grounds further south. This population appears to feed primarily in a marine ecosystem (the Aleutian Islands) that is rarely used by whales from other populations (Bettridge et al. 2015). Animals from the Okinawa/Philippines DPS migrate to feeding grounds in the northern Pacific, primarily off the Russian coast.

Central American DPS

The Central American DPS is composed of whales that breed along the Pacific coast of Costa Rica, Panama, Guatemala, El Salvador, Honduras and Nicaragua. Whales from this breeding ground feed almost exclusively offshore of California and Oregon in the eastern Pacific, with only a few individuals identified at the northern Washington-southern British Columbia feeding grounds (Bettridge et al. 2015). Some individuals from the Central America DPS feed in southern British Columbia, Canada. The Central American DPS was determined to be discrete based on re-sight data as well as findings of significant genetic differentiation between it and other populations in the North Pacific. The genetic composition of the DPS is also unique in that it shares mitochondrial DNA (mtDNA) haplotypes with some Southern Hemisphere DPSs, suggesting it may serve as a conduit for gene flow between the North Pacific and Southern Hemisphere (Bettridge et al. 2015). The breeding ground of this DPS occupies a unique ecological setting, and its primary feeding ground is in a different marine ecosystem from most other populations.

Mexico DPS

The Mexico DPS consists of whales that breed along the Pacific Coast of mainland Mexico, the Baja California Peninsula and the Revillagigedos Islands. The Mexican DPS feeds across a broad geographic range from California to the Aleutian Islands, with concentrations in California-Oregon, northern Washington-southern British Columbia, northern and western Gulf of Alaska and Bering Sea feeding grounds (Figure 3-2; (Bettridge et al. 2015)). This DPS was determined to be discrete based on significant genetic differentiation as well as evidence for low rates of movements among breeding areas in the North Pacific based on sighting data. It also differs from some other North Pacific populations in the ecological characteristics of its feeding areas.

Subsistence or Whaling

No subsistence or whaling of humpback whales occurs in the United States, but humpback whales may be killed under “aboriginal subsistence whaling” and “scientific permit whaling” provisions of the IWC.

3.4.7.1.3.1.7 Right Whale

Right whales in the three major ocean basins (North Pacific, North Atlantic, and Southern Ocean) represent separate lineages. The North Atlantic right whale, *Eubalaena glacialis*, and the North Pacific right whale, *E. japonica*, would be expected in NW-ATL, NW-ATL Florida and Caribbean, NEPAC-North, and AK proposed action areas and therefore may be encountered during OPC operations or while the vessel is in transit to and from its respective homeport.

North Atlantic right whale (Eubalaena glacialis)

Since 1970, North Atlantic right whales have been listed as endangered under the Endangered Species Preservation Act of 1969, the predecessor to the ESA. When the ESA was passed in 1973, the right whale was listed as endangered throughout its range. In 2008, NMFS listed the North Atlantic right whale and the North Pacific right whale as two separate, endangered species (73 FR 12024; March 06, 2008). It is also designated as “depleted” and classified as a strategic stock under the MMPA. Critical habitat has been proposed for the North Atlantic right whale (Section 3.4.8.1.6).

North Atlantic right whales from two populations primarily inhabit temperate and subpolar waters of the North Atlantic Ocean. Historically, the two populations were presumably largely isolated from each other, and the eastern stock is now thought to be functionally extinct. The Western Atlantic stock breeds off the southeastern U.S. (Florida and Georgia) and feeds in the Gulf of Maine and off eastern Canada, as far north as Nova Scotia. The location of much of the population is unknown during the winter. Davis et al. (2017) documented broad-scale use of much more of the U.S. eastern seaboard than previously believed and that there has also been an apparent shift in habitat use patterns. Surveys flown in an area from 20 mi to 99 mi (31 to 160 km) from the shoreline off northeastern Florida and southeastern Georgia report the majority of right whale sightings occur within 56 mi (90 km) of the shoreline. One sighting occurred roughly 87 mi (140 km) offshore (Hayes et al. 2020) and an offshore survey in March 2010 observed the birth of a right whale in waters 47 mi (75 km) off Jacksonville, Florida (Foley et al. 2011). Although habitat models predict that right whales are not likely to occur farther than 56 mi (90 km) from the shoreline (Gowan and Ortega-Ortiz 2014), the frequency with which right whales occur in offshore waters in the southeastern U.S. remains unclear.

There are seven areas where western North Atlantic right whales aggregate seasonally: the coastal waters of the southeastern U.S.; the Great South Channel; Jordan Basin; Georges Basin along the northeastern edge of Georges Bank; Cape Cod and Massachusetts Bays; the Bay of Fundy; and the Roseway Basin on the Scotian Shelf (Brown et al. 2000; Cole et al. 2013). Since 2013, increased detections in the Gulf of St. Lawrence indicate right whale presence in late spring through early fall (Cole et al. 2016; Khan et al. 2018). Right whales are also present year-round in the Gulf of Maine (Bort et al. 2015; Morano et al. 2012a), New Jersey (Whitt et al. 2013), and Virginia (Salisbury et al. 2016). Movements within and between habitats are extensive, and the area off the Mid-Atlantic States is an important migratory corridor.

New England waters are important feeding habitats for right whales, where they feed primarily on copepods (largely of the genera *Calanus* and *Pseudocalanus*). Right whales must locate and exploit extremely dense patches of zooplankton to feed efficiently (Mayo and Marx 1990). These dense zooplankton patches are likely a primary characteristic of the spring, summer, and fall right whale habitats (Kenney et al. 1986; Kenney et al. 1995). Analysis of sighting data show that there is a strong seasonal component to right whale use of habitat areas (Baumgartner et al. 2007; Baumgartner et al. 2003; Baumgartner and Mate 2003; Pace and Merrick 2008) while other studies also highlight the high interannual variability in right whale use of some habitats (Ganley et al. 2019; Pendleton et al. 2009).

North Pacific right whale (Eubalaena japonica)

Since 1970, North Pacific right whales (*Eubalaena japonica*) have been listed as endangered under the Endangered Species Preservation Act of 1969, the predecessor to the ESA. When the ESA was passed in 1973, the right whale was listed as endangered throughout its range. In 2008, NMFS listed the North Atlantic right whale and the North Pacific right whale as two separate, endangered species (73 FR 12024; March 06, 2008). It is also designated as “depleted” and classified as a strategic stock under the MMPA. Critical habitat has been proposed for the North Pacific right whale (Section 3.4.8.1.6).

Once distributed widely across the North Pacific from North America to the Far East, North Pacific right whales are today among the world’s rarest marine mammals (Wade et al. 2011). The species is comprised of an eastern and western populations that are largely or wholly discrete (Brownell Jr. et al. 2001; LeDuc et al. 2012). The summer range of the Eastern stock includes the Gulf of Alaska and the Bering Sea, while the Western stock is believed to feed in the Okhotsk Sea and in pelagic waters of the northwestern North Pacific. The winter calving grounds of both stocks remain unknown. Right whales have been acoustically detected and consistently observed in the Bering Sea in most summers (Goddard and Rugh 1998; Rone et al. 2012), although right whales often range outside this area and occur elsewhere in the Bering Sea (Clapham et al. 2004; LeDuc et al. 2002; Moore et al. 2000).

Analyses from acoustic data recorders indicates that right whales remain in the southeastern Bering Sea from May through December with peak call detection in September (Mellinger et al. 2004; Munger et al. 2008; Stafford and Mellinger 2009; Stafford et al. 2010; Wright 2017; Wright et al. 2019). During ice-free months, North Pacific right whale calling occurred at consistently high levels in the southeastern Bering shelf (Wright 2017; Wright et al. 2018) and Umnak and Unimak Pass (Wright 2017; Wright et al. 2019). No North Pacific right whale calls were detected from January to April in the southeastern Bering Sea, which coincides with persistent winter detections in the waters of the eastern Aleutian Islands, supporting the theory that North Pacific right whales migrate out of the Bering Sea during winter months (Wright 2017). Passive acoustic monitoring of the northern Bering Sea detected calls matching the North Pacific right whale up-call criterion in late fall through spring (Wright et al. 2019), suggesting that North Pacific right whales occur in the northern Bering Sea during winter months; however, due to similarity of call types, there remains a possibility that some winter calls were made by bowhead whales.

There have been far fewer sightings of right whales in the Gulf of Alaska than in the Bering Sea (Brownell Jr. et al. 2001) and there have been only a few acoustic detections (Mellinger et al. 2004; Širović et al. 2015). Right whales were acoustically detected in Barnabus Trough and on the shelf and in deeper waters to the south and east of Kodiak Island, but were not visually observed (Rone et al. 2014; Rone et al. 2017). Although illegal Soviet catches of right whales occurred in offshore areas, including a large area east and southeast of Kodiak Island (Doroshenko 2000; Ivashchenko and Clapham 2012), the sightings and acoustic detection of right whales in coastal waters east of Kodiak Island indicate at least occasional use of this area. However, the lack of visual detections of right whales indicates that right whales may today be extremely rare in the Gulf of Alaska.

Migratory patterns of North Pacific right whales are unknown, although it is thought they migrate from high-latitude feeding grounds in summer to more temperate waters during the winter, possibly including offshore waters (Braham and Rice 1984; Clapham et al. 2004; Scarff 1986). A right whale sighted off Maui in April 1996 (Salden and Michelsen 1999) was identified 119 days later and 2,554 mi (4,111 km) north in the Bering Sea (Kennedy et al. 2012); to date this is the only low- to high-latitude match of an individually identified right whale in the eastern North Pacific. There is one other modern record from Hawaii of a right whale—an animal seen twice in March and April 1979 (Herman et al. 1980; Rowntree et al. 1980).

Occasional sightings of right whales have been made off California and off Baja California, Mexico, including two records from California in 2017—off La Jolla and in the Channel Islands (both of which were single whales). While the scarcity of records from this region superficially suggests (as did Brownell et al. (2001)) that it lacked historical importance for the species, it ignores the fact that right whales had been severely depleted in their feeding grounds prior to 1854, when the first coastal whaling station was established in California. Thus, it remains possible that California and Mexico, and possibly offshore waters of Hawaii, were once the principal calving grounds for right whales from the Gulf of Alaska and Bering Sea (Muto et al. 2020).

Subsistence or Whaling

There are no reported takes of North Atlantic or North Pacific right whales by Native subsistence hunters in the proposed action areas. There are also no known takes of North Atlantic or North Pacific right whales from current whaling practices.

3.4.7.1.3.1.8 Sei Whale

The sei whale (*Balaenoptera borealis*) was listed as endangered under the Endangered Species Preservation Act of 1969 on December 2, 1970 (35 FR 12222; 30 July 1970), the predecessor to the ESA. When the ESA was passed in 1973, the sei whale was listed as endangered throughout its range. It is also designated as “depleted” and classified as a strategic stock under the MMPA. No critical habitat is currently designated for the sei whale. The Nova Scotia stock, the Eastern North Pacific stock, and the

Hawaii stock of sei whales are discussed below as they would overlap with the NW-ATL, NEPAC-South, and HI-PAC proposed action areas and therefore may be encountered during OPC operations or while the vessel is in transit to and from its respective homeport.

Sei whales have a global distribution and occur in the North Atlantic Ocean, North Pacific Ocean, and Southern Hemisphere, but are not often seen near the coast and occur from the tropics to polar zones in both hemispheres. Sei whales are more restricted to the mid-latitude temperate zone and undergo seasonal migrations. They have largely unpredictable patterns, but when they are present, they tend to be present in numbers (i.e., not singletons). Currently, the population structure of sei whales has not been adequately defined; therefore, populations are often divided on an ocean basin level (NMFS 2011). Two subspecies have been identified (although not yet confirmed with empirical evidence): the northern sei whale (*Balaenoptera borealis borealis*) and southern sei whale (*Balaenoptera borealis schleglii*) (Rice 1998), although definitive conclusions regarding this classification cannot be made but the ranges of these populations are not known to overlap (Rice 1998). Calving occurs in the midwinter, in low latitude portions of the species' range.

Nova Scotia stock

The range of the Nova Scotia sei whale stock includes the continental shelf waters of the northeastern U.S. and extends northeastward to south of Newfoundland. Data supports a migratory corridor between animals foraging in the Labrador Sea and the Azores and a separate foraging ground in the Gulf of Maine and Nova Scotia (Prieto et al. 2014). Habitat suitability analyses suggest that the distribution patterns of sei whales in U.S. waters appear to be related to waters that are cool (< 50 °F [10 °C]), with high levels of chlorophyll and inorganic carbon, and where the mixed layer depth is relatively shallow (164 ft [<50m]) (Chavez-Rosales et al. 2019; Palka et al. 2017). Sei whales have often been found in the deeper waters characteristic of the continental shelf edge region (Hain et al. 1985; Mitchell 1975). During the spring/summer feeding season, existing data indicate that a major portion of the Nova Scotia sei whale stock is centered in northerly waters, perhaps on the Scotian Shelf (Mitchell and Chapman 1977). Mitchell (1975) described two "runs" of sei whales, in June–July and in September–October and speculated that the sei whale stock migrates from south of Cape Cod and along the coast of eastern Canada in June and July, and returns on a southward migration again in September and October; however, the details of such a migration remain unverified.

The southern portion of the species' range during spring and summer includes the northern portions of the U.S. Atlantic EEZ—the Gulf of Maine and Georges Bank. Spring is the period of greatest abundance in U.S. waters, with sightings concentrated along the eastern margin of Georges Bank, into the Northeast Channel area, south of Nantucket, and along the southwestern edge of Georges Bank (CETAP 1982; Cholewiak et al. 2018; Kraus et al. 2016; Palka et al. 2017; Roberts et al. 2016). However, the wintering habitat for sei whales remains largely unknown.

The general offshore pattern of sei whale distribution is disrupted during episodic incursions into shallower, more inshore waters. North Atlantic sei whales are largely planktivorous, feeding primarily on euphausiids and copepods (Flinn et al. 2002). A review of prey preferences by Horwood (1987) showed that, in the North Atlantic, sei whales seem to prefer copepods over all other prey species. Sei whales are reported in some years in more inshore locations and such episodes, often punctuated by years or even decades of absence from an area (Jonsgård and Darling 1977).

Eastern North Pacific stock

In the North Pacific Ocean, the sei whale has been reported to occur mainly south of the Aleutian Islands (Leatherwood 1988; Nasu 1974), and although Japanese sighting records presented by Masaki (1977) reported concentrations in the northern and western Bering Sea from July through September, these data have never been confirmed (NMFS 2011). Sei whales occur all across the temperate North Pacific north of 40° N latitude. In the south, they range from Baja California, Mexico to Japan and Korea in the west (Andrews 1916; Horwood 1987), and they have been documented in the Hawaiian Islands (Smultea et al. 2010). However, sei whales are rare in the California Current (Barlow 2016; Dohl et al. 1983; Forney et al. 1995; Green et al. 1992) and are extremely rare south of California (Lee 1993; Wade and Gerrodette 1993).

Although rare, sei whales from the Eastern North Pacific stock could be encountered in the NEPAC-North and NEPAC-South proposed action areas, but their presence would be strongly associated with oceanographic conditions. Studies in the North Pacific and North Atlantic Oceans show that sei whales are strongly associated with ocean fronts and eddies (Nasu 1966; Nemoto and Kawamura 1977; Skov et al. 2008). These are oceanographic features that likely concentrate prey—and may be exploited by feeding sei whales—that, in turn, are dependent on prevailing currents. These whales may also use currents in large scale movements or migrations (Olsen et al. 2009). In addition to calanoid copepods and euphausiids, sei whales in the North Pacific reportedly prey on pelagic squid and fish the size of adult mackerel (Kawamura 1982; Nemoto and Kawamura 1977). Off central California, mainly during the 1960s, sei whales fed mainly on anchovies from June through August and on krill (North Pacific krill) during September and October (Clapham et al. 1997; Rice 1977). In addition to the above mentioned prey, sei whales also feed on a variety of other fish species (including saury, whiting, lamprey, and herring) (Flinn et al. 2002).

Hawaii stock

Although rare, sei whales from the Hawaii stock could be encountered in the HI-PAC proposed action area, but their presence would be strongly associated with oceanographic conditions. Sei whales are distributed far out to sea in temperate regions of the world and do not appear to be associated with coastal features. Summer/fall shipboard surveys of the waters within the U.S. EEZ of the Hawaiian Islands resulted in four sightings in 2002 and three in 2010 (Barlow 2003; Bradford et al. 2017b).

Subsistence or Whaling

There are no reported takes of sei whales by Native subsistence hunters in the proposed action areas. In 1986, the IWC banned commercial whaling; however, there are still some countries that do whale, particularly in the Southern Ocean. There are no known takes of sei whales from current whaling practices.

3.4.7.1.3.2 ESA-Listed Odontocetes

This section describes the status and management including critical habitat designations, geographic range and distribution, population and abundance and prey interactions of ESA-listed odontocete species that are expected to occur in the proposed action areas (Table 3-23). MMPA stock information is provided to establish distribution in proposed action areas.

Table 3-23. ESA-Listed Odontocetes in the Proposed Action Areas

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status*[1]	*Distribution of the Stock/DPS*	*Proposed Action Area(s)*	*Critical Habitat within Proposed Action Area(s)*
False killer whale (*Pseudorca crassidens*)	Hawaii Islands Stock Complex; Main Hawaiian Island Insular DPS; Endangered	1) Main Hawaiian Islands Insular: 72-km radius of the MHI, with greater offshore use on the leeward portion of the MHI. 2) Northwestern Hawaiian Islands: 93-km radius around the NWHI, extended to the southeast to encompass Kauai and Niihau. 3) Hawaii Pelagic Stocks: The pelagic stock has no outer boundary with an inner boundary at 11 km from the MHI shore.	HI-PAC	83 FR 35062; August 23, 2018
Killer whale (*Orcinus orca*)	Eastern North Pacific - Southern Resident; Southern Resident DPS; Endangered	Reside in the inland waterways of the Salish Sea and visit outer coastal waters off Washington and Vancouver Island traveling to central California and Southeast Alaska.	AK; NEPAC-North; NEPAC-South	86 FR 41668; August 2, 2021
Sperm whale (*Physeter macrocephalus*)	Hawaii; Endangered	U.S. EEZ of the Hawaiian Islands and adjacent High Seas waters with no apparent distributional hiatus.	HI-PAC	None
	North Pacific; Endangered	From the Canadian/ Washington border through the Gulf of Alaska, out the Aleutian chain, and North in the Bering Sea to St. Matthews Island	AK	None
	CA/OR/WA; Endangered	U.S. EEZ from Canada to Mexico with no apparent distributional hiatus.	NEPAC-South; NEPAC-North	None
	Northern Gulf of Mexico; Endangered	U.S. EEZ of the Gulf of Mexico primarily inhabiting continental slope and oceanic waters where they are widely distributed.	GoMEX	None
	North Atlantic; Endangered	U.S. EEZ waters from southern Florida to Canada primarily on the continental shelf edge, over the continental slope, and into mid-ocean regions.	NW-ATL; NW-ATL-Florida and the Caribbean	None
	Puerto Rico and USVI; Endangered	U.S. EEZ waters surrounding Puerto Rico and the U.S. Virgin Islands with a small, isolated population.	NW-ATL-Florida and the Caribbean	None

[1] All marine mammals in the United States are offered protection under the MMPA. Some species are offered further protection under the ESA.

3.4.7.1.3.2.1 False Killer Whale

There are three DPSs designated for false killer whales (*Pseudorca crassidens*) that make up the Hawaiian Islands Stock Complex (Table 3-23) (Bradford et al. 2018; Bradford et al. 2013; Bradford et al. 2017a; Bradford et al. 2015; Carretta et al. 2017; Forney et al. 2010; Oleson et al. 2010). The MHI insular DPS is listed as endangered (77 FR 70915; November 28, 2012). This is the only DPS listed under the ESA and is also considered depleted under the MMPA. Critical habitat is designated within the HI-PAC proposed action area (83 FR 35062; July 24, 2018; Section 3.4.8.1.6). The MHI insular stock would overlap with the HI-PAC proposed action area and therefore may be encountered during OPC operations or while the vessel is in transit to and from its respective homeport.

False killer whales are regularly found within Hawaiian waters and have been reported in groups of up to 100 individuals (Baird et al. 2003; Baird et al. 2013; Shallenberger 1981b). However, MHI insular false killer whales are the least abundant odontocete in Hawaii, and this DPS has declined dramatically over the past 20 years (Baird 2009a; Carretta et al. 2010; Oleson et al. 2010; Reeves et al. 2009). Distribution of the MHI insular false killer whale was assessed using data from visual surveys and satellite tag data. Tagging data from seven groups of individuals tagged off the islands of Hawaii and Oahu indicate that the whales move rapidly and semi-regularly throughout the MHI, and have been documented as far as 60 nm (111 km) offshore over a total range of 31,969 mi^2 (82,800 km^2) (Baird et al. 2012). Photo identification studies also documented that the animals regularly use both leeward and windward sides of the islands (Baird et al. 2009; Baird et al. 2005; Baird et al. 2010; Baird et al. 2012; Forney et al. 2010). Individuals utilize habitat over varying water depths, from less than 164 ft (50 m) to greater than 13,123 ft (4,000 m) (Baird et al. 2010; Palmer et al. 2017), although they prefer waters deeper than 3,300 ft (1,000 m) (National Marine Fisheries Service 2013). It has been hypothesized that inter-island movements may depend on the density and movement patterns of their prey species (Baird et al. 2009).

False killer whales feed primarily on deep sea cephalopods and fish (Odell and McClune 1999). Their main prey occurs at the surface and down to a depth of 492 ft (150 m), so it is assumed that foraging false killer whales will inhabit these areas of the water column (Clarke and Pascoe 1985). They may prefer large fish species, such as mahi mahi and tunas. Four MHI insular false killer whales stranded in Hawaii between 2010 and 2016 and had squid, yellowfin tuna, mahi mahi, jack, marlin, and bonefish in their stomach contents (West 2016).

Subsistence or Whaling

There are no reported takes of false killer whales by Native subsistence hunters in the proposed action areas. They are hunted in other parts of the world, including Indonesia, Japan, and the West Indies.

3.4.7.1.3.2.2 Killer Whale, Southern Resident

The Southern Resident DPS (SRKW) of killer whale (*Orcinus orca*) is listed as endangered under the ESA (70 FR 69903; February 16, 2005). Critical habitat was designated in three specific areas in the U.S. Pacific Northwest on December 29, 2006 (71 FR 69054). On August 2, 2021 (86 FR 41668; Section 3.4.8.1.6), six additional critical habitat areas were designated that would overlap with the NEPAC-North proposed action area. The SRKW would overlap with the NEPAC-North proposed action area and therefore may be encountered while the vessel is in transit to and from its respective homeport.

There is currently only a single species of killer whale (Ford 2009; Morin et al. 2010); however, different geographic forms are distinguished by distinct social and foraging behaviors and other ecological traits and are referred to as ecotypes. There are three genetically distinct ecotypes of killer whales within the North Pacific: resident, transient, and offshore killer whales (Muto et al. 2019). Ten killer whale stocks overlap with the proposed action areas, including (1) the AT1 Transient stock (Alaska from Prince William Sound through the Kenai Fjords); (2) the Alaska resident stock (southeastern Alaska to the Aleutian Islands and Bering Sea); (3) the Northern Resident stock (Washington State through part of southeastern Alaska); (4) the Offshore stock (southeast Alaska through California); (5) the West Coast Transient stock (Alaska through California); (6) the Southern Resident stock (mainly within the inland waters of Washington State and southern British Columbia, but also in coastal waters from southeast Alaska through California); (7) the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock (Prince William Sound through the Aleutian Islands and Bering Sea); (8) the Hawaii stock, (9) the Northern Gulf of Mexico stock; and (10) the Western North Atlantic stock (Allen and Angliss 2015; Carretta et al. 2015). The AT1 Transient stock is considered "depleted" under the MMPA.

Killer whales are found in all marine habitats from the coastal zone (including most bays and inshore channels) to deep oceanic basins and from equatorial regions to the polar pack ice zones of both hemispheres. Although killer whales are also found in tropical waters and the open ocean, they are most numerous in coastal waters and at higher latitudes (Dahlheim and Heyning 1999; Forney and Wade 2006). In spring and summer months, the SRKW is most frequently seen in the San Juan Islands region with intermittent sightings in Puget Sound (Whale Museum 2021). In the fall and early winter months, the SRKWs are seen more frequently in Puget Sound, where returning chum and Chinook salmon are concentrated (Osborne et al. 1988). By winter, they spend progressively less time in the inland marine waters and more time off the coast of Washington, Oregon, and California (Black 2011). Although this DPS is well researched, their winter distribution is not well documented (Carretta et al. 2019a; Carretta et al. 2019b; Rice et al. 2015; Rice et al. 2017).

The killer whale has no known natural predators; it is considered to be the top predator of the oceans (Ford 2009). Killer whales feed on a variety of prey, including bony fishes, elasmobranchs (i.e., sharks, skates, and rays), cephalopods, seabirds, sea turtles, and other marine mammals (Fertl 1996; Jefferson et al. 2008). Some populations are known to specialize in specific types of prey (Jefferson et al. 2008; Krahn et al. 2004; Wade et al. 2009). SRKW prefer Pacific salmon species, particularly the ESA-listed Chinook salmon (Ford and Ellis 2006; Ford et al. 1998).

Subsistence or Whaling

There are no reported takes of killer whales by Native subsistence hunters in the proposed action areas. In 1986, the International Whaling Commission banned commercial whaling; however, there are still some countries that do whale, particularly in the Southern Ocean. There are no known takes of SRKW from current whaling practices.

3.4.7.1.3.2.3 Sperm Whale

The sperm whale (*Physeter macrocephalus*) is listed as endangered under the ESA throughout its range (35 FR 18319, December 2, 1970). It is also designated as "depleted" under the MMPA. There is no designated critical habitat for this species. Sperm whales are divided into six stocks: (1) California-Oregon-Washington; (2) Hawaii; (3) North Pacific; (4) North Atlantic; (5) Northern Gulf of Mexico; and (6) Puerto Rico and U.S. Virgin Islands and are each discussed below as they would overlap with all of the proposed action areas and therefore may be encountered during OPC operations or while the vessel is in transit to and from its respective homeport.

Male sperm whales are found from tropical to polar waters in all oceans of the world, between approximately 70° N and 70° S (Rice 1998). The female distribution is more limited and corresponds approximately to the 40° parallels but extends to 50° N in the North Pacific (Whitehead 2003). Sperm whales are somewhat migratory. General shifts occur during summer months for feeding and breeding, while in some tropical areas, sperm whales appear to be largely resident (Rice 1998; Whitehead 2003; Whitehead et al. 2008). Pods of females with calves remain on breeding grounds throughout the year, between 40° N and 45° N (Rice 1998; Whitehead 2003), while males migrate between low-latitude breeding areas and higher-latitude feeding grounds (Pierce et al. 2007). In the northern hemisphere, "bachelor" groups (males typically 15–21 years old and bulls [males] not taking part in reproduction) generally leave warm waters at the beginning of summer and migrate to feeding grounds that may extend as far north as the perimeter of the arctic zone. In fall and winter, most return south, although some may remain in the colder northern waters during most of the year (Pierce et al. 2007). Sperm whales show a strong preference for deep waters (Rice 1998; Whitehead 2003). Their distribution is typically associated with waters over the continental shelf break, over the continental slope, and into deeper waters.

Sperm whales socialize for predator defense and foraging purposes. Sperm whales forage during deep dives that routinely exceed a depth of 1,300 ft (400 m) and 30-minute duration (Watkins et al. 2002). Sperm whales feed on squid, other cephalopods, and bottom-dwelling fish and invertebrates (Davis et al. 2007; Marcoux et al. 2007; Rice 1989).

North Atlantic stock

The distribution of the sperm whale in the U.S. EEZ occurs on the continental shelf edge, over the continental slope, and into mid-ocean regions. Waring et al. (Waring et al. 2001; Waring et al. 1993) suggested that this offshore distribution is more commonly associated with the Gulf Stream edge and other features. Sperm whales that occur in the eastern U.S. Atlantic EEZ likely represent only a fraction of the total stock, but the nature of linkages of the U.S. habitat with those to the south, north, and offshore is unknown. Historical whaling records (Schmidly et al. 1981) suggested an offshore distribution off the southeast U.S., over the Blake Plateau, and into deep ocean waters. In the southeast Caribbean, both large and small adults, as well as calves and juveniles of different sizes are reported (Watkins 1985). In winter, sperm whales are concentrated east and northeast of Cape Hatteras. In spring, the center of distribution shifts northward to east of Delaware and Virginia, and is widespread throughout the central portion of the mid-Atlantic bight and the southern portion of Georges Bank. This is supported by acoustic studies in which detection of sperm whale vocalizations had a winter peak off Cape Hatteras, with the peak shifting farther north in the spring (Stanistreet et al. 2018). In summer, the distribution is similar but also includes the area east and north of Georges Bank and into the Northeast Channel region, as well as the continental shelf (inshore of the 100-m isobath) south of New England. In the fall, sperm whale occurrence south of New England on the continental shelf is at its highest level, and there remains a continental shelf edge occurrence in the mid-Atlantic bight.

Northern Gulf of Mexico stock

In the U.S. Gulf of Mexico surveys indicate that sperm whales inhabit continental slope and oceanic waters where they are widely distributed (Fulling et al. 2003; Maze-Foley and Mullin 2006; Mullin 2007; Mullin and Fulling 2004; Mullin et al. 2004) and are present in all seasons (Hansen et al. 1996; Mullin and Hoggard 2000; Mullin 1994). Because there are many confirmed records from Gulf of Mexico waters beyond U.S. boundaries (Jefferson and Schiro 1997; Ortega-Ortiz 2002), sperm whales almost certainly occur throughout the waters belonging to Mexico and Cuba (Jefferson et al. 2008). Acoustic recordings of sperm whale vocalizations, from mixed groups in the Gulf of Mexico compared to those from other areas of the Atlantic indicated that Gulf sperm whales constitute a distinct acoustic clan that is rarely encountered outside of the Gulf. It is assumed from this that groups from other clans enter the northern Gulf only infrequently (Gordon et al. 2008).

Puerto Rico and the U.S. Virgin Islands stock

In waters surrounding Puerto Rico and the U.S. Virgin Islands sperm whales inhabit continental slope and oceanic waters in winter (Roden and Mullin 2000; Swartz and Burks 2000; Swartz et al. 2002). Mignucci-Giannoni (1998) found records for sperm whales in the waters of Puerto Rico, U.S. Virgin Islands and British Virgin Islands, and suggested they occur from late fall through winter and early spring, but are rare from April to September. In addition, sperm whales are one of the most common species to strand in waters of Puerto Rico and the Virgin Islands (Mignucci-Giannoni et al. 1999). When compared to other areas, sperm whales have not been studied extensively in the waters around Puerto Rico and the U.S. Virgin Islands. However, research has been conducted in the eastern Caribbean Sea by Gero et al. (2007), who found that the population of sperm whales was small and quite isolated. Gero et al. (2007) suggested that movements of sperm whales between the adjacent areas of the Caribbean Sea, Gulf of Mexico and Atlantic may not be common. Gero et al. (Gero et al. 2009) also found differences in some aspects of the social organization of sperm whales in the eastern Caribbean compared to the Sargasso Sea.

California/Oregon/Washington stock

Sperm whales are distributed across the entire North Pacific and into the southern Bering Sea in summer, but the majority are thought to be south of 40° N in winter (Gosho et al. 1984; Miyashita et al. 1995; Rice 1974; Rice 1989). Sperm whales are found year-round in California waters (Barlow 1995; Dohl et al. 1983; Forney et al. 1995), but they reach peak abundance from April through mid-June and from the end of August through mid-November (Rice 1974). Sperm whales are seen off Washington and Oregon in every season except winter (Green et al. 1992). Summer/fall surveys in the eastern tropical Pacific (Wade and Gerrodette 1993) show that although sperm whales are widely distributed in the tropics, their relative abundance declines westward towards the middle of the tropical Pacific and declines northward towards the tip of Baja California. No apparent distributional hiatus was found between the U.S. EEZ off California and Hawaii (Barlow and Taylor 2005). Sperm whales in the California Current have been identified as demographically independent from animals in Hawaii and the Eastern Tropical Pacific, based on genetic analyses (Mesnick et al. 2011).

Hawaii stock

The Hawaiian Islands marked the center of a major nineteenth century whaling ground for sperm whales (Gilmore 1959; Townsend 1935). Sperm whales have also been sighted throughout the Hawaiian EEZ, including nearshore waters of the main and Northwestern Hawaiian Islands (Baird 2016; Barlow 2006; Lee 1993; Mobley Jr et al. 2000; Rice 1960; Shallenberger 1981a). In addition, the sounds of sperm whales have been recorded throughout the year off Oahu (Thompson 1982). Within the U.S. EEZ of the Hawaiian Islands, sperm whales were sighted in summer/fall (Barlow 2006; Bradford et al. 2017b). Recent genetic analyses revealed significant differences suggesting demographic independence between matrilineal groups found in California, Oregon, and Washington, and those found elsewhere in the central and eastern tropical Pacific. In addition, male sperm whales sampled in the sub-Arctic, suggested mixing of males from potentially several populations during the summer (Mesnick et al. 2011).

North Pacific stock

In the North Pacific, sperm whales are distributed widely. Although females and young sperm whales were thought to remain in tropical and temperate waters year-round. Mizroch and Rice (2006) and Ivashchenko et al. (2014) showed that there were extensive catches of female sperm whales above 50°N; Soviet catches of females were made as far north as Olyutorsky Bay (62° N) in the western Bering

Sea, as well as in the western Aleutian Islands. Mizroch and Rice (2013) also showed movements by females into the Gulf of Alaska and western Aleutians. During summer, males are found in the Gulf of Alaska, Bering Sea, and waters around the Aleutian Islands (Ivashchenko et al. 2014; Kasuya and Miyashita 1988; Mizroch and Rice 2013). Surveys also found sperm whales to be the most frequently sighted large cetacean in the coastal waters around the central and western Aleutian Islands (Muto et al. 2020). Acoustic surveys detected the presence of sperm whales year-round in the Gulf of Alaska, although they appear to be more common in summer than in winter (Mellinger et al. 2004). This seasonality of detections is consistent with the hypothesis that sperm whales generally move to higher latitudes in summer and to lower latitudes in winter (Whitehead and Arnbom 1987). Recovered data from historical tagging studies of sperm whales confirmed extensive movements of sperm whales throughout their range (Mizroch and Rice 2013; Straley et al. 2014).

Subsistence or Whaling

There are no reported takes of sperm whales by Native subsistence hunters in the proposed action areas. The IWC accorded sperm whales complete protection from commercial whaling by member states beginning with the 1981–1982 pelagic season and subsequently with the 1986 coastal season (IWC 1982). Currently, Japan takes a small number of sperm whales each year under an exemption for scientific research. Norway and Iceland have formally objected to the IWC ban on commercial whaling and are therefore free to resume whaling of sperm whales under IWC rules, but neither country has expressed an interest in taking sperm whales.

3.4.7.1.3.3 ESA-Listed Pinnipeds, Sirenians, Ursids, and Mustelids

This section describes the status and management including critical habitat designations, geographic range and distribution, population abundance, and prey interactions of ESA-listed seals, sea lions, manatees, polar bear, and sea otter that are expected to occur in the proposed action areas (Table 3-24). MMPA stock information is provided to establish distribution in proposed action areas.

Table 3-24. ESA-Listed Pinnipeds, Sirenians, and Carnivores in the Proposed Action Areas

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status*[1]	*Distribution of the Stock/DPS*	*Proposed Action Area(s)*	*Critical Habitat within Proposed Action Area(s)*
Pinnipeds - Otariids				
Guadalupe fur seal (*Arctocephalus philippii townsendi*)	Mexico Threatened	Range in waters from Baja California, Mexico, along the California coast and as far north as Oregon and Washington (based on stranding reports). Breed on Isla Guadalupe and Isla bento del Este, Mexico and San Miguel Island, California.	NEPAC-South; NEPA-North	None
Steller sea lion (*Eumetopias jubatus*)	Western DPS Endangered	West of 144˚ W (although mixing of stocks occurs in Southeast Alaska). Haulouts occur in Aleutians and to Russia and northern Japan.	NEPAC-North; NEPAC-South; AK	58 FR 45269; August 27, 1993
Pinnipeds - Phocids				
Bearded seal (*Erignathus barbatus nauticus*)	Alaska stock; Beringia DPS Threatened	Bering and Chukchi Seas, related to sea ice presence. Rarely haul out on land.	AK	None
Hawaiian monk seal (*Neomonachus schauinslandi*)	Hawaii Endangered	Distributed throughout the MHI and NWHI, with subpopulations at French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, Midway Atoll, Kure Atoll, and Necker and Nihoa Islands.	HI-PAC	80 FR 50925; August 21, 2015
Ringed seal (*Pusa hispida hispida*)	Alaska; Arctic subspecies- **Threatened**	Distributed throughout ice pack in the Beaufort and Chukchi Seas, as far south as Bristol Bay.	AK	87 FR 19232; April 1, 2022
Sirenians				
West Indian Manatee (*Trichechus manatus*)	Antillean (Puerto Rico); Florida Threatened	Range includes southeastern U.S. (primarily Florida), east coast of Mexico, Central America, northeastern South America, Cuba, Hispaniola, Puerto Rico and Jamaica as well as Trinidad and Tobago.	NW-ATL; NW-ATL-Florida and the Caribbean; GoMEX	42 FR 47840; September 22, 1977
Carnivores - Mustelids				
Sea otter (*Enhydra lutris*)	Northern sea otter (Southcentral Alaska,	Southcentral stock extends from Cape Yakatag to Cook Inlet, including Prince	AK	74 FR 51988; October 8, 2009

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status*[1]	*Distribution of the Stock/DPS*	*Proposed Action Area(s)*	*Critical Habitat within Proposed Action Area(s)*
	Southeast Alaska, Southwest Alaska, Washington); Southwest Alaska DPS- **Endangered**	William Sound , the Kenai Peninsula coast, and Kachemake Bay; Southeast stock extends from Dixon Entrance to Cape Yakataga; and Southwest stock include Alaska Peninsula and Bristol Bay coasts and the Aleutian, Barren, Kodiak, and Pribilof Islands.		
Carnivores - Ursids				
Polar bear (*Ursus maritimus*)	Southern Beaufort Sea; Alaska Chukchi/Bering Sea Threatened	Occur throughout the polar region; Occur as far south as St. Lawrence Island and St. Matthew Island and the Kuskokwim Delta. Most abundant denning habitat around the edge of the pack ice in the Chukchi Sea and Arctic Ocean.	AK	75 FR 76085; December 7, 2010

[1] All marine mammals in the United States are offered protection under the MMPA. Some species are offered further protection under the ESA.

3.4.7.1.3.3.1 Bearded Seal

Two subspecies of bearded seal have been described: *Erignathus barbatus* from the Laptev Sea, Barents Sea, North Atlantic Ocean, and Hudson Bay (Rice 1998); and *E.b. nauticus* from the remaining portions of the Arctic Ocean and the Bering and Okhotsk seas (Heptner et al. 1976; Manning 1974; Ognev 1935; Scheffer 1958). The geographic distributions of these subspecies are not separated by conspicuous gaps, and there are regions of integrating generally described as somewhere along the northern Russian and central Canadian coasts. The subspecies *E. b. nauticus*, is further divided into an Okhotsk DPS and a Beringia DPS. The Beringia DPS, also considered the Alaska bearded seal stock under the MMPA, is the only subspecies whose distribution overlaps with the AK proposed action area and therefore may be encountered during OPC operations or while the vessel is in transit to and from its respective homeport. Both the Okhotsk and the Beringia DPSs of bearded seals are listed as threatened under the ESA (77 FR 76740; December 28, 2012) and critical habitat has been proposed for bearded seals (86 FR 1433; January 8, 2021; Section 3.4.7.1.3.3.1).

Bearded seals are a northern Arctic species with circumpolar distribution (Burns 1967; Burns 1981; Burns and Frost 1979; Clarke et al. 2013; Fedoseev 1965; Johnson et al. 1966; Kelly 1988; Smith 1981). Their normal range extends from the Arctic Ocean (85° N) south to Sakhalin Island (45° N) in the Pacific and south to Hudson Bay (55° N) in the Atlantic (Allen 1880; King 1983; Ognev 1935). Beringia DPS bearded seals are widely distributed throughout the northern Bering, Chukchi, and Beaufort Seas and are most abundant north of the ice edge zone (MacIntyre et al. 2013). Bearded seals inhabit the seasonally ice-covered seas of the Northern Hemisphere, where they whelp and rear their pups and molt their coats on the ice in the spring and early summer.

The overall summer distribution is quite broad, with seals rarely hauled out on land; some seals, mostly juveniles, may not follow the ice northward, but instead remain near the coasts of the Bering and Chukchi Seas (Burns 1967; Burns 1981; Heptner et al. 1976; Nelson 1981). As the ice forms again in the fall and winter, most seals move south with the advancing ice edge through the Bering Strait into the Bering Sea where they spend the winter (Burns 1981; Burns and Frost 1979; Cameron and Boveng 2007; Cameron and Boveng 2009; Kelly et al. 1988). This southward migration is less noticeable and predictable than the northward movements in late spring and early summer (Burns 1981; Burns and Frost 1979; Kelly 1988). During winter, the central and northern parts of the Bering Sea shelf have the highest densities of bearded seals (Braham et al. 1981; Burns 1981; Burns and Frost 1979; Fay 1974; Heptner et al. 1976; Nelson et al. 1984). In late winter and early spring, bearded seals are widely, but not uniformly, distributed in the broken, drifting pack ice ranging from the Chukchi Sea south to the ice front in the Bering Sea. In these areas, they tend to avoid the coasts and areas of fast ice (Burns 1967; Burns and Frost 1979).

Bearded seals along the Alaskan coast tend to prefer areas where sea ice covers 70 to 90 percent of the surface, and are most abundant 20–100 nm (37–185 km) offshore during the spring season (Bengtson et al. 2000; Bengtson et al. 2005; Simpkins et al. 2003). In spring, bearded seals may also concentrate in nearshore pack ice habitats, where females give birth on the most stable areas of ice (Reeves 2002). Bearded seals haul out on spring pack ice (Simpkins et al. 2003) and generally prefer to be near polynyas and other natural openings in the sea ice for breathing, hauling out, and prey access ((Nelson et al. 1984; Stirling 1997). While molting between April and August, bearded seals spend substantially more time hauled out then at other times of the year (Reeves 2002). Throughout the colder season, bearded seals move away from shore (Burns 1967). Bearded seals hunt on the seafloor in the shallow continental shelf areas of the Arctic. Their diet mainly consists of crabs, shrimp, mollusks, arctic and saffron cod, flatfish, sculpins, and octopus. They may also eat marine algae in some regions.

Subsistence

Bearded seals are an important resource for Alaska Native subsistence hunters. Approximately 64 Alaska Native communities in western and northern Alaska, from Bristol Bay to the Beaufort Sea, regularly harvest ice seals (Ice Seal Committee 2019).

3.4.7.1.3.3.2 Guadalupe Fur Seal

The Guadalupe fur seal (*Arctocephalus townsendi*) is listed as threatened under the ESA throughout its range (50 FR 51252; January 15, 1986). It is also protected designated as strategic and "depleted" under the MMPA, due to their listing as threatened under the ESA. The population is considered to be a single stock because all are recent descendants from one breeding colony at Isla Guadalupe, Mexico. In 1928, the government of Mexico declared Guadalupe Island a pinniped sanctuary and in 1967 banned the hunting of Guadalupe fur seals. Guadalupe fur seals would be found in the NEPAC-South and NEPAC-South proposed action areas and therefore may be encountered during OPC operations or while the vessel is in transit to and from its respective homeport

Guadalupe fur seals live in the waters off southern California and the Pacific Coast of Mexico. During the breeding season, they are found in coastal rocky habitats and caves. Little is known about their whereabouts during the non-breeding season. They generally do not migrate, although they have been documented traveling great distances from their breeding grounds, which are almost entirely on Guadalupe Island, Mexico, although there are small populations off Baja California on San Benito Archipelago and off southern California at San Miguel Island. It is the only species of the *Arctocephalus* genus that occurs north of the equator. Guadalupe fur seals are not considered common along the West Coast of the United States, but immature animals commonly strand on beaches as far north as Washington State. Guadalupe fur seals that have stranded in central California and were treated at rehabilitation centers were fitted with satellite tags and documented to travel as far north as Graham Island and Vancouver Island, British Columbia, Canada (Norris et al. 2015). Some satellite-tagged animals traveled far offshore outside the U.S. EEZ to areas 700 nm (1,296 km) west of the California/Oregon border.

Guadalupe fur seals are generally solitary, are thought to be non-social animals when at sea. They primarily feed at night on coastal and pelagic squid, and small pelagic fish (e.g., mackerel, sardine, and lanternfish) by diving to average depths of 65 ft (20 m) with maximum depths of about 250 ft (76 m).

Subsistence

No subsistence hunting of Guadalupe fur seals occurs in the United States or Mexico.

3.4.7.1.3.3.3 Hawaiian Monk Seal

The Hawaiian monk seal (*Neomonachus schauinslandi*) is one of the most endangered seal species in the world. The population overall has been declining for over six decades and current numbers are only about one-third of historic population levels. Hawaiian monk seals are distributed throughout the NWHI, with subpopulations at French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, Midway Atoll, Kure Atoll, and Necker and Nihoa Islands. They also occur throughout the MHI. These monk seals are endemic to these islands, occurring nowhere else in the world. Hawaiian monk seals are protected under the ESA, the MMPA, and State of Hawaii law. Critical habitat was designated in August 2015 (80 FR 50925; August 21, 2015; Section 3.4.8.1.6). Monk seals would be found in the HI-PAC proposed action area and therefore may be encountered during OPC operations or while the vessel is in transit to and from its respective homeport.

Hawaiian monk seals are mostly solitary and don't live in colonies like sea lions or other seals, but they do sometimes lie near each other in small groups though usually not close enough to make physical contact. They usually sleep on beaches and also occasionally sleep in small underwater caves. Monk seals do not migrate seasonally, but some seals have traveled hundreds of miles in the open ocean. Individual seals often frequent the same beaches over and over, but they do not defend territories.

Hawaiian monk seals are found throughout the entire Hawaiian archipelago, a distance of 1,549 mi (2,493 km) from Kure Atoll in the northwest to the island of Hawaii in the southeast. Only about 1,400 Hawaiian monk seals are left in the world (Johanos 2016) and their population is much lower than historic levels. The majority of Hawaiian monk seals (about 1,100 individuals) live in the NWHI, and a much smaller population (about 300) lives in the MHI. There have also been rare sightings of Hawaiian monk seals, as well as a single birth, at Johnston Atoll, the closest atoll southwest of the Hawaiian Islands.

Monk seals live in warm, subtropical waters and spend two-thirds of their time at sea. They use the waters surrounding atolls and islands and areas farther offshore on reefs and submerged banks; they also use deep water coral beds as foraging habitat. When on land, monk seals breed and haul out to rest, give birth, and molt on sand, corals, and volcanic rock shorelines. They prefer sandy, protected beaches surrounded by shallow waters for pupping.

Hawaiian monk seals are "generalist" feeders, which means they eat a wide variety of foods depending on what's available. They eat many types of common fishes, squids, octopuses, eels, and crustaceans (crabs, shrimps, and lobsters). Diet studies indicate that they forage at or near the seafloor and prefer prey that hide in the sand or under rocks. They do not target most of the locally popular gamefish species such as giant trevally (ulua), pāpio (baby ulua), and bonefish (ʻōʻio).

Subsistence

No subsistence hunting of Hawaiian monk seals occurs in the United States.

3.4.7.1.3.3.4 Ringed Seal

Most taxonomists currently recognize five subspecies of ringed seals (*Phoca [pusa] hispida*): *Phoca hispida hispida* in the Arctic Ocean and Bering Sea; *P.h. ochotensis* in the Sea of Okhotsk and northern Sea of Japan; *P.h. botnica* in the northern Baltic Sea; *P. h. lagodensis* in Lake Ladoga, Russia; and *P. h. saimensis* in Lake Saimaa, Finland. NMFS issued a final rule to list the Arctic, Okhotsk, and Baltic subspecies of the ringed seal as threatened and the Ladoga subspecies of the ringed seal as endangered under the ESA (77 FR 76706; December 28, 2012). Only the Arctic subspecies (*P.h. hispida*) that occurs within the U.S. EEZ of the Beaufort, Chukchi, and Bering Seas overlaps with the AK proposed action area. NMFS designated critical habitat for the Arctic subspecies of the ringed seal (87 FR 19232; April 1, 2022; Section 3.4.8.1.6) which is within the AK proposed action area and therefore may be encountered during OPC operations or while the vessel is in transit to and from its respective homeport.

Ringed seals have a circumpolar distribution throughout the Arctic Basin, Hudson Bay and Straits, and Bering, Okhotsk, and Baltic Seas. They have a wide distribution in seasonally and permanently ice-covered waters, are strongly correlated with pack and land-fast ice, and are well adapted to occupying both shorefast and pack ice (Kelly et al. 1988). However, ringed seals rarely come ashore in the Arctic. In Alaska waters, during winter and early spring when sea ice is at its maximal extent, ringed seals are abundant in the northern Bering Sea, Norton and Kotzebue Sounds, and throughout the Chukchi and Beaufort Seas (Frost 1985; Kelly et al. 1988). Although details of their seasonal movements have not been adequately documented, it is thought that most ringed seals that winter in the Bering and Chukchi Seas migrate north in spring as the seasonal ice melts and retreats (Burns 1970), and spend summers in the pack ice of the northern Chukchi and Beaufort Seas, as well as in nearshore ice remnants in the Beaufort Sea (Frost 1985). During summer, ringed seals range hundreds to thousands of kilometers to forage along ice edges or in highly productive open water areas (Freitas et al. 2008; Harwood et al. 2015; Harwood and Stirling 1992; Kelly et al. 2010). With the onset of freeze-up in the fall, ringed seal movements become increasingly restricted. Seals that have summered in the Beaufort Sea are thought to move west and south with the advancing ice pack, with many seals dispersing throughout the Chukchi and Bering Seas while some remain in the Beaufort Sea (Crawford et al. 2012; Frost and Lowry 1984; Harwood et al. 2012). Some adult ringed seals return to the same small home ranges they occupied during the previous winter (Kelly et al. 2010).

Ringed seals remain in contact with the ice most of the year and use it as a platform for pupping and nursing in late winter to early spring, for molting in late spring to early summer, and for resting at other times of the year. Nearly all ringed seals breed on fast ice, excavating lairs in snow, in pressure ridges, and in other snow covered features. Pupping generally occurs from March through April.

These seals construct, maintain, and defend breathing holes and subnivean lairs (used for sheltering pups during whelping and nursing) in seasonally ice-covered waters. Ringed seals have at least two distinct types of subnivean lairs: haulout lairs and birthing lairs (Smith and Stirling 1975). Haulout lairs are typically single-chambered and offer protection from predators and cold. Birthing lairs are larger, multi-chambered areas that are used for pupping in addition to protection from predators. Ringed seals excavate subnivean lairs in drifts over their breathing holes in the ice, in which they rest, give birth, and nurse their pups for five to nine weeks during late winter and spring (Chapskii 1940; McLaren 1958; Smith and Stirling 1975). Most ringed seals are born in early April and about a month after birthing pups, mating begins in late April and early May. Ringed seals are expected in the proposed action area year-round, but during the Arctic summer months, from May to September, pupping would not occur and subnivean lairs would not be occupied.

In general, ringed seals prey upon fish and crustaceans. Ringed seals are known to consume up to 72 different species in their diet; their preferred prey species is the polar cod (Jefferson et al. 2008). Ringed seals also prey upon a variety of other members of the cod family, including Arctic cod (Holst et al. 2001) and saffron cod, with the latter being particularly important during the summer months in Alaskan waters (Lowry et al. 2004). Invertebrate prey seems to become prevalent in the ringed seals diet during the open-water season and often dominates the diet of young animals (Holst et al. 2001; Lowry et al. 2004). Large amphipods (*Themisto libellula*), krill (*Thysanoessa inermis*), mysids (*Mysis oculata*), shrimps (*Pandalus* spp., *Eualus* spp., *Lebbeus polaris*, and *Crangon septemspinosa*), and cephalopods (*Gonatus* spp.) are also consumed by ringed seals.

Subsistence

Ringed seals are hunted by Alaska Native subsistence hunters from Bristol Bay to the Beaufort Sea.

3.4.7.1.3.3.5 Steller Sea Lion

The Steller sea lion (*Eumetopias jubatus*) is listed as a threatened species under the ESA (55 FR 126451; April 5, 1990) due to substantial declines in the western portion of the range. In 1997, NMFS designated two DPSs of Steller sea lions under the ESA: a Western DPS and an Eastern DPS (62 FR 24345 and 62 FR 30772; May 5, 1997). Due to persistent decline, the Western DPS was reclassified as endangered, while the increasing Eastern DPS remained classified as threatened. In 2013, the Eastern DPS was delisted (78 FR 66140; November 4, 2013) under the ESA. Critical habitat has been designated (58 FR 45269; August 27, 1993; Section 3.4.8.1.6). Steller sea lions would be expected in the AK and NEPAC-North proposed action areas and therefore may be encountered during OPC operations or while the vessel is in transit to and from its respective homeport.

The present range of Steller sea lions extends around the North Pacific Ocean rim from northern Japan, the Kuril Islands and Okhotsk Sea, through the Aleutian Islands and Bering Sea, along Alaska's southern coast, and south to California (Burkanov and Loughlin 2005; Kenyon and Rice 1961; Loughlin et al. 1992; Loughlin et al. 1984) with centers of abundance and distribution in the Gulf of Alaska and Aleutian Islands. Most adult Steller sea lions occupy rookeries during the pupping and breeding season, which extends from late May to early July (Gisiner 1985; Pitcher and Calkins 1981). As a result, peak abundance occurs during the summer breeding season. Major haulout sites and rookeries are centered in the Aleutian Islands and at islands and mainland sites in the Gulf of Alaska (Loughlin et al. 1984). Seal Rocks, which is near the entrance to Prince William Sound, is the northernmost rookery while Año Nuevo Island off central California is the southernmost rookery (37°06' N). Steller sea lions from the Western DPS breed on the Pribilof and Aleutian Islands (Schusterman 1981). Steller sea lions that breed in Asia are also considered part of the Western DPS (Muto et al. 2020).

Steller sea lions are not known to migrate annually, but individuals may widely disperse outside of the breeding season (late-May to early-July) (Jemison et al. 2013; Jemison et al. 2018; Muto et al. 2020). There is an exchange of sea lions across the stock boundary (144° W), especially due to the wide-ranging seasonal movements of juveniles and adult males (Baker et al. 2005; Jemison et al. 2013; Jemison et al. 2018). Colonization events in the northern part of the Eastern DPS indicate movement of Western DPS sea lions into this area, but the mixed part of the range remains small (Jemison et al. 2013), and the overall discreteness of the Eastern from the Western stock remains distinct. During the breeding season, sea lions return to their natal rookery to breed and pup (Hastings et al. 2017; Raum-Suryan et al. 2002); however, mixing of breeding females from Prince William Sound to Southeast Alaska established two mixed-stock rookeries (Gelatt et al. 2007; Jemison et al. 2013; Jemison et al. 2018; O'Corry-Crowe et al. 2014), which have been predominately established by Western stock females (Jemison et al. 2013; Jemison et al. 2018; Rehberg et al. 2018). The Steller sea lion is the largest otariid and shows marked sexual dimorphism with males larger than females.

Steller sea lions are widely distributed along the shelf break and coastal waters but are also found offshore in waters greater than 6,562 ft (2,000 m) (Bonnell et al. 1983; Fiscus 1983; Kajimura and Loughlin 1988; Kenyon and Rice 1961). Foraging habitat is primarily shallow, nearshore, and continental shelf waters (Reeves et al. 1992; Robson 2002). Steller sea lions often feed 4–13 nm (7–24 km) offshore on a variety of fish species such as capelin, cod, herring, mackerel, pollock, rockfish, salmon, and sand lance (Fiscus et al. 1976). They also prey upon squid, octopus, bivalves, and gastropods.

Subsistence

Steller sea lions are hunted for subsistence and information on the subsistence harvest of Steller sea lions comes from the Alaska Department of Fish and Game, the Ecosystem Conservation Office of the Aleut Community of St. Paul Island, and the Kayumixtax Eco-Office of the Aleut Community of St. George Island (Muto et al. 2020).

3.4.7.1.3.3.6 Sea Otter

The sea otter (*Enhydra lutris*) is divided into two distinct subspecies: the Southern sea otter (*Enhydra lutris nereis*), also known as California sea otters, and the northern sea otter (*E. lutris kenyoni*), or the Southwest AK DPS. Southern sea otters are listed as threatened under the ESA (42 FR 2965; January 14, 1977) and northern sea otters are also listed as threatened (70 FR 46366; August 9, 2005). Critical habitat has been designated for the northern sea otter (74 FR 51988; October 8, 2009; Section

3.4.8.1.6), but no critical habitat is designated for the southern sea otter. The southern sea otter would be expected to overlap with the NEPAC-North and NEPAC-South proposed action areas. The northern sea otter would be expected to overlap with the AK proposed action area. Therefore sea otters may be encountered while the vessel is in transit to and from its respective homeport and on rare occasions during OPC operations.

The sea otter (*Enhydra lutris*) is a species that ranges around the North Pacific Ocean rim, from Baja California, Mexico to the east coast of the Russian Kamchatka peninsula and the Kuril Islands towards Japan. Sea otters inhabit nearshore waters. Typically, due to water depths, foraging would occur closer to shore and resting may occur nearshore or further offshore (Laidre et al. 2009). Due to their benthic foraging, sea otter distribution is largely limited by their ability to dive to the seafloor (Bodkin et al. 2004). Depending on factors such as habitat, sex, reproductive status, and per-capita prey availability, obtaining this quantity of food requires that sea otters spend 20–50 percent of the day foraging.

Mating and pupping occur throughout the year, but on average across the range, a peak period of pupping occurs from October to January, with a secondary peak in March and April (Chinn et al. 2016). Females typically give birth to a single pup, with care provided solely by the pup's mother for the approximately 6 months until weaning. Pup rearing and provisioning impose high energetic costs on females, requiring them to increase foraging effort during this period.

Northern sea otter

The northern sea otter is found in the Aleutian Islands, Southern Alaska, British Columbia, and Washington. They inhabit coastal, shallow waters with sandy or rocky bottoms, which include bays, inlets, fiords, and harbors. They rarely come ashore and when they do, they remain close to the water. In Alaska there are three stocks of northern sea otters: the Southwest, Southcentral, and Southeast stocks. The Southwest stock, which includes otters in the Aleutian Archipelago, the Alaska Peninsula, and Kodiak Island, is listed as threatened under the ESA. The Southcentral and Southeast Alaska stocks are not listed under the ESA. This species is most commonly observed within the 12.2 ft (40 m) depth contour because the animals require frequent access to benthic foraging habitat in subtidal and intertidal zones (Riedman and Estes 1990). Actual home range sizes of adult otters is relative small, with male territories ranging from 10.5 to 28.5 square miles ([mi^2] 4 to 11 square kilometers [km^2] and female home ranges from a few 62 mi^2 (24 km^2) (Garshelis and Garshelis 1984; Jameson 1989; Ralls et al. 1988).

Due to their benthic foraging, sea otter distribution is largely limited by their ability to dive to the sea floor (Bodkin et al. 2004). Off the coast of Washington, Laidre et al. (2009) found that adult females spent 60 percent of their time foraging in habitats no more than 33 ft (10 m) deep and were rarely found foraging in waters 98 ft (30 m) deep. Males in the same study spent most of their time (32–34 percent) foraging in habitats 33–98 ft (10–30 m) deep. Beyond 131 ft (40 m) deep, foraging was minimal (1–2 percent of time) for both sexes (Laidre et al. 2009).

Southern sea otter

Southern sea otters, also known as California sea otters, live in waters along the central California coastline. They occur in two areas, the mainland coastline from San Mateo County to Santa Barbara County and San Nicolas Island, Ventura County. Sea otters exhibit a high degree of spatial structure due to the limited mobility of reproductive females Very limited mixing of adult and sub-adult females between habitat areas only 31 mi (50 km) apart occurs (Tinker et al. 2013). Sea otters rest alone or in groups called "rafts" and tend to prefer areas with surface kelp canopies, but will also rest in open water (Riedman and Estes 1990). Sea otters sometimes haul out, although opportunities for hauling out vary spatially and temporally. The highest densities of southern sea otters occur in the central portion of their range (Seaside to Cayucos, California). Sea otter densities tend to be most stable from year to year in rocky, kelp-dominated areas, which are primarily occupied by females, dependent pups, and territorial males. In contrast, sandy and soft-bottom habitats (in particular those in Monterey Bay, Estero Bay, and Pismo Beach to Pt. Sal, CA) tend to be occupied by non-territorial males and sub-adult animals of both sexes (and only rarely by adult females and pups) and are more variable in abundance from year to year (Tinker et al. 2008).

The sea otter home ranges appear to reflect coastal bathymetry and the distribution of resources as well as reproductive strategy. The maximum home range area in Monterey Bay is 17.46 mi^2 (45.22 km^2), which is more than double that off of Big Sur, presumably due to the greater travel distances and ultimately prohibitive energy expenditures required to access resources distributed along a narrow coastal shelf, like that off Big Sur, rather than along a wide continental shelf, like that off Monterey (Tinker et al. 2013). Compared to males, most female southern sea otters are more sedentary, with adult females rarely dispersing more than 12 mi (20 km) within a 1-year period (Tinker et al. 2013), although occasionally females travel longer distances of 25-31 mi (40-50 km) (Tinker et al. 2006). Juvenile males move further from natal groups than do juvenile females.

Subsistence

Data for subsistence harvest of sea otters in Southeast Alaska are collected by a mandatory Marking, Tagging and Reporting Program administered by the USFWS since 1988. Unlawful takes also occur and records are maintained by the USFWS.

3.4.7.1.3.3.7 Polar Bear

The polar bear (*Ursus maritimus*) is listed as threatened throughout its range under the ESA (73 FR 28212; May 15, 2008). Critical habitat has been designated (75 FR 76085; December 7, 2010; Section 3.4.8.1.6) and is within the AK proposed action area (Figure 3-9). There are two polar bear stocks in Alaska: the Southern Beaufort Sea and the Chukchi/Bering Seas that would be expected in the AK proposed action area and may be encountered during OPC operations or while the vessel is in transit to and from its respective homeport.

The polar bear belongs to the order Carnivora and is a member of the bear family Ursidae. Polar bears are circumpolar in their distribution in the Northern Hemisphere; they occur in several largely discrete stocks or populations (Harington 1968). Polar bear movements are extensive and individual activity areas are enormous (Amstrup et al. 2000; Garner et al. 1990).

Chukchi/Bering Seas stock

The Chukchi/Bering Seas stock is widely distributed on the pack ice in the Chukchi Sea and northern Bering Sea and adjacent coastal areas in Alaska and Russia. The northeastern boundary of the Chukchi/Bering Seas stock is near the Colville Delta in the central Beaufort Sea (Amstrup 1995; Amstrup et al. 2005; Garner et al. 1990), and the western boundary is near Chauniskaya Bay in the eastern Siberian Sea. The southern boundary of the Chukchi/Bering Seas stock extends into the Bering Sea and is determined by the annual extent of pack ice (Garner et al. 1990). Historically, polar bears ranged as far south as St. Matthew Island (Hanna 1920) and the Pribilof Islands (Ray 1971) in the Bering Sea. An extensive area of overlap between the Southern Beaufort Sea stock and the Chukchi/Bering Seas stock occurs between Point Barrow and Point Hope, centered near Point Lay (Amstrup et al. 2000; Garner et al. 1994; Garner et al. 1990).

Southern Beaufort Sea stock

The Southern Beaufort Sea stock spends the summer on pack ice and moves toward the coast during fall, winter, and spring (Durner et al. 2004). Polar bears in the Southern Beaufort Sea concentrate in shallow waters less than 984 ft (300 m) deep over the continental shelf and in areas with greater than 50 percent ice cover in all seasons except summer, in order to access prey such as ringed and bearded seals (Amstrup et al. 2000; Durner et al. 2006; Durner et al. 2009; Stirling et al. 1999). The eastern boundary of the Southern Beaufort Sea stock occurs south of Banks Island and east of the Baillie Islands, Canada (Amstrup et al. 2000). The western boundary of the Southern Beaufort Sea stock is near Point Hope, Alaska. Polar bears from this population have historically denned on both the sea ice and land. Therefore, the southern boundary of the Southern Beaufort Sea stock is defined by the limits of terrestrial denning sites inland of the coast, which follows the shoreline along the North Slope in Alaska and Canadian Arctic (Bethke et al. 1996). The main terrestrial denning areas for the Southern Beaufort Sea population in Alaska occur on the barrier islands from Barrow/Utqiagvik to Kaktovik and along coastal areas up to 25 mi (40 km) inland, including the Arctic National Wildlife Refuge to Peard Bay, west of Barrow/Utqiagvik (Amstrup et al. 2000; Amstrup and Gardner 1994; Durner et al. 2001; Durner et al. 2006). Mating occurs in late March through early May. In November and December, females dig maternity dens in fast ice, drifting pack ice, or land along the coast. Females give birth between December and January and stay in their dens with their cubs until spring (Reeves 2002).

Polar bears' main prey is ringed and bearded seals (Durner et al. 2004; Durner et al. 2006; Durner et al. 2009; Stirling et al. 1999). Occasionally, polar bears are known to prey upon walruses or beluga whales trapped by ice, and they may also consume carrion when prey is scarce (USFWS 2014b).

Subsistence

Historically, polar bears have been killed for subsistence, handicrafts, and recreation. Hunting by non-Natives has been prohibited since 1973 when provisions of the MMPA went into effect. Under the MMPA, an exemption was made for Alaska Natives living in coastal communities to allow them to hunt polar bears for subsistence and the creation of handicrafts provided that the hunt was not done in a wasteful manner. Recently, harvest levels by Alaska Natives from the Chukchi/Bering Seas stock have been declining. No user agreement, similar to the one between the Inuvialuit and Inupiat for the Southern Beaufort Sea stock, exists for the Chukchi/Bering Seas stock.

3.4.7.1.3.3.8 West Indian Manatee

The West Indian manatee (*Trichechus manatus*) includes two distinct subspecies: the Florida manatee (*T. manatus latirostris*) and the Antillean manatee (*T. manatus manatus*). Manatees were listed as endangered under the ESA in 1967 (32 FR 4061; March 11, 1967) and are now listed as threatened under the ESA (82 FR 16668; April 5, 2017). Critical habitat was designated for the Florida subspecies (42 FR 47840; September 22, 1977; Section 3.4.8.1.6) and is within the GoMEX (Figure 3-6) and NW-ATL-Florida and the Caribbean proposed action areas (Figure 3-4). Florida manatees would be expected to overlap with the GoMEX and NW-ATL-Florida and the Caribbean proposed action areas, specifically when the OPC is in transit to and from the offshore operation areas and its respective homeport within these proposed action areas. Manatees live in marine, brackish, and freshwater systems in coastal and riverine areas throughout their range (U.S Fish and Wildlife Service 1986; UNEP 2010; USFWS 1980, 1999, 2001). Preferred habitats include areas near the shore featuring underwater vegetation like seagrass and eelgrass. They are herbivores that feed opportunistically on a wide variety of marine, estuarine, and freshwater plants, including submerged, floating, and emergent vegetation (Alves-Stanley et al. 2010; Etheridge et al. 1985). Manatees have also been known to eat small fish from nets (Powell Jr 1978). Manatees require fresh water for drinking (Favero et al. 2020).

Manatees are found in the southeastern U.S., eastern Mexico, Guatemala, Belize, Honduras, Costa Rica, Panama, Nicaragua, Colombia, Venezuela, Guyana, Suriname, French Guiana, Brazil, Trinidad and Tobago, Jamaica, Cuba, Haiti, the Dominican Republic, Puerto Rico, and in the Bahamas. In the U.S. manatees can be found in Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, Puerto Rico, South Carolina, and Texas (U.S Fish and Wildlife Service 1986; UNEP 2010; USFWS 1980, 1999, 2001). Florida manatees can be found throughout Florida for most of the year. However, they cannot tolerate temperatures below 68° F (20° C) for extended periods of time, and during the winter months these cold temperatures keep the population concentrated in peninsular Florida (Linzey 2020). Many manatees rely on the warm water from natural springs and power plant outfalls.

During the summer manatees expand their range, and on rare occasions are seen as far north as Massachusetts on the Atlantic Coast and as far west as Texas on the Gulf Coast. Manatees may travel hundreds of miles during a year's time, preferring to travel along channels and shorelines (Linzey 2020).

Subsistence

There are no reported takes of manatees by Native subsistence hunters in the proposed action areas.

3.4.7.1.4 Non-ESA-Listed Marine Mammals Potentially Present in the Proposed Action Areas

For a list of each species, MMPA stock, and presence in proposed action area refer to Appendix G. Like their ESA-listed counterparts, non-ESA listed mysticetes, odontocetes, and pinnipeds are found exclusively or primarily in waters of a particular depth, temperature range, and oceanographic regime. For most species, little is known of the particular factors that cause them to be found in one area and not in another, but one major factor affecting their distribution pattern is the pattern of major ocean currents influencing productivity and prey availability. Therefore, non-ESA listed marine mammals are expected in all proposed action areas. Some may be considered residents, while others may be seasonal or migratory. A complete list of non-ESA listed marine mammals that may overlap with the proposed action areas can be found in Appendix G. Environmental consequences (Section 3.4.7.2) evaluated for ESA-listed species would also be applicable for non-ESA-listed marine mammals.

3.4.7.2 Environmental Consequences to Marine Mammals

Impacts to marine mammals would potentially result from fathometer noise (Section 3.4.7.2.1), vessel noise (Section 3.4.7.2.2), vessel movement (Section 3.4.7.2.4), and MEM (Section 3.4.7.2.5) associated with the Proposed Action. There would be no impacts to marine mammals from Doppler speed log noise as it is outside of their hearing ranges (Appendix F). While some of the noise created by the Proposed Action may be detected by marine mammals, they would not be exposed to noise at close range, continuously, or for extended periods of time. Therefore, neither TTS nor PTS is expected as a result of the Proposed Action. As a result, there would be no population level impacts to marine mammals from acoustic stressors associated with the Proposed Action. Potential impacts to marine mammals from gunnery training, gunnery noise, and aircraft movement are discussed Table 3-3, and are not further analyzed in this PEIS/POEIS.

3.4.7.2.1 Fathometer Noise

Marine mammals in the proposed action areas may be exposed to fathometer noise during the Proposed Action. The fathometer (i.e., single beam echosounder) used for navigation aboard the OPC is discussed in detail in Section 2.4 and detailed in Table 2-2. The frequency range of the echosounder is from 50–200 kHz (Section 3.2.1.1). As discussed in Section 3.2.1.1, the single beam echosounder would be considered a *de minimis* acoustic source. This determination by Coast Guard is based on the Navy's definition of a *de minimis* source (Navy 2013). The operational characteristics of the source exclude the possibility of any significant impact to a species.

The source level associated with the echosounder (205 dB, Table 2-2) is a maximum level that was taken directly next to the source. However, the Coast Guard would not operate the echosounder at the maximum level during the Proposed Action. As a result, the received sound levels are expected to be much lower than the criteria for onset of TTS and PTS provided in Section 3.2.1.5.2 and Table 3-6. Therefore, fathometer noise would not be expected to cause any injury to mysticetes (LF cetaceans), odontocetes (MF and HF cetaceans), pinnipeds (PW in-water), or otariids, sirenians (manatee), and polar bears (OW in water) that may be within the proposed action areas. In addition, the level of sound diminishes significantly outside of the downward-focused, narrow beam width of sound directly below the vessel. Because the noise is transient and both vessels and marine mammals would be moving throughout vast proposed action areas, source levels associated with the Proposed Action would not be expected to cause any non-auditory physiological effects or injuries to mysticetes, odontocetes, pinnipeds, sirenians, or carnivores that may be within the proposed action areas. Therefore, any potential impact to marine mammals as a result of fathometer noise would be limited to masking or behavioral responses.

The echosounder's system operates in a wide range of frequencies (between 50 and 200 kHz). Although there is a lack of audiometry data (Appendix F), based on anatomical studies and analysis of sounds that they produce, most baleen whales hear best at low frequencies, from 7 Hz to 35 kHz (National Marine Fisheries Service 2016; Southall et al. 2007). Watkins (1986) stated that humpback whales often react to frequencies from 15 Hz to 28 kHz, but did not react to frequencies above 36 kHz. Fin and right whales also often react to frequencies from 15 Hz to 28 kHz, but did not react frequencies above 36 kHz (Watkins 1986). Therefore, mysticetes are unlikely to detect or react to fathometer noise. Similarly, sea lions and fur seals hear best between 60 Hz to 39 kHz (Kastak and Schusterman 1998; Moore and Schusterman 1987; Schusterman et al. 1972; Southall 2005), and are unlikely to detect fathometer noise. Because fathometer noise is outside the range of best hearing for mysticetes, sea lions, and fur seals, the operation of the fathometer would not likely mask sounds that are biologically important to these species.

As discussed in Appendix F, most phocids can hear frequencies between 50 Hz and 86 kHz (National Marine Fisheries Service 2016; Southall et al. 2007), but can detect sounds up to 140 kHz although sensitivity is low (Cunningham and Reichmuth 2016). Thus, it is possible that a phocid could detect fathometer noise if the animal were swimming within or near the vertical beam, but only if the navigational system was operating at a frequency within their hearing range. The overlap between the echosounder's frequency and the phocid best hearing range is limited to 50 and 86 kHz, which would be at the echosounder's lower operational frequencies. Although phocids can hear frequencies between 50 Hz and 86 kHz, sensitivity to noise decreases at the low and high ends of this range (Perrin and Wursig 2009). Sills et al. (2015) determined that hearing abilities for ringed seals are actually better than what Terhune and Ronald (1975) previously reported (from 2–50 kHz) with best sensitivity at 49 dB re 1 µPa (12.8 kHz in water) and critical ratio measurements ranging from 14 dB at 0.1 kHz to 31 dB at 25.6 kHz. Since the lowest operational frequency for the echosounder only overlaps with the high end of the range of best hearing for a phocid, the sensitivity to the echosounder is expected to be poor because of the ear's decreased sensitivity to extreme low and high frequency noise. Data suggest that exposures of pinnipeds to sources between 90 and 140 dB re 1 µPa at 1 m do not elicit strong behavioral responses (Southall et al. 2007). In contrast, data on grey (*Halichoerus grypus*) and harbor seals (*Phoca vitulina*) indicate avoidance responses at received levels of 135–144 dB re 1 µPa at 1 m and high frequency sonar (Götz and Janik 2010).

Because it is unknown at what exact decibel level a phocid, such as a bearded or ringed seal, may elicit a response, it is expected that bearded or ringed seals may elicit similar behavioral responses as the other phocid seals described above if exposed to source levels higher than 140 dB re 1 µPa at 1 m. Pinnipeds are expected to exhibit no more than short-term and inconsequential responses to the echosounder given the device's *de minimis* characteristics (e.g., narrow downward-directed beam, which is focused directly beneath the vessel). However, any masking or behavioral response to the echosounder, although unlikely, is expected to be short-term, any disturbance is expected to be temporary, and any individual that may respond would be expected to return to its normal behavior after the vessel departs the area.

The maximum potential impact would be to odontocetes, as their range of best hearing is from 150 Hz to 160 kHz (Appendix F), which could overlap with low- and medium-frequency echosounder signals (Table 2-2). However, in the unlikely event that an odontocete is within the proposed action areas and within a range to detect the echosounder, it would be expected to exhibit no more than a short-term response to the echosounder given the device's *de minimis* characteristics. ESA-listed sperm whales and southern resident killer whales may be present in the NEPAC-North proposed action area and ESA-listed false killer whales may be present in the HI-PAC proposed action area; based on their hearing range, these species may be able to detect the echosounder.

For SRKW, the Fisheries and Oceans Canada has issued voluntary actions, such as turning off echosounders when not in use, to try and reduce the noise in their habitat. In the United States, the SRKW task force identified an echosounder as one of the key sources of concern (Southern Resident Orca Task Force 2018). Noise from echosounders or fish finders near killer whales, especially at commonly used frequencies of 50 and 80 kHz, overlaps with echolocation frequencies (Au et al. 2013). Preliminary results from NOAA suggest Southern Residents near the San Juan Islands are exposed to transducer noise more than one-third of the time (Holt et al. 2018). Although intermittent, exposure could impair the killer whales' ability to locate and hunt for prey. Outputs from such devices have induced avoidance behavior in seals (Hastie et al. 2014) and led to increased vigilance behavior in other toothed whales (Quick et al. 2017). Many modern echosounders are dual-frequency at 50 and 200 kHz, and the latter frequency does not overlap with the SRKWs' hearing range. Manufacturers have indicated contemporary transducers that operate at 1 kilowatt have separate transmitters for each frequency, which means each frequency can be disabled at will, and that by switching such units to the 200 kHz setting, boaters could avoid sending 50 kHz pulses into the water column. Based on their hearing range, it is possible that the noise from the fathometer may be detected by Southern Resident killer whales, if they are within the vicinity of the transiting vessel. However, in the unlikely event that a SRKW is within the transiting route and within a range to detect the echosounder, Southern Resident killer whales are expected to exhibit no more than a short-term response to the echosounder given the system's characteristics (e.g., narrow, downward-directed beam), which is focused directly beneath the vessel.

In a few studies, some evidence of disruptions of sperm whale clicking and behavior from exposure to pingers (Watkins and Schevill (1975), the Heard Island Feasibility Test (Bowles et al. 1994), and the Acoustic Thermometry of Ocean Climate at Pioneer Seamount off Half Moon Bay, California (Costa et al. 1998)). Sperm whales have been observed to frequently stop echolocating in the presence of underwater pulses made by echosounders (emitting about 1 pulse per second at 6–13 kHz); however, sperm whales did not show a prolonged reaction to continuous pulsing from echosounders (Watkins and Schevill 1975). Goold (1999) reported that six sperm whales were driven through a narrow channel using ship noise, echosounder, and fishfinder emissions from a flotilla of 10 vessels; however, OPCs would operate mainly in open ocean areas, not confined channels. Therefore, this reaction by sperm whales would not be expected as a result of normal vessel operation and navigation. In the unlikely event that a sperm whale is within the proposed action areas and within a range to detect the echosounder, it would be expected to exhibit no more than a short-term response to the echosounder given the device's *de minimis* characteristics.

False killer whales sensitive hearing ranges between 16-64 kHz (Thomas et al. 1988). Although there have not been specific observations or studies regarding a false killer whales potential behavioral response to an echosounder, such as those described above for killer whales and sperm whales, given their similarities to other odontocetes, in the unlikely event that a false killer whale is within the proposed action areas and within a range to detect the echosounder, it would be expected to exhibit no more than a short-term response to the echosounder given the device's *de minimis* characteristics.

In addition, Coast Guard SOPs (Appendix C) would initiate adaptive mitigation responses to marine mammal presence to minimize the impact of fathometer and Doppler speed log noise. Coast Guard would monitor the presence of marine mammals and maintain or increase distance between the vessel and a marine mammal, as long as it was safe to do so. In addition, Coast Guard would support the recovery of protected living marine resources through internal compliance with laws designed to preserve marine protected species, including planning passage around marine sanctuaries, such as federally-designated critical habitat. These actions would minimize the impact or harm of fathometer noise to marine mammals and federally-designated critical habitat (Section 3.4.8).

3.4.7.2.2 Vessel Noise

Marine mammals in the proposed action areas may be exposed to vessel noise during the Proposed Action. As discussed in Appendix F, marine mammal hearing has been grouped into generalized hearing ranges. The noise created by vessels is detailed in Table 2-2. In general, small vessel noise (e.g., OTH boat noise) would be expected to range from 1–7 kHz and large vessel (e.g., OPC vessel noise) would be expected to range from 20–300 Hz; therefore marine mammals may be able to detect vessel noise associated with the Proposed Action. The received levels from vessel noise (Table 2-2) from the Proposed Action are expected to be below the onset of TTS and PTS for all marine mammal groups (Table 3-6), including mysticetes, odontocetes, pinnipeds, sea otters, manatees, and polar bears that may be within the proposed action areas. Potential impacts of vessel noise to marine mammals includes masking and behavioral responses. However, it is difficult to differentiate between behavioral responses to just a vessel sound or just the visual cues associated with the presence of a vessel; thus, it is assumed that both play a role in prompting reactions from animals (Richardson et al. 1995).

Underwater sound from vessels is generally at relatively low frequencies, usually between 5 and 500 Hz (Hildebrand 2009; NRC 2003; Urick 1983; Wenz 1962). The dominant noise source is usually propeller cavitation which has peak power near 50–150 Hz (at blade rates and their harmonics), but also radiates broadband power at higher frequencies, at least up to 100,000 Hz (Arveson and Vendittis 2000; Gray and Greeley 1980; Ross 1976). While propeller singing is caused by blades resonating at vortex shedding frequencies and emits strong tones between 100 and 1,000 Hz, propulsion noise is caused by shafts, gears, engines, and other machinery and has peak power below 50 Hz (Richardson et al. 1995). Overall, larger vessels generate more noise at low frequencies (<1,000 Hz) because of their relatively high power, deep draft, and slower-turning (<250 rotations per minute) engines and propellers (Richardson et al. 1995). Based on this information, underwater vessel noise from an OPC or OTH could overlap with the same low-frequency sounds that many whales use for communication for feeding and mating, and therefore, could cause masking. Auditory response curves for odontocetes show maximum auditory sensitivity near where toothed whale signals have peak power (Mooney et al. 2012; Tougaard et al. 2014) at about 1,000–2,000 Hz for social sounds and 10,000–100,000 Hz or higher for echolocation. NMFS (2016; 2018) characterized MF cetaceans (and manatees Appendix F) with a generalized hearing range from 150 Hz to 160 kHz, and pinnipeds as PW with a generalized hearing range from 50 Hz to 86 kHz or OW with a generalized hearing range from 60 Hz to 39 kHz (Appendix F). Each group is discussed in more detail below.

Since many marine mammals rely on sound to find prey, moderate social interactions, and facilitate mating (Tyack 2008), vessel noise may interfere with these functions by masking biologically important sounds (if the vessel noise overlaps with the hearing sensitivity of the marine mammal and the important sound) (Clark et al. 2009; Hatch et al. 2012; Southall et al. 2007). The potential impact or harm from vessel noise from auditory masking is missing biologically relevant sounds that marine organisms may rely on, as well as eliciting behavioral responses such as an alert, avoidance, or other behavioral reaction (NRC 2003, 2005; Williams et al. 2015). The impact or harm of masking can vary depending on the ambient noise level within the environment, the received level, frequency of the vessel noise, and the received level and frequency of the sound of biological interest (Clark et al. 2009; Foote et al. 2004; Parks et al. 2011; Southall et al. 2000).

Vessel noise also has the potential to disturb marine mammals and elicit an alert, avoidance, or other behavioral reaction (Huntington et al. 2015; Pirotta et al. 2015; Williams et al. 2014). Most studies have reported that marine mammals react to vessel sounds and traffic with short-term interruption of feeding, resting, or social interactions (Huntington et al. 2015; Magalhães et al. 2002; Merchant et al. 2014; Pirotta et al. 2015; Richardson et al. 1995; Williams et al. 2014). In cases where vessels actively approached marine mammals (e.g., whale watching), scientists have documented that animals exhibit altered behavior such as increased swimming speed, erratic movement, and active avoidance behavior (Acevedo 1991; Baker and MacGibbon 1991; Bursk 1983; Constantine et al. 2003; New et al. 2015; Parsons 2012; Pirotta et al. 2015; Trites and Bain 2000; Williams et al. 2002), reduced blow interval (Richter et al. 2003), disruption of normal social behaviors (Lusseau 2003; Lusseau 2006; Pirotta et al. 2015), and the shift of behavioral activities which may increase energetic costs (Constantine et al. 2003; Constantine et al. 2004). These reactions could be caused by vessel noise or the presence of the vessel itself. Some species respond negatively by retreating or responding to the vessel antagonistically, while other animals seem to ignore vessel noises altogether (Watkins 1986). Marine mammals are frequently exposed to vessels due to research, ecotourism, commercial and private vessel traffic, and government activities.

While most mysticetes hear best at low frequencies, blue whales have been observed reacting to mid-frequency sound in the range of 3.5–3.6 kHz (Goldbogen et al. 2013). However, the responses varied across individuals and the responses themselves were strongly affected by the whale's behavioral state at the time of exposure, with surface feeding animals typically showing no change in behavior. By contrast, responses from deep feeding and non-feeding whales ranged from termination of deep foraging dives to prolonged mid-water dives. The potential impacts of vessel noise can be assessed more confidently in odontocetes because they constitute mid-frequency or high-frequency functional hearing groups (Southall et al. 2007) in which auditory response curves have been obtained for many species. These curves show maximum auditory sensitivity near the frequencies where toothed whale signals have peak power (Mooney et al. 2012; Tougaard et al. 2014)—at about 1–20 kHz for social sounds and 10–100 kHz or higher for echolocation.

Studies showed that bowhead whales avoided encroaching vessels by as much as 2.5 mi (4 km), but returned to the displaced area within a day (Koski and Johnson 1987; Richardson et al. 1985). If vessels were not moving towards bowhead whales, bowhead whales did not demonstrate avoidance behaviors such as those described previously. Bowhead whales located more than 1,640 ft (500 m) behind the moving vessel did not demonstrate avoidance behavior and actually approached vessels to within 328 to

1,640 ft (100 to 500 m) (Wartzok et al. 1989). Therefore, it would appear that directionality and vessel speed could influence behavioral reactions of bowhead whales.

Other baleen whales, like the humpback whale, has exhibited varied responses to vessels, ranging from approaching to avoiding (Au and Green 2000; Baker and Herman 1989; Bauer and Herman 1986; Stamation et al. 2009). Vertical avoidance was observed within 1 mi (2 km), while horizontal avoidance occurred from 1–2 mi (2–4 km) away (Baker and Herman 1989; Baker et al. 1983). Humpback whales are less likely to react if actively engaged in feeding (Krieger and Wing 1984, 1986), although Blair et al. (2016) reported that humpback whales significantly changed foraging behavior in response to high levels of ship noise in the North Atlantic. Although vessels could cause some short-term changes in behavior, any disturbance is expected to be temporary and any exposed baleen whale is expected to return to its normal behavior after the vessel moves through the area.

Vocal changes in response to anthropogenic noise can occur across the repertoire of sound production modes used by marine mammals, including odontocetes, such as whistling, echolocation click production, calling, and singing. Changes to vocal behavior and call structure may result from a need to compensate for an increase in background noise. In cetaceans, vocalization changes have been reported from exposure to anthropogenic sources such as sonar, vessel noise, and seismic surveying. Veirs et al. (2016) measured ship noise in Puget Sound, Washington, and determined that median received spectrum levels of noise from 2,809 isolated transits are elevated relative to median background levels not only at low frequencies (20-30 dB re 1 mPa^2/Hz from 100 to 1,000 Hz), but also at high frequencies (5–13 dB from 10,000 to 96,000 Hz). Based on these results, noise received from ships at ranges less than 1.86 mi (3 km) could extend to frequencies used by odontocetes. As these ships enter shallow waters and traverse the estuarine habitat typically occupied by major ports, the noise they radiate may impact coastal marine life. However, impacts would be temporary and intermittent since OPCs would only occupy major ports for a short amount of time. Behavioral responses to boat (as opposed to ship) noise have been documented in odontocetes. Bottlenose dolphins whistle (at 4–20 kHz) less when exposed to boat noise at 500–12,000 Hz (Buckstaff 2004) and Indo-Pacific bottlenose dolphins lower their 5–10 kHz whistle frequencies when noise is increased by boats in a band from 5,000 to 18,000 Hz (Morisaka et al. 2005). For every 1 dB increase in broadband underwater noise (1,000–40,000 Hz) associated with nearby boats, SRKW compensated by increasing the amplitude of their most common call by 1 dB (Holt et al. 2008). Sperm whales have also exhibited varied responses to outboard vessels up to 1 mi (2 km) away (Cawthorn 1992). However, many individual sperm whales remained in areas with regular boat presence (Gordon et al. 1992). Smaller odontocetes, including some dolphins and porpoises and other smaller toothed whales (and occasionally sea lions and fur seals), interact with vessels by bow riding when a vessel is moving. Bow-riding is when the animals position themselves in such a manner as to be lifted up and pushed forward by the circulating water generated to form a bow pressure wave of an advancing vessel (Hertel 1969; Lang 1966). Although vessels could cause some short-term changes in behavior, any disturbance is expected to be temporary and any exposed odontocete is expected to return to its normal behavior after the vessel moves through the area.

Pinnipeds could react to vessels when hauled out, and thus reacting to both the in-air sound of a vessel as well as to the visual cue from the vessel itself. In 1997, Henry and Hammill (2001) conducted a study to measure the impact or harm of small boats (i.e., kayaks, canoes, motorboats and sailboats) on harbor seal haul out behavior in Metis Bay, Quebec, Canada and noted that the most frequent disturbances were caused by lower speed, lingering kayaks, and canoes as opposed to motorboats conducting high speed passes. The study concluded that boat traffic at current levels had only a temporary effect on the haul out behavior of harbor seals in the Metis Bay area because once the animals were disturbed, there did not appear to be any significant lasting effect on the recovery of numbers to their pre-disturbance levels.

Pinnipeds may also react to vessels while they are in the water, from hearing just the in-water vessel noise or hearing the in-water vessel noise and the sight of the vessel approaching (only likely if the pinniped's head is above water). Richardson et al. (1995) stated that for in-water vessel reactions only, pinnipeds are much less likely to react to vessels if they are in water and not hauled out. While in water, pinnipeds show a high tolerance to vessels, though it is not known if these incidents cause them stress, despite their tolerance (Richardson et al. 1995). Johnson and Acevedo-Gutierrez (2007) evaluated the efficacy of buffer zones for watercraft around harbor seal haulout sites on Yellow Island, Washington. The authors estimated the minimum distance between the vessels and the haulout sites, categorized the vessel types, and evaluated seal responses to the disturbances. During the course of the seven-weekend study, the authors recorded 14 human-related disturbances, which were associated with stopped powerboats and kayaks. During these events, hauled out seals became noticeably active and moved into the water. The flushing occurred when stopped kayaks and powerboats were at distances as far as 453 and 1,217 ft (138 and 371 m), respectively. The authors note that the seals were unaffected by passing powerboats, even those approaching as close as 128 ft (39 m), possibly indicating that the animals had become tolerant of the brief presence of the vessels and ignored them. The authors reported that on average, the seals quickly recovered from the disturbances and returned to the haulout site in less than or equal to 60 minutes. The study concluded that the return of seal numbers to pre-disturbance levels and the relatively regular seasonal cycle in abundance throughout the study area, counter the idea that disturbances from powerboats may result in site abandonment (Johnson and Acevedo-Gutiérrez 2007). Frequent and close disturbances may cause abandonment of a haulout site (Allen et al. 1984), but are not likely to occur from infrequent exposure to boats passing by the haulout. In general, from the available information, pinnipeds exposed to intense (approximately 110 to 120 dB re 20 μPa @ 1 m) non-pulsed sounds often leave haulout areas and seek refuge temporarily (minutes to a few hours) in the water (Southall et al. 2007). Although vessels could cause some short-term changes in behavior, any disturbance is expected to be temporary and any exposed pinniped is expected to return to its normal behavior after the vessel moves through the area.

In recorded observations, polar bears do not appear to be significantly affected by vessel noise and/or presence. Some polar bears have been observed walking, running, and swimming away from approaching vessels, but these reactions were brief and localized. Other polar bears have been observed approaching vessels or having no reaction to vessels (Richardson et al. 1995). Although vessels could cause some short-term changes in behavior, any disturbance is expected to be temporary and any exposed polar bear is expected to return to its normal behavior after the vessel moves through the area.

Manatees responded to boats, by changing their orientation, depth, and fluking behavior most often when a boat approached closely less than 32 ft (<10 m) (Rycyk et al. 2018). Manatees were also more likely to change their depth when not on a seagrass bed and when actively fluking before the boat passed. The boat speed did not appear to impact the occurrence of intensity of the manatee response. However, compared to fast approaches, slower passes did allow the manatee more time to respond and the behavioral response occurred earlier relative to the time of the boat's closest point of approach. Manatees have also been shown to respond to acoustically simulated boat approaches (Miksis-Olds et al. 2007). These playbacks elicited faster swimming and greater variability in respiration rate in response to the sound of the faster boats. Although vessels could cause some short-term changes in behavior, any disturbance is expected to be temporary and any exposed manatee is expected to return to its normal behavior after the vessel moves through the area.

Sea otters are generally non-migratory and generally do not disperse over long distances (Garshelis and Garshelis 1984). However, sound frequencies produced by vessels would fall within the hearing range of sea otters. Controlled sound exposure trials on southern sea otters indicate that those otters can hear frequencies between 125 Hz to 38 kHz with best sensitivity between 1.3 and 27 kHz (Ghoul and Reichmuth 2014). Because sea otter hearing abilities and sensitivities have not been fully evaluated, the Coast Guard relied on functionally similar hearing information from other species to evaluate the potential impacts of noise exposure. California sea lions (*Zalophus californianus*) have shown frequency ranges of hearing most functionally similar to the sea otter (Ghoul and Reichmuth 2014) and provide the closest proxy for which data are available. Available studies on northern and southern sea otter behavior indicate that sea otters are somewhat more resistant to the effects of sound than other marine mammals (Ghoul and Reichmuth 2012a, 2012b; Riedman 1983, 1984). Southern sea otters off the California coast showed only mild interest in boats passing within hundreds of meters and appeared to have habituated to boat traffic (Curland 1997; Riedman 1983). Sea otters in Alaska have shown signs of disturbance (escape behaviors) in response to the presence and approach of vessels. Behaviors included diving or actively swimming away from a boat, hauled-out sea otters entering the water, and groups of otters dispersing and swimming in multiple different directions (Udevitz et al. 1995). Sea otters in Alaska have also been shown to avoid areas with heavy boat traffic but return to those same areas during seasons with less traffic (Garshelis and Garshelis 1984). It is not known if the response was caused by vessel movement or to vessel noise. Although vessels could cause some short-term changes in behavior, any disturbance is expected to be temporary and any exposed sea otter is expected to return to its normal behavior after the vessel moves through the area.

Masking impacts would be similar to what is currently present in the proposed action areas, because the proposed action activities are not expected to change the current ambient noise levels. Coast Guard would follow SOPs (Appendix C) to minimize the impact of vessel noise by monitoring the presence of marine mammals and maintaining or increasing distance between the vessel and a marine mammal. The noise generated by these vessels are not expected to elicit significant behavioral responses to exposed individuals. Such reactions would not be expected to significantly disrupt behavioral patterns such as migration, breathing, nursing, breeding, feeding and sheltering to a point where the behavior pattern is abandoned or significantly altered or result in reasonably foreseeable takes of marine mammals. Coast Guard would support the recovery of protected living marine resources through internal compliance with laws designed to preserve marine protected species, including planning passage around marine sanctuaries, such as federally-designated critical habitat (Section 3.4.8). These actions would minimize the impact or harm of vessel noise to marine mammals and federally-designated critical habitat.

3.4.7.2.3 Aircraft Noise

Marine mammals in the proposed action areas may be exposed to aircraft noise during the Proposed Action. The noise range of helicopters and UAS are discussed in detail in Section 3.2.1.3 and Table 2-2. Helicopter noise ranges from 20 Hz to 5 kHz (Table 2-2) with dominant tones typically below 500 Hz (Richardson et al. 1995). Aircraft would not operate at an altitude lower than 2,000 ft (610 m) within 0.5 mi (805 m) of marine mammals observed on ice or land. Helicopters would also not hover or circle above such areas. Per the Coast Guard Air Operations Manual (COMDTINST M3710.1 (series)), aircraft would avoid any identified environmentally sensitive areas, to include, but not be limited to, critical habitat designated under the ESA, sanctuaries, and marine mammal haulouts and rookeries, but if deemed necessary (e.g., for personnel safety) to pass over such areas, aircraft would adhere to FAA and any instructions in the CFR. Similar to the helicopters, UAS would avoid any identified environmentally sensitive areas, to include, but not limited to, critical habitat designated under the ESA, sanctuaries, and marine mammal haulouts and rookeries.

Any SAR training that may require helicopters to fly below 2,000 ft (610 m), would avoid environmentally sensitive areas, critical habitat, sanctuaries, marine mammal haulouts and rookeries, and areas where ESA-listed species are known to occur, and would follow the Coast Guard's SOPs (Appendix C) and the Coast Guard Air Operations Manual (COMDTINST M3710.1 (series)).

Potential impact or harm to species from aircraft could involve acoustic and non-acoustic effects (Section 3.2.1.3 and 3.2.2.2, respectively) and it is unclear if reactions are due to sound or the physical presence of the aircraft flying overhead. The noise associated with aircraft needs to be considered in multiple ways: in-air, on the sea surface, and underwater (Appendix D). There is a dearth of information on acoustic effects of helicopter overflights on pinniped hearing and communication (Richardson et al. 1995) and to the Coast Guard's knowledge, there has been no specific documentation of TTS or PTS in free-ranging pinnipeds exposed to helicopter operations during realistic field conditions[19]. Therefore, hearing threshold shifts and physical effects to pinnipeds from aircraft noise associated with the Proposed Action are not expected. While noise from aircraft would not be expected to cause direct physical effects, aircraft noise has the potential to affect behavior. No TTS or PTS is expected for any marine mammal due to aircraft noise (Section 3.2.1.5.2). Thus, any potential marine mammal responses from aircraft noise associated with the Proposed Action include behavioral reactions such as quick dives or turns, change in course, or flushing and stampeding from a haulout site.

There are very few documented studies of the impact or harm of aircraft overflights to marine mammals at the water's surface. Given in-air transmission loss with distance, it would be estimated that for a helicopter at 100 ft (31 m), the in-water sound just beneath the surface would be approximately 138 dB re 1 µPa. While low flying aircraft may disturb a marine mammal at the surface, the Coast Guard Air Operations Manual (COMDTINST M3710.1 (series)) stipulates aircraft stay at or above an altitude of 2,000 ft (610 m) in environmentally sensitive areas and in other areas at altitudes not below 2,000 ft (610 m), when possible. Therefore, the received level from aircraft conducting proposed action activities would be significantly less than 138 dB re 1 µPa described above, when measured at the water's surface. In addition, aircraft noise would only be detected in a narrow cone directly beneath the aircraft as it moves throughout the proposed action areas (Appendix D), and then only by a marine mammal at the surface or if the animal is submerged, once the aircraft noise has travelled through the air-water interface (Section 3.2.1.3).

Underwater helicopter noise may be detected by species that dive or forage below the water's surface. The reactions of cetaceans to aircraft noise are varied and often dependent on what the animal is doing at the time (e.g., migrating, feeding, mating, etc.). In general, a behavioral response by cetaceans could include a decrease in swim speed, change in direction of travel, or a cessation of feeding or mating in response to broadcast sounds. Cetaceans may exhibit various behavioral reactions to aircraft overflights such as diving underwater, slapping the water's surface with their flukes or flippers, or swimming away from the aircraft track (Richardson et al. 1995).

For example, bowhead whales react to overflight aircrafts in various ways such as diving underwater, turning away from the aircraft, and dispersing away from the area exposed to the aircraft. Bowhead whales frequently reacted to a circling piston-engine aircraft at less than 1,000 ft (305 m) in altitude. Infrequent reactions occurred at 1,499 ft (457 m) of altitude and rare reactions occurred at greater than 2,000 ft (610 m) (Richardson et al. 1995). Reactions seemed more pronounced when bowhead whales

[19] In 2004, researchers measured auditory fatigue to airborne sound in harbor seals, California sea lions, and northern elephant seals after exposure to non-pulse noise for 25 minutes (Holt et al. 2004; Kastak et al. 2004; Kastak et al. 2005). In the study, the harbor seal experienced approximately 6 dB of TTS at 99 dB re 20 µPa. The authors identified onset of TTS in the California sea lion at 122 dB re 20 µPa. The northern elephant seal experienced TTS-onset at 121 dB re 20 µPa (Kastak et al. 2004).

are in shallow water. Repeated overflights did not seem to displace many (if any) bowheads from feeding areas. Bowhead whales appear to be more susceptible to aircraft overflights while resting and less so when actively feeding, mating, or socializing. Patenaude et al. (2002) observed fourteen percent of bowhead whales and 38 percent of beluga whales responding to the sound of a Bell 212 helicopter passing overhead repeatedly at an altitude of 492 ft (150 m) and a distance of 820 ft (250 m). Responses included short surfacings, immediate dives or turns, vigorous swimming, and breaching. Meanwhile, gray whale reactions to aircraft are variable with mothers with calves being particularly sensitive (Clarke et al. 1989; Ljungblad and Moore 1983). Malme et al. (1983; 1984) observed the behavioral reactions of gray whales from underwater playbacks of a Bell 212 helicopter and noted that there were changes to their swim speed and direction of travel. (Watkins and Moore 1983) found that, when below 492 ft (150 m) in altitude, some disturbance to right whales occurred and Payne et al. (1983) saw rare reactions to a circling aircraft between 16 and 492 ft (5 and 150 m) in altitude. Clarke (1956) observed that some sperm whales showed no reaction to a helicopter at a low altitude unless they were in its downwash. At an altitude of 492–755 ft (150–230 m), some sperm whales remained at the surface while others dove immediately (Mullin et al. 1991). Although, there is little to no information regarding the potential behavior response of manatees to aircraft; it is expected that in the unlikely event that aircraft associated with the Proposed Action would overlap with a manatee at or near the surface of the water, similar to cetaceans, any behavioral response would be short and intermittent.

Aircraft noise would dissipate over the altitude distance but, should a cetacean or manatee at the water's surface detect the helicopter noise, any behavioral response to passing aircraft would be temporary and minimal and would not cause population level effects. Any noise generated by the UAS is expected to be minimal and below the hearing threshold of marine mammals, both in-air and under water (where noise would attenuate even further). Therefore, as described above, behavioral reactions of cetaceans to aircraft noise associated with the Proposed Action are expected to be, at most, minor to moderate avoidance responses of a few individuals, over short and intermittent periods.

There are few well-documented studies of the impact or harm of aircraft overflight over pinniped haulout sites or rookeries, and many of those that exist are specific to military activities (Efroymson et al. 2001). Pinnipeds, otariids, sea otters, and polar bears, more so than cetaceans, have the potential to be disturbed by in-air and underwater noise generated by the engine of the aircraft (Born et al. 1999; Richardson et al. 1995) because they spend part of their life on land, or in the case of the sea otter, rafting at the water's surface, and not exclusively in the water.

Behavioral reactions of hauled out pinnipeds to aircraft flying overhead have been noted, such as looking up at the aircraft, moving on the ice or land, entering a breathing hole or crack in the ice, or entering the water (Blackwell et al. 2004; Born et al. 1999). Reactions depend on several factors including the animal's behavioral state, activity, group size, habitat, age or experience, and the flight pattern of the aircraft (Richardson et al. 1995). Walruses, for example, have very varied reactions to aircraft overflights from looking upward to diving underwater (Richardson et al. 1995). Spotted seals haul out on sea ice react at considerable distances to aircraft by moving swiftly across ice floes and diving off into the water (Richardson et al. 1995). Spotted seals on beaches move into the water when a survey aircraft flies over at altitudes up to 1,000 to 2,493 ft (305 to 760 m) or more and at lateral distances up to 0.6 mi (1 km). This fleeing behavior persists despite frequent exposure to aircraft overflights, but the seals return to their haulout sites shortly after exposure (Richardson et al. 1995). Sea otters spend a great percentage of their time grooming, feeding, and resting on the water's surface and, therefore, could be impacted by helicopter activities. The behavioral response is expected to be similar to what is described for pinnipeds.

Overall, there has been no indication that single or occasional aircraft flying above pinnipeds in water cause long-term displacement of these animals (Richardson et al. 1995). The Lowest Observed Adverse Effects Levels are rather variable for pinnipeds on land, ranging from just over 492 ft (150 m) to about 6,563 ft (2,000 m) (Efroymson et al. 2001). A conservative (90th percentile) distance effects level is 3,773 ft (1,150 m). Most thresholds represent movement away from the overflight. (Bowles and Stewart 1980) estimated a Lowest Observed Adverse Effects Level of 1,000 ft (305 m) for helicopters (low and landing) in California sea lions and harbor seals observed on San Miguel Island, California; animals responded to some degree by moving within the haulout and entering into the water, stampeding into the water, or clearing the haulout completely. Both species always responded with the raising of their heads. California sea lions appeared to react more to the visual cue of the helicopter than the noise.

Pinnipeds exposed to intense (approximately 110 to 120 dB re 20 µPa) non-pulse sounds often leave haulout areas and seek refuge temporarily (minutes to a few hours) in the water (Southall et al. 2007). Per Richardson et al. (1995), approaching aircraft generally flush animals into the water and noise from a helicopter is typically directed down in a ‘‘cone’’ underneath the aircraft. In these cases, the helicopter was deliberately approaching areas where pinnipeds were expected. The Coast Guard would not deliberately approach known areas where pinnipeds are expected (Appendix C); therefore, any impact or harm to pinnipeds as a result of proposed action activities is expected to be considerably less than the above mentioned case studies.

As stated previously, reactions to helicopter disturbance are difficult to predict, though helicopters have been recorded to elicit a stronger behavioral response (e.g., diving, increase in surfacing) by bearded and ringed seals (Born et al. 1999). Observations of ringed seals within the water column showed some ringed seals surfaced 66–98 ft (20–30 m) from the edge of an ice pan only a few minutes after a helicopter had landed and shut down near the ice edge (Richardson et al. 1995). Additionally, a study conducted by Born et al. (1999) found that wind chill was also a factor in level of response of ringed seals hauled out on ice (higher wind chill increases probability of leaving the ice), as well as time of day and relative wind direction.

Behavioral reactions of ringed seals to aircraft have also been recorded. Ringed seal pups are born in lairs from mid-March through April, and mothers nurse their pups in the lairs for five to eight weeks (Hammill et al. 1991; Lydersen and Hammill 1993; Smith et al. 1973). Sea ice habitat that is suitable for the formation and maintenance of subnivean birth lairs is typically seasonal landfast (shorefast) ice, except for any bottom-fast ice extending seaward from the coast line in waters less than 7 ft (2 m) deep, or dense, stable pack ice that has undergone deformation and contains snowdrifts at least 21 in (54 cm) deep. From mid-May through early June, ringed seals also frequently haul out on the exposed ice surface. Ringed seals were shown to leave their subnivean lairs and enter the water when a helicopter was at an altitude of less than 1,000 ft (305 m) and within 1.2 mi (2 km) lateral distance (Richardson et al. 1995). Ringed seal vocalizations in water were similar between areas subject to low-flying aircraft and areas that were less disturbed (Calvert and Stirling 1985). These data suggest that although a ringed seal may leave a subnivean lair (Burns et al. 1982), aircraft disturbance was temporary and did not cause the animals to leave the general area. Williams et al. (2006) investigated whether ringed seals use of breathing holes and lairs during winter and spring was affected by the construction and drilling on Northstar Island, built in the nearshore Alaskan Beaufort Sea, and determined that activities did not negatively affect the seals’ use of their lairs. Williams et al. (2006) further determined that given the turnover and creation of new structures (lairs) during the ice-covered season, it was unlikely that the loss of a breathing hole or resting structure over the course of the winter, from natural or anthropogenic causes, would significantly impact an individual seal. Structures used by ringed seals are not distributed randomly and are usually concentrated along pressure ridges, cracks, leads, or other surface deformations (Furgal et al. 1996; Hammill and Smith 1989; Lydersen and Smith 1989; Nichols 1999; Smith and Stirling 1975). Although lairs are often cryptic and likely difficult to identify from air, they are rarely occupied for long periods and as mentioned previously, ringed seals tend to use structures for shorter periods in areas of higher ice deformation. In all likelihood, most of the personnel transport to any ice location would occur outside of the pupping season, so impacts to ringed seals associated with lairs would be extremely low. Aircraft would not operate at an altitude lower than 2,000 ft (610 m) within 0.5 mi (805 m) of marine mammals observed on ice or land. Helicopters would also not hover or circle above such areas. Per the Coast Guard Air Operations Manual (COMDTINST M3710.1 (series)), aircraft would avoid any identified environmentally sensitive areas, to include, but not be limited to, critical habitat designated under the ESA, sanctuaries, and marine mammal haulouts and rookeries, but if deemed necessary (e.g., personnel safety) to pass over such areas, aircraft would adhere to FAA and any instructions in the CFR. In addition, the Coast Guard would follow SOPs (Appendix C) to avoid impacts to hauled out pinnipeds. Therefore, the Coast Guard does not anticipate any effect from aircraft activities to ringed seals in subnivean lairs during the Proposed Action.

While much is still unknown about polar bear social structure, most encounters with polar bears would be with individual males, juveniles alone or in pairs, or females alone or with one to two cubs. Behavioral reactions of a species or individuals depends on several factors including, but not limited to: the animal’s current behavioral state at the time of exposure, activity, group size, habitat, age or experience, and the flight pattern of the aircraft (Richardson et al. 1995). Behavioral responses by polar bears could include quick movements, a change in course or speed, or running or swimming away, depending on whether the bear is on land or ice or in water.

Polar bears have been seen moving away from helicopters at an altitude of less than 656 ft (200 m) or at a distance of less than 1,312 ft (400 m) (Richardson et al. 1995). An aircraft approaching close to a polar bear den does not usually cause the polar bear to abandon the den since snow greatly attenuates aircraft noise (Amstrup 1993). It is unlikely that an individual would be exposed repeatedly for long periods due to the short duration of the aircraft flights during the Proposed Action, considering the vast size of the polar bear home range. The likelihood that a polar bear would travel along the same route as the helicopter for a long enough period to receive continuous exposure to helicopter noise is extremely low. The likelihood of a polar bear being under the flight path for multiple flights or for a long duration of one flight would be low. Thus, noise from aircraft would not be expected to cause direct physical effects, but aircraft noise does have the potential to temporarily affect behavior.

In 2010, the USFWS has released “polar bear interaction” guidelines (75 FR 61631; October 6, 2010) to ensure that activities are conducted in a manner that avoids conflicts between humans and polar bears. This guidance suggests keeping overflights to an altitude of at least 2,000 ft (610 m) vertically and 0.5 mi (0.8 km) horizontally in order to avoid disturbing bears with aircraft. Coast Guard aircraft would not operate at an altitude lower than 2,000 ft (610 m) within 0.5 mi (805 m) of marine mammals observed on ice or land. Helicopters would also not hover or circle above such areas. As such, at these altitudes, a behavioral response from polar bears would not be expected.

Additionally, Coast Guard aircraft would support the recovery of protected living marine resources through internal compliance with laws designed to preserve marine protected species. Per the Coast Guard Air Operations Manual (COMDTINST M3710.1 (series)) and SOPs in Appendix C, aircraft would avoid any identified environmentally sensitive areas, to include, but not be limited to, critical habitat designated under the ESA, sanctuaries, and marine mammal haulouts and rookeries, but if deemed necessary (e.g., personnel safety) to pass over such areas, aircraft would adhere to FAA and any instructions in the CFR. These actions would minimize the impact or harm of aircraft noise to marine mammals and federally-designated critical habitat. The Coast Guard would also train crew members, so that when a marine mammal is sighted, the pilot would be alerted, so avoidance measures could be taken.

3.4.7.2.4 Vessel Movement

Marine mammals in the proposed action areas may be exposed to vessel movement during the Proposed Action. Vessels associated with the Proposed Action are OPCs and OTH boats which are discussed in Sections 2-15 and 2.2.3.1 and in Table 3-2. In general, all vessels would operate at speeds of 12–15 knots. Marine mammals within the proposed action areas may be exposed to vessel movement associated with the Proposed Action, including towing and anchoring. Vessels have the potential to impact or harm marine mammals by disturbing them in the water column or causing mortality or serious injury from vessel collisions.

Interactions between surface vessels and marine mammals have demonstrated that surface vessels represent a source of acute and chronic disturbance for marine mammals (Au and Green 2000; Bejder et al. 2006; Hewitt 1985; Jefferson et al. 2009; Kraus et al. 1986; Magalhães et al. 2002; Nowacek et al. 2004; Richter et al. 2008; Richter et al. 2003; Williams et al. 2009). In some circumstances, marine mammals respond to vessels with the same behavioral repertoire and tactics they employ when they encounter predators. It is not clear what environmental cues marine mammals might respond to—the sound of water being displaced by the vessels, the sound of engines, or a combination of environmental cues vessels produce while they transit.

Boat traffic has been shown to affect the behavior of the endangered SRKW population around San Juan Island, Washington (Lusseau et al. 2009; Williams et al. 2014). In the presence of boats, whales were significantly less likely to be foraging and significantly more likely to be traveling. These changes in behavior were particularly evident when boats were within 330 ft (100 m) of the whales. (Lusseau et al. 2009). However, OPCs would not be expected to transit or operate in the vicinity of San Juan Island, Washington.

Vessel collisions are a well-known source of mortality in marine mammals, and can be a significant factor affecting some large whale populations (Berman-Kowalewski et al. 2010; Jensen and Silber 2003; Knowlton and Kraus 2001; Laist et al. 2001; Neilson et al. 2012b; Redfern et al. 2013; Van Waerebeek et al. 2007; Vanderlaan et al. 2009; Vanderlaan et al. 2008). The most vulnerable marine mammals to collision are thought to be those that spend extended periods at the surface or species whose unresponsiveness to vessel sound makes them more susceptible to vessel collisions (Gerstein 2002; Laist and Shaw 2006; Nowacek et al. 2004). During a review of data on the subject, Laist et al. (2001) compiled historical records of ship strikes, which contained 58 anecdotal accounts. It was noted that in the majority of cases, the whale was either not observed or seen too late to maneuver in an attempt to avoid collision. Another important variable is ship speed, as lethal vessel collisions are more likely at higher vessel speeds (Gende et al. 2011; Vanderlaan and Taggart 2007; Wiley et al. 2011). Laist et al. (2001) noted that most severe and fatal injuries to marine mammals occurred when the vessel was traveling in excess of 14 knots; meanwhile, Vanderlaan and Taggart (2007) found that the greatest risk of a lethal strike was when the vessel reached speeds of 8.6 to 15 knots. However, while slow speed does decrease the chance of a fatal collision, it will not eliminate the risk of a collision. In addition, any collision could result in serious injury or mortality, depending on circumstance. Vanderlaan and Taggart (2007) concluded that at speeds below 8 knots, there was still a 20 percent risk of death from blunt trauma. Vessels associated with the Proposed Action would typically operate at speeds of 12–15 knots.

Marine mammals such as dolphins, porpoises, and pinnipeds do not appear to be as susceptible to vessel collisions, though the risk of a collision still exists for these species. Few authors have specifically described the responses of pinnipeds to vessels, and most of the available information on reactions to boats concerns pinnipeds hauled out on land (or ice). Brueggeman et al. (1992) stated ringed seals hauled out on the ice showed short-term escape reactions when they were within 0.1553 to 0.311 ft (0.25 to 0.5 km) of a vessel. From the limited data available, it appears that pinnipeds are not as susceptible to vessel collisions as other marine mammal species. This may be due, at least in part, to the large amount of time they spend hauled out (especially when resting and breeding) and their high maneuverability in the water. However, pinniped carcasses also do not typically wash up in an area where they can be reported to the local stranding network, or a necropsy is unable to be performed to determine cause of death, so incidents of reporting a vessel collision as cause of death are low.

Schoeman et al. (2020) conducted a global review of vessel collisions with marine animals and determined that reports of collisions with smaller animals are scarce, but this is due to reporting bias. The risk of collision with seals and sea otters has been documented (Byard et al. 2012; Kreuder et al. 2003; Wilson et al. 2017), but clearly not to the extent of vessel collisions with large whales. Behaviors such as resting, foraging, nursing, and socializing likely distract animals from risk detection (Dukas 2002). Little is known about the extent of collision indices with sea otters. The probability of collision between a vessel and marine animal increases with a higher vessel and/or animal density (e.g., (Bezamat et al. 2014; Di-Méglio et al. 2018; Lagueux et al. 2011; Nichol et al. 2017; Priyadarshana et al. 2015; Redfern et al. 2013; Redfern et al. 2019; Rockwood et al. 2017)). Although, a vessel collision with a sea otter is possible, particularly in coastal regions where the majority of sea otters would occur, OPC presence would be intermittent and only as they transit to and from ports, which would be typically in areas of heavy vessel activity.

Of particular concern to manatees is mortality that results from collisions with boats, which are responsible for approximately 25% of all reported manatee deaths (Deutsch and Reynolds III 2012). In the most recent and comprehensive population viability analysis of the Florida manatee, Runge et al. (2017) concluded that an increase in watercraft-related mortality could substantially increase the risk of quasi-extinction over the 100 years. However, the details of manatee-boat collisions are rarely reported; from 1978 to 2006, only 21 vessel operators or witnesses reported the details of a lethal collision with a manatee (Calleson and Frohlich 2007). Of these reports, vessel size ranged from 16 to 120 ft (4.9 to 36.6 m) and the speed of the vessel ranged from 2.5 mph to 40 mph (4 km/h to 64 km/h) (most speeds indicative of planning) (Calleson and Frohlich 2007). To reduce encounter rates, management tools such as boat speed-restrictions, manatee sanctuaries (e.g., no-vessel no-motor zones), and local plans and reviews of boat facility siting (e.g., marinas). Slowing down ocean-going vessels has been found to reduce the probability of lethal ship strikes with North Atlantic right whales (Vanderlaan and Taggart 2007) and the number of known manatee deaths from watercraft collisions has declined after the imposition of speed zones (Laist and Shaw 2006). Although, the risk of vessel collision with a manatee exists in the NW-ATL Florida and Caribbean and GoMex proposed action areas, OPCs and support vessels would follow Coast Guard SOPs as they transit to and from ports. Although OPC homeports are unknown at this time, it is very likely that they would be located in areas that would avoid transit through known manatee habitat. Polar bears do not appear to be significantly affected by vessel moment. Some polar bears have been observed walking, running, or swimming away from approaching vessels, but these reactions were brief and localized. Other polar bears have been observed approaching vessels or having no reaction to vessels (Richardson et al. 1995). Because polar bears spend much of their time out of water, some proportion of the time that a vessel may near a polar bear it may be on land where there is a decreased risk for strike.

Since 1998, the Coast Guard has reported 14 collisions with whales in the waters of the U.S. EEZ. Between 2006 and 2020, Coast Guard vessels have reported ten collisions with whales in the waters of the U.S. EEZ. The Coast Guard has also improved watchstander training (e.g., lookout training), placing an emphasis on marine protected species awareness to decrease the risk of a marine-mammal-vessel collisions. As a federal agency and co-investigator with NMFS, Coast Guard is required to report all collisions with whales to NMFS. There have been no reported collisions between an MEC and a marine mammal.

To date, the majority of scientific publications have focused on collisions between vessels and North Atlantic right whales (Davies and Brillant 2019; Kraus et al. 2005; Parks et al. 2012; van der Hoop et al. 2015; Van Der Hoop et al. 2012), fin whales (David et al. 2011; Panigada et al. 2017; Redfern et al. 2013; Redfern et al. 2019; Sierra et al. 2014; Williams and O'Hara 2010), blue whales (Berman-Kowalewski et al. 2010; Ilangakoon 2012; Priyadarshana et al. 2015; Redfern et al. 2013; Redfern et al. 2019), humpback whales (Alzueta et al. 2001; Hill et al. 2017; Neilson et al. 2012a; Redfern et al. 2013; Redfern et al. 2019; Wiley et al. 1995), sperm whales (Carrillo and Ritter 2010; Di-Méglio et al. 2018; Fais et al. 2016; Frantzis et al. 2019), and the Florida manatee (Edwards et al. 2016; Laist and Shaw 2006; Lightsey et al. 2006; Rommel et al. 2007). As mentioned above, large whales appear to be more susceptible to vessel collisions than any other marine mammal species. Bowhead whales often begin avoiding vessels from more than 2.2 nm (4 km) away (Richardson et al. 1995). Avoidance by this species usually entails altered headings, faster swimming speeds, and shorter amounts of time spent surfacing. Bowhead whales are more tolerant of vessels moving slowly or moving in directions other than towards them. In most studies, observers noted bowhead whales exhibiting avoidance within 1,640 ft (500 m) of vessels, though avoidance at farther distances was not able to be judged by observers on vessels (Richardson et al. 1995). Large delphinids have reactions to vessels ranging from avoidance to bow riding. SRKW's, the largest delphinid, critical habitat in the Salish Sea includes inbound and outbound commercial shipping lanes as well as recreational vessels and whale watching boats and members of the SRKW pod have been killed from vessel collisions. Although sperm whales are severely impacted by ship strikes in certain areas, like the Canaray Island (Arregui et al. 2019), most sperm whales in the proposed action areas would be expected to react to vessels by changing course and diving to more shallow depths (Gaskin 1964; Reeves et al. 2002).

Anchoring, which is considered in this PEIS/POEIS to be a part of vessel movement, would occur in designated anchorages, which are usually soft-bottom areas with regular bottom disturbance. Anchoring may disturb marine mammals feeding in the benthic zone and could cause behavioral reactions such as diving or swimming away from the disturbance created as the anchor is set and retrieved. However, any response is expected to be temporary and any individual animal would be expected to return to their normal activity. Anchoring would not be expected to strike, injure, or kill any marine mammal found in the proposed action area.

As part of the Proposed Action, the OPC would tow a vessel using towing lines/cables at a typical speed of 5 knots. Similar to the discussion above regarding vessel movement, a towed vessel may impact or harm a marine mammal; however, the chance that such an encounter would result in serious injury is extremely remote because of the low probability that a marine mammal would overlap with infrequent towing events associated with the Proposed Action. In addition, the likelihood of a marine mammal and partially submerged cable interaction (e.g., strike) is extremely low. Although a risk of entanglement with tow lines is present when a tow line is submerged, in order for an organism to become entangled in a line, the materials must have certain properties, such as the ability to form loops and a high breaking strength. Because tow lines would not be expected to have any loops or slack and would be taut, Coast Guard would have a lookout present, and marine mammal species are highly mobile, the risk of entanglement to marine mammals would be negligible. There would be no population level impacts on any marine mammal species as a result of anchoring or towing because the number of individuals impacted would be few, if any.

The most likely response of a marine mammal to vessel movement is a behavioral reaction. Short-term behavioral reactions to vessel movement are not expected to result in long-term impacts to individuals (such as chronic stress). Avoidance of a vessel as it moves through the proposed action areas is unlikely to cause abandonment or significant alteration of behavioral patterns, including breeding, feeding, or sheltering. Marine mammals would be expected to return to their normal behavior once the vessel has moved through the area. There would be no population level impacts to marine mammals as a result of vessel movement associated with the Proposed Action.

3.4.7.2.5 Military Expended Materials

Marine mammals in the proposed action areas may be exposed to MEM during the Proposed Action. Inert small caliber (0.50 caliber or MK-38 standard [25 mm]) and large caliber (57 mm) gun rounds, as well as the Nulka round, used in gunnery training may enter the water as MEM during the Proposed Action and would not be recovered. As discussed in Section 3.2.1.4, gunnery training would occur far from shore and in designated areas. Therefore, marine mammals that inhabit waters greater than 3 nm (6 km) offshore are most likely to overlap with the presence of MEM from gunnery training. Impacts to haul out areas are not expected because gunnery training would not occur close to shore or near ice where animals would haul out, nor would it be expected that MEM would drift to areas where haul outs are located. The Coast Guard would attempt to retrieve all targets used in gunnery training, but in the event that a fragment or target cannot be recovered, MEM from a non-recoverable target would not present a significant threat to marine mammal populations because of the small number expected. Although, any fragment or non-recoverable target could disperse, it would likely stay within the training area before sinking. Therefore, non-recoverable targets are considered MEM associated with gunnery training and are included in the discussion below on the potential impact to marine mammals from MEM is ingestion, which may result in injury or death.

Most marine mammals feed either at the surface or in the water column. Of the mysticetes, gray whales regularly feed at the seafloor, but do so in relatively shallow, soft-bottom areas where, because of the locations where gunnery training is expected to occur, MEM from the Proposed Action is not likely to overlap with gray whales. While humpback whales feed predominantly by lunging through the water to feed on krill and fish, there are instances of humpback whales disturbing the bottom in an attempt to flush prey, such as sand lance (Hain et al. 1995). In a comprehensive review of documented ingestion of debris by marine mammals, there are two species of mysticetes (bowhead and minke whale) with ingestion records (Laist 1997). The items ingested included plastic sheeting and a polythene bag (Laist 1997), both found typically within the water column. Since gray whales and humpback whales are known to forage at or near the seafloor, it is possible, but extremely unlikely that they would ingest MEM, such as inert bullets or the Nulka round, found on the seafloor. Additionally, any MEM that sinks to the seafloor is also likely to be covered due to shifting sediment.

Of the odontocetes, sperm whales are known to incidentally ingest foreign objects while foraging; however, this does not always result in negative consequences to health or vitality (Laist 1997; Walker and Coe 1989). While this incidental ingestion has led to sperm whale mortality in some cases, Whitehead (Whitehead 2002) suggests the scale to which this affects sperm whale populations is not significant. Sperm whales are recorded as having ingested fishing net scraps, rope, wood, and plastic debris such as plastic bags and items from the seafloor (Walker and Coe 1989). Walker and Coe provided data on the stomach contents from of 16 species of odontocetes, some of which occur or had stranded in North Pacific waters, with evidence of debris ingestion. Of the odontocete species occurring in the proposed action area, only sperm whales have been documented have ingested items (likely incidentally) that do not float and, thus, are indicative of foraging at the seafloor. Similar to gray whales and humpback whales, sperm whales are known to forage at the seafloor and there is a possibility that they could ingest MEM, however, the likelihood that sperm whales would ingest MEM found on the seafloor is very low.

Most of the pinniped species feed within the water column and on the seafloor. In a comprehensive review of documented ingestion of debris by marine mammals (Laist 1997), there is only one ESA-listed pinniped species—a Steller sea lion—that is also present within the proposed action areas. The Steller sea lion ingestion record indicates ingestion of a Styrofoam cup (Laist 1997), an object which floats and can be found mainly in the water column where this species feeds. As pinnipeds mainly feed at or below the water's surface in the water column, and not on the seafloor, expended practice munitions and targets are not likely to be encountered or ingested by pinnipeds. Sea otters and manatees both exploit specific prey resources on the seafloor. However, MEM items would be expected to move quickly through the water column and settle on the seafloor and eventually covered due to shifting sediment. In addition, gunnery training would likely occur farther offshore than where the majority of sea otters and manatees would occur, likely reducing the potential for exposure or risk of MEM ingestion. Therefore, pinnipeds, sea otters, and manatees would not be expected to ingest MEM associated with the Proposed Action. Gunnery training would not take place in the Arctic portions of the AK proposed action area; therefore, no impacts to polar bears is expected from MEM associated with gunnery training.

3.4.7.2.6 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, any potential impacts to marine mammals would be limited to the fathometer noise, vessel noise, aircraft noise, gunnery noise, vessel movement, aircraft movement, and MEM associated with the Proposed Action. Proposed action activities are not expected to yield any lasting effects on the survival, growth, recruitment, or reproduction of marine mammal species at the population level.

As discussed in Section 3.4.7.2.1, although there is a potential for behavioral responses to specific marine mammals exposed to the fathometer noise, Coast Guard would follow SOPs (Appendix C) to minimize the impact or harm of fathometer noise to marine mammals and federally-designated critical habitat (Section 3.4.8). Most vessel use associated with the Proposed Action would occur in waters primarily between 12 nm (22 km) from shore and inside 200 nm (370 km) and would be widely distributed throughout the proposed action areas. Vessel use in inshore waters would limited to transit to and from the vessel's homeport. As discussed in Section 3.4.7.2.2, potential impacts to marine mammals as a result of vessel noise include masking and behavioral responses, especially in those species that may detect low frequency noise. However, effects from vessel noise would be intermittent and would only impact those individual marine mammals that would be close to the vessel noise while in transit through the proposed action areas and while there may be some short-term changes in behavior, any disturbance is expected to be temporary and any exposed animal is expected to return to its normal behavior after the vessel moves through the area. Therefore, there would be no significant impact or harm to marine mammals from vessel noise under Alternative 1.

Aircraft would not operate at an altitude lower than 2,000 ft (610 m) within 0.5 mi (805 m) of marine mammals and would follow Coast Guard Air Operations Manual (COMDTINST M3710.1 (series)). Therefore, as discussed in Section 3.4.7.2.3, there would be no significant impact or harm to marine mammals from aircraft noise under Alternative 1. There would be no impacts to marine mammals from aircraft movement associated with the Proposed Action.

Short-term behavioral reactions to vessel movement are not expected to result in long-term impacts to individuals and marine mammals would be expected to return to their normal behavior once the vessel has moved through the area. There would be no population level impacts to marine mammals as a result of vessel movement associated with the Proposed Action. Therefore, as discussed in Section 3.4.7.2.4, there would be no significant impact or harm to marine mammals from vessel movement under Alternative 1.

Gunnery training would occur far from shore and in designated areas and as discussed in Section 3.4.7.2.5, marine mammals would not be expected to ingest MEM associated with the Proposed Action. Therefore, there would be no significant impact or harm to marine mammals from MEM under Alternative 1.

Pursuant to the ESA, there would be no effect to ESA-listed marine mammals (Table 3-22; Table 3-23; Table 3-24) from aircraft movement. Fathometer and Doppler speed log noise, vessel noise, aircraft noise, gunnery noise, vessel movement, gunnery, and MEM associated with the Proposed Action may affect, but are not likely to adversely affect ESA-listed marine mammals ((Table 3-22; Table 3-23; Table 3-24) under Alternative 1.

Additionally, the Proposed Action would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed marine mammals (Section 3.4.8.1.6; Table 3-22; Table 3-23; Table 3-24), including humpback whales, North Atlantic right whales, North Pacific right whales, false killer whales, Southern resident killer whales, Steller sea lions, Hawaiian monk seals, bearded seals, ringed seals, West Indian manatees, sea otters, and polar bears under Alternative 1.

3.4.7.2.7 Impacts Under Alternatives 2–3

Under Alternatives 2–3, any potential impacts to marine mammals would be similar to those discussed for activities under Alternative 1. There could be a potential reduction in the number of vessels conducting the Coast Guard's mission in the proposed action areas. However, the difference would not result in substantive changes to the potential for or types of, impacts to marine mammals. Therefore, there would be no significant impact or harm to marine mammals under Alternatives 2–3.

As discussed in Section 3.4.7.2.6, pursuant to the ESA, there would be no effect to ESA-listed marine mammals (Table 3-22; Table 3-23; Table 3-24) from aircraft movement. Fathometer noise, vessel noise, aircraft noise, gunnery noise, vessel movement, gunnery, and MEM associated with the Proposed Action may affect, but are not likely to adversely affect ESA-listed marine mammals (Table 3-22; Table 3-23; Table 3-24) under Alternatives 2–3.

Additionally, the Proposed Action would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed marine mammals (Section 3.4.8.1.6; Table 3-22; Table 3-23; Table 3-24), including humpback whales, North Atlantic right whales, North Pacific right whales, false killer whales, Southern resident killer whales, Steller sea lions, Hawaiian monk seals, bearded seals, ringed seals, West Indian manatees, sea otters, and polar bears under Alternatives 2–3.

3.4.7.2.8 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, the physical and acoustic impacts would not be introduced into the marine environment, with the exception of OPCs 1–5. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impact or harm to marine mammals with implementation of the No Action Alternative.

3.4.8 Federally-Designated Critical Habitat

3.4.8.1 Affected Environment

Within the proposed action areas, critical habitat has been federally-designated for one species of marine vegetation, fifteen species of marine invertebrates, four species of birds, seven species of marine fish, four species of sea turtles, and ten species of marine mammals. For the purposes of the Proposed Action, from shore to 12 nm (22 km) would be considered the area where an OPC would transit to and from a homeport to the operational area. The operational area of the OPC, therefore, would be defined as more than 12 nm (22 km) from shore within each proposed action area. Critical habitat may be located in either OPC operational areas within the proposed action areas or in "transit only" areas. Since the exact location of each OPC's homeport is unknown, should an OPC's vessel transit overlap with critical habitat, a general analysis of potential impacts is provided. Only critical habitat that is within the OPC operational areas are described in detail below. Depending on the date that the critical habitat was designated, the Services detail either "primary constituent elements" (PCEs) of the critical habitat, or PBFs that are essential to the conservation of the species in the designation. PCEs and PBFs are discussed, where applicable. Table 3-25 describes federally-designated critical habitat and where it is distributed within OPC proposed action areas.

Table 3-25. Federally-Designated Critical Habitat in the Proposed Action Areas

Species	*FR Citation*	*Description*	*Proposed Action Area(s)*	*Distribution*	
				Transit Area	*Operational Area*
Marine Invertebrates					
Acropora globiceps	Proposed: 85 FR 76262; November 27, 2020	17 units of proposed critical habitat of varying depths in American Samoa, Guam, CNMI, and the Pacific Remote Island Area (PRIA).	HI-PAC	X	
Acropora jacquelineae	Proposed: 85 FR 76262; November 27, 2020	17 units of proposed critical habitat of varying depths in American Samoa, Guam, CNMI, and the PRIA.	HI-PAC	X	
Acropora retusa	Proposed: 85 FR 76262; November 27, 2020	17 units of proposed critical habitat of varying depths in American Samoa, Guam, CNMI, and the PRIA.	HI-PAC	X	
Acropora speciosa	Proposed: 85 FR 76262; November 27, 2020	17 units of proposed critical habitat of varying depths in American Samoa, Guam, CNMI, and the PRIA.	HI-PAC	X	
Black abalone	76 FR 66805; October 27, 2011	Rocky intertidal and subtidal habitat within five segments of California Coast.	NEPAC-North; NEPAC-South	X	

Species	***FR Citation***	***Description***	***Proposed Action Area(s)***	***Distribution***	
				Transit Area	***Operational Area***
Boulder star coral complex	Proposed: 85 FR 76302; November 27, 2020	28 areas of varying depths throughout Florida, Puerto Rico, St. Thomas and St. John, US Virgin Islands, Flower Garden Banks, and Navassa Island.	NW-ATL-Florida and the Caribbean; GoMEX	X	X
Elkhorn coral	73 FR 72209; November 26, 2008	Depths from mean low water to 98 ft (30 m) with substrate of suitable quality and availability.	NW-ATL-Florida and the Caribbean	X	
Euphillia paradivisa	Proposed: 85 FR 76262; November 27, 2020	17 units of proposed critical habitat of varying depths in American Samoa, Guam, CNMI, and the PRIA.	HI-PAC	X	
Isopora crateriformis	Proposed: 85 FR 76262; November 27, 2020	17 units of proposed critical habitat of varying depths in American Samoa, Guam, CNMI, and the PRIA.	HI-PAC	X	
Pillar coral	Proposed: 85 FR 76302; November 27, 2020	28 areas of varying depths throughout Florida, Puerto Rico, St. Thomas and St. John, US Virgin Islands, Flower Garden Banks, and Navassa Island.	NW-ATL-Florida and the Caribbean; GoMEX	X	
Rough cactus coral	Proposed: 85 FR 76302; November 27, 2020	28 areas of varying depths throughout Florida, Puerto Rico, St. Thomas and St. John, US Virgin Islands, Flower Garden Banks, and Navassa Island.	NW-ATL-Florida and the Caribbean; GoMEX	X	X
Seriatopora aculeata	Proposed: 85 FR 76262; November 27, 2020	17 units of proposed critical habitat of varying depths in American Samoa, Guam, CNMI, and the PRIA.	HI-PAC	X	
Staghorn coral	73 FR 72209; November 26, 2008	Depths from mean low water to 98 ft (30 m) with substrate of suitable quality and availability.	NW-ATL-Florida and the Caribbean	X	
Birds					
Piping plover	66 FR 36137; July 10, 2001	Along the Gulf and Atlantic Coasts and along interior bays, inlets, and lagoons	NW-ATL-Florida and the Caribbean; GoMEX	x	
Spectacled eider	66 FR 9146; February 6, 2001	Coastal areas along the Y-K Delta, Norton Sound, and	AK	x	x

Species	***FR Citation***	***Description***	***Proposed Action Area(s)***	***Distribution***	
				Transit Area	***Operational Area***
		Ledyard Bay and an area of the Bering Sea between St. Lawrence and St. Matthew islands			
Steller's eider	66 FR 8850; February 2, 2001	Coastal habitat on the Y-K Delta and Kuskokwim Shoals, Sea Islands, Nelson Lagoon, and Izembek Lagoon on the western Alaska Coast	AK	x	
Western snowy plover	77 FR 36727; June 19, 2012	Sandy beaches, dunes, salt flats, mud flats, gravel beds, artificial salt ponds, and dredge spoil sites along the coast of Washington, Oregon, and California	NEPAC-North	x	
Marine Fish					
Bocaccio	79 FR 68041; November 13, 2014	portions of Puget Sound/Georgia Basin	NEPAC-North	x	
Eulachon	76 FR 65324; October 20, 2011	In a combination of freshwater creeks and rivers and their associated estuaries from Washington to northern California	NEPAC-North	x	
Green surgeon	71 FR 17757; April 7, 2006	Coastal marine waters from California to Washington	NEPAC-North	x	
Gulf sturgeon	68 FR 13356; April 18, 2003	14 geographic areas from Florida to Louisiana	GoMEX	x	
Smalltooth sawfish	74 FR 45353; October 02, 2009	Along the southwestern coast of Florida between Charlotte Harbor and Florida Bay	GoMEX; NW-ATL-Florida and the Caribbean	x	
Steelhead trout	70 FR 52630; September 2, 2005	Freshwater and a few limited brackish systems in San Francisco Bay, California	NEPAC-North; NEPAC-South	x	
Yelloweye rockfish	79 FR 68042; November 13, 2014	In Puget Sound/Georgia Basin	NEPAC-North	x	
Sea Turtles					
Green sea turtle	63 FR 46693; September 2, 1998	In coastal waters around Culebra Island, Puerto Rico, from the mean high water line seaward to 3	NW-ATL-Florida and the Caribbean	x	

Species	***FR Citation***	***Description***	***Proposed Action Area(s)***	***Distribution***	
				Transit Area	***Operational Area***
		nm (6 km) to include Culebra's outlying keys			
Hawksbill sea turtle	63 FR 46693; September 2, 1998	Portions of Mona Island, Culebra Island, Cayo Norte, and Island Culebrita, from the mean high tide line to a point 492 ft (150 m) from shore; also includes coastal waters surrounding Mona and Monito Islands, Puerto Rico, from the mean high water line seaward to 3 nm (6 km)	NW-ATL-Florida and the Caribbean	x	
Leatherback sea turtle	43 FR 43688; September 26, 1978 44 FR 17710; March 23, 1979	Terrestrial nesting habitat on Sandy Point, St. Croix, U.S. Virgin Islands as well as the waters up to and including the 100-fathom curve shoreward to the mean high tide line	NW-ATL-Florida and the Caribbean	x	
Leatherback sea turtle	77 FR 4169; January 26; 2012	Foraging habitat in coastal waters of California from Point Arena to Point Arguello and the coastal waters of Washington and Oregon from Cape Flattery south to Cape Blanco	NEPAC-North	x	x
Loggerhead sea turtle (Northwest Atlantic Ocean DPS)	79 FR 39855; August 11, 2014 79 FR 51264; August 28, 2014	Marine: from Texas (through the Gulf of Mexico and along the coast of the U.S. Atlantic Ocean) as far north as the waters off of Delaware; terrestrial: nesting beaches in in North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi	NW-ATL-Florida and the Caribbean; GOMEX	x	x
Marine Mammals					
Humpback whale (Central America DPS)	84 FR 54354; October 9, 2019	Marine waters off the coasts of Oregon and California	NEPAC-North; NEPAC-South	x	x
Humpback whale (Mexico DPS)	84 FR 54354; October 9, 2019	Marine waters within designated areas of Alaska, Washington, Oregon, and California	AK; NEPAC-North; NEPAC-South	x	x
Humpback whale (Western	84 FR 54354; October 9, 2019	Marine waters within designated areas in Alaska	AK	x	

Species	***FR Citation***	***Description***	***Proposed Action Area(s)***	***Distribution***	
				Transit Area	***Operational Area***
North Pacific DPS)					
North Atlantic right whale	81 FR 4837, 26; February 2016	Marine habitat in the Gulf of Maine and Georges Bank region and off the Southeast U.S. Coast	NW-ATL	x	x
North Pacific right whale	73 FR 19000; April 8, 2008	one area in the Gulf of Alaska and one in the Bering Sea	AK	x	x
False killer whale	83 FR 35062; July 24, 2018	The waters surrounding the MHI from the 148 ft (45 m) depth contour out to the 10,500 ft (3,200 m) depth contour	HI-PAC	x	x
Southern resident killer whale	71 FR 69054, December 29, 2006	In three specific areas (1) the Summer Core Area in Haro Strait and waters around the San Juan Islands; (2) Puget Sound; and (3) the Strait of Juan de Fuca	NEPAC-North	x	x
Hawaiian monk seal	80 FR 50925; August 21, 2015	Includes sixteen occupied areas within the range of the species: ten areas in the NWHI and six in the MHI.	HI-PAC	x	x
Ringed seal	87 FR 19232; April 1, 2022	Includes the contiguous marine waters from the coastline of Alaska to an offshore limit within the U.S. EEZ in the Bering, Chukchi, and Beaufort Seas	AK	x	x
Steller sea lion (Western DPS)	58 FR 45269; August 27, 1993	Extends 3,000 ft (915 m) landward, an air zone that extends 3,000 ft (915 m) above, and an aquatic zone that extends 3,000 ft (915 m) seaward of each major rookery and haulout	AK	x	x
Northern sea otter	74 FR 51988; October 8, 2009	Includes all of the Aleutian Islands, Bristol Bay, the Kodiak Archipelago, the Alaska Peninsula, and western Cook Inlet	AK	x	
Polar bear	75 FR 76085; December 7, 2010	Encompasses three areas or units: barrier islands, sea ice, and terrestrial denning habitat	AK	x	x

Species	*FR Citation*	*Description*	*Proposed Action Area(s)*	*Distribution*	
				Transit Area	*Operational Area*
West Indian manatee	41 FR 41914, September 24, 1976	Coastal U.S. territorial waters in Florida that encompass riverine and coastal portions of the Gulf and Atlantic Coasts of Florida (to the Georgia-Florida border)	NW-ATL-Florida and the Caribbean; GOMEX	x	

3.4.8.1.1 Critical Habitat for ESA-Listed Invertebrates

Federally-designated critical habitat for ESA-listed invertebrates is within the NEPAC-North and NEPAC-South for black abalone (Figure 3-7 and Figure 3-8, respectively) and within the NW-ATL-Florida and the Caribbean proposed action area (Figure 3-4) for staghorn and elkhorn corals. These critical habitats are only located in areas of OPC transit, within 12 nm (22 km) of the coast.

Critical habitat is proposed for the Boulder Star coral complex (*Orbicella annularis, O. faveolata, O. franksi*), Rough Cactus coral, and Pillar coral (85 FR 76302; November 27, 2020). Proposed critical habitat would contain 28 specific areas containing approximately 5,900 mi^2 (15,000 km^2) of marine habitat. These areas would overlap with the NW-ATL-Florida and the Caribbean (Figure 3-5) and GoMEX (Figure 3-6) proposed action areas.

Critical habitat is proposed for Acropora globiceps, A. jacquelineae, A. retusa, A. speciosa, Euphillia paradivisa, Isopora crateriformis, and Seriatopora aculeata (85 FR 76262; November 27, 2020). Proposed critical habitat would contain 17 specific occupied areas containing approximately 230 mi^2 (600 km^2) of marine habitat. These areas would overlap with the HI-PAC proposed action area. Since critical habitat for the Acropora globiceps, A. jacquelineae, A. retusa, A. speciosa, Euphillia paradivisa, Isopora crateriformis, and Seriatopora aculeata corals is still proposed, NOAA has not released GIS data to develop maps, and therefore Coast Guard was unable to develop maps at the time of publishing this document. The Coast Guard reviewed the designations based on depth contours available at: https://www.fisheries.noaa.gov/action/proposed-rule-designate-critical-habitat-threatened-indo-pacific-corals.

3.4.8.1.2 Critical Habitat for ESA-Listed Birds

Federally-designated critical habitat for ESA-listed seabirds and shorebirds that only overlaps with OPC transit areas, within 12 nm (22 km) of the coast, is within the NW-ATL-Florida and the Caribbean (Figure 3-4) and GoMEX (Figure 3-6) proposed action areas for piping plovers; NEPAC-North (Figure 3-8) proposed action area for the western snowy plover; and the AK (Figure 3-9) proposed action area for Steller's eider.

Spectacled eider critical overlaps with both the OPC transit and operational areas (Figure 3-9). While much of the spectacled eider critical habitat is within 12 nm (22 km) of the coast, there is a portion within the OPC operational area, outside 12 nm (22 km) of the coast, in the Bering Sea. This critical habitat is discussed further below.

3.4.8.1.2.1 Spectacled Eider Critical Habitat

Spectacled eider critical habitat encompasses approximately 38,610 mi^2 (100,000 km^2) and includes the Yukon-Kuskokwim Delta and Norton Sound within the Bering Sea, Ledyard Bay in the Chukchi Sea, and the Bering Sea between St. Lawrence and St. Matthew islands (66 FR 9146; February 6, 2001) in the AK proposed action area (Figure 3-9). Spectacled eiders use these areas for breeding, molting, and wintering (Alaska Department of Fish and Game 2017a).

- 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, habitat or community composition. Plant communities within this zone include, but are not limited to: low wet sedge tundra, grass marsh, dwarf shrub/graminoid (i.e., temporarily flooded and grass-like) meadow, high and intermediate graminoid meadow, and mixed high graminoid meadow/dwarf shrub uplands.
- All marine waters greater than 16 ft (5 m) and less than or equal to 82 ft (25 m) in depth a mean lower low water, along with associated marine aquatic flora and fauna in the water column, and the underlying marine benthic community.
- All marine waters less than or equal to 246 ft (75 m) in depth at mean lower low water, along with associated marine aquatic flora and fauna in the water column, and the underlying marine benthic community.

3.4.8.1.3 Critical Habitat for ESA-Listed Marine Fish

Federally-designated critical habitat for ESA-listed marine fish only overlaps with OPC transit areas, within 12 nm (22 km) of the coast. The NEPAC-North proposed action area (Figure 3-8) includes critical habitat for bocaccio, eulachon, green sturgeon, steelhead trout, and yelloweye rockfish. Critical habitat for the steelhead trout extends into the NEPAC-South proposed action area (Figure 3-7). The GoMEX proposed action area (Figure 3-6) includes critical habitat for the Gulf sturgeon and smalltooth sawfish. Critical habitat for the smalltooth sawfish extends into the NW-ATL-Florida and the Caribbean proposed action area (Figure 3-4).

3.4.8.1.4 Critical Habitat for ESA-Listed Sea Turtles

Federally-designated critical habitat for ESA-listed sea turtles within the NW-ATL-Florida and the Caribbean proposed action area (Figure 3-4) includes critical habitat for green sea turtle, hawksbill sea turtle, leatherback sea turtle, and loggerhead sea turtle. Critical habitat areas for green sea turtles, hawksbill sea turtles, and leatherback sea turtles in the Atlantic Ocean are only located in areas of OPC transit, within 12 nm (22 km) of the coast. Loggerhead sea turtle critical habitat is located in areas of transit and in OPC operational areas, outside 12 nm (22 km) of the coast, in both the NW-ATL Florida and the Caribbean (Figure 3-4) and GoMEX (Figure 3-6) proposed action areas and is discussed below. Critical habitat for leatherback sea turtle in the Pacific Ocean overlaps with OPC transit and operational areas of the NEPAC-North (Figure 3-8) proposed action area and is discussed below.

3.4.8.1.4.1 Leatherback Sea Turtle

In the Pacific Ocean, designated critical habitat for leatherback sea turtles is foraging habitat in coastal waters of California from Point Arena to Point Arguello and the coastal waters of Washington and Oregon from Cape Flattery south to Cape Blanco (77 FR 4169; January 26, 2012) in the NEPAC-North and NEPAC-South proposed action areas. The PCE of this critical habitat is the availability of the primary prey species of the leatherback sea turtle, which are true jellyfish of the order Semaeostomeae (Figure 3-8).

3.4.8.1.4.2 Loggerhead Sea Turtle Critical Habitat

Critical habitat is only designated for the Northwest Atlantic Ocean DPS of loggerhead sea turtles and includes both marine and terrestrial nesting habitats (79 FR 39855; August 11, 2014 and 79 FR 51264;

August 28, 2014). The marine habitat designation stretches from Texas (through the Gulf of Mexico [Figure 3-6] and along the coast of the U.S. Atlantic Ocean [Figure 3-3 and Figure 3-4]) as far north as the waters off of Delaware in the GoMEX, NW-ATL-Florida and the Caribbean, and the NW-ATL proposed action areas. Specific areas designated as critical habitat include 38 occupied marine areas within the species' range. NMFS categorized this critical habitat into five different habitat types that comprise the critical habitat designation, which include:

- Nearshore reproductive habitat (portions of nearshore waters adjacent to nesting beaches used by females and hatchlings to egress to open water environments),
- Winter habitats (warm waters south of Cape Hatteras where juveniles and adults tend to concentrate during winter months),
- Breeding habitats (areas with high concentrations of both male and female adults during the breeding season in proximity to Florida migratory corridor and nesting grounds),
- Constricted migratory habitat (migratory corridors restricted in width),
- *Sargassum* spp. habitat (juvenile loggerhead developmental habitats where *Sargassum* spp. supports adequate prey abundance and cover) (National Oceanic and Atmospheric Administration 2014c).

PCEs that support the five habitat types summarized above for loggerhead sea turtle conservation include oceanic conditions that would concentrate certain life stage loggerheads together at different locations and in different seasons.

3.4.8.1.5 Critical Habitat for ESA-Listed Marine Mammals

Federally-designated critical habitat for ESA-listed marine mammals that only overlaps with OPC transit areas, within 12 nm (22 km) of the coast, is within the AK (Figure 3-9) proposed action area for the northern sea otter and the polar bear, and within the NW-ATL-Florida and the Caribbean (Figure 3-4) and GoMEX (Figure 3-6) proposed action areas for the West Indian manatee.

Federally-designated critical habitat for ESA-listed marine mammals that overlaps with OPC transit areas and OPC operational areas, outside of 12 nm (22 km) from the coast, includes critical habitat for the humpback whale, North Atlantic right whale, North Pacific right whale, false killer whale, Southern Resident killer whale, Bearded seal, Hawaiian monk seal, ringed seal, and Steller sea lion. These critical habitats are discussed further below.

3.4.8.1.5.1 Humpback Whale Critical Habitat

Critical habitat for the Western North Pacific, Central America, and Mexico DPSs of humpback whales was designated on May 21, 2021 (86 FR 21082). Critical habitat includes specific marine areas located off the coasts of California, Oregon, Washington, and Alaska. Critical habitat boundaries for the Mexico DPS includes marine waters within designated areas of Alaska (Figure 3-9), Washington, Oregon, and California (Figure 3-8) in the AK, NEPAC-North, and NEPAC-South proposed action areas. Critical habitat boundaries for the Western North Pacific DPS includes marine waters within designated areas in Alaska (Figure 3-9) in the AK proposed action area. Critical habitat boundaries for the Central America DPS includes marine waters off the coasts of Oregon and California (Figure 3-7 and Figure 3-8) in the NEPAC-North and NEPAC-South proposed action areas. The PBF of critical habitat for humpback whales is prey species, primarily euphasusiids, and small pelagic schooling fish of sufficient quality, abundance, and accessibility within humpback whale feeding areas to support feeding and population growth. Critical habitat does not include areas owned or controlled by the Department of Defense, or designated for its use, where these areas overlap with the boundaries of critical habitat for the Mexico and Western North

Pacific DPSs of humpback whales, including all areas subject to the Naval Base Ventura County, Point Mugu, California, and the Naval Outlying Field, San Nicolas Island, California approved Integrated Natural Resource Management Plans, and the Quinault Range Site (QRS), with an additional 6 mi (10 km) buffer around the QRS and the Southeast Alaska Acoustic Measurement Facility.

Critical habitat has been identified under Canadian law to the extent possible off Langara Island, southeast Moresby Island, Gil Island, and southwest Vancouver Island. These areas support feeding and foraging, and resting and socializing, and they are protected from destruction. A recovery strategy under Species at Risk Act was published in 2013 (Fisheries and Oceans Canada 2013). This critical habitat area would overlap with the Central American DPS.

3.4.8.1.5.2 North Atlantic and North Pacific Right Whale Critical Habitat

In 2016, the Northeastern U.S. Foraging Area Critical Habitat was expanded to include nearly all U.S. waters of the Gulf of Maine (81 FR 4837; February 26, 2016). The areas being designated as critical habitat contain approximately 29,763 nm^2 (102,084 km^2) of marine habitat in the Gulf of Maine and Georges Bank region (Unit 1) and off the Southeast U.S. Coast (Unit 2) (Figure 3-3) in the NW-ATL proposed action area. Critical habitat consists of those PBFs that are essential to the conservation of a given species and include: 1) foraging habitat, specifically regarding the copepod *Calanus finmarchicus*; 2) calving habitat; 3) migration; and, 4) breeding.

NMFS has also designated two areas as North Pacific right whale critical habitat: one in the Gulf of Alaska and one in the Bering Sea (73 FR 19000; April 8, 2008). Critical habitat in the Bering Sea is located approximately 35 nm (65 km) north of King Cove in the Aleutian Islands (Figure 3-9) in the AK proposed action area. Areas of concentration where right whales feed are characterized by certain PCEs which include nutrients, physical oceanographic processes, certain species of zooplankton, and long photoperiod due to the high latitude. These feeding areas, supporting a significant assemblage of the remaining North Pacific right whales, are critical in terms of their conservation value.

3.4.8.1.5.3 False Killer Whale Critical Habitat

Critical habitat for the MHI insular false killer whale is designated (83 FR 35062; July 24, 2018) within the HI-PAC proposed action area (Figure 3-10). A number of economic (e.g., Bureau of Energy Management) and national security exclusion areas (e.g., military training and testing areas) are exempt from the MHI insular false killer whale critical habitat designation.

Critical habitat is designated as “island associated marine habitat” within the waters surrounding the MHI from the 148 ft (45 m) depth contour out to the 10,500 ft (3,200 m) depth contour. Four PBFs of the island associated marine habitat are necessary to support the MHI insular false killer whales’ ability to travel, forage, communicate, and move freely among the waters of the Main Hawaiian Islands:

- Adequate space for movement and use within shelf and slope habitat;
- Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth;
- Waters free of pollutants of a type and amount harmful to MHI insular false killer whale; and
- Sound levels that will not significantly impair MHI insular false killer whale use or occupancy.

3.4.8.1.5.4 Southern Resident Killer Whale Critical Habitat

Critical habitat was designated for the Southern Resident killer whale DPS in 2006 (71 FR 69054; November 29, 2006). The specific areas of critical habitat were designated in the Summer Core Area in Haro Strait and waters around the San Juan Islands, Puget Sound, and the Strait of Juan de Fuca, which comprise approximately 2,560 mi^2 (6,630 km^2) of marine habitat. On August 2, 2021, six additional critical habitat areas along the west coast of the U.S. were designated as critical habitat (86 FR 41668). Specific newly designated areas along the U.S. West Coast include 15,910 mi^2 (41,207 km^2) of marine waters between the 20 ft (6.1 m) depth contour and the 656.2 ft (200 m) depth contour from the U.S. international border with Canada south to Point Sur, California (Figure 3-8). These areas of critical habitat overlap with the NEPAC-North proposed action area. PBFs of Southern Resident killer whale critical habitat include:

- Water quality to support growth and development.
- Prey species of sufficient quantity, quality and availability to support individual growth, reproduction and development, as well as overall population growth.
- Passage conditions to allow for migration, resting, and foraging.

3.4.8.1.5.5 Bearded Seal Critical Habitat (Proposed)

NMFS proposed to designate critical habitat for the Beringia DPS of the bearded seal (86 FR 1433; January 8, 2021). The proposed area would include an area of marine habitat in the Bering, Chukchi, and Beaufort seas located in the AK proposed action area (Figure 3-9). The following PBFs are essential to the conservation of the bearded seal in the United States:

- Sea ice habitat suitable for whelping and nursing, which is defined as areas with waters 200 m or less in depth containing pack ice of at least 25 percent concentration and providing bearded seas access to those waters from the ice.
- Sea ice habitat suitable as a platform for molting, which is defined areas with waters 200 m or less in depth containing pack ice of at least 15 percent concentration and providing bearded seals access to those waters from the ice.
- Primary prey resources to support bearded seals in waters 200 m or less in depth: Benthic organisms, including epifaunal and infaunal invertebrates, and demersal and schooling pelagic fishes.
- Acoustic conditions that allow for effective communication by bearded seals for breeding purposes within waters used by breeding bearded seals.

3.4.8.1.5.6 Hawaiian Monk Seal Critical Habitat

Specific areas for critical habitat designation (80 FR 50925; August 21, 2015) include sixteen occupied areas within the range of the species: ten areas in the NWHI and six in the MHI located in the HI-PAC proposed action area (Figure 3-10). These areas contain one or a combination of habitat types: preferred pupping and nursing areas, significant haul out areas, and/or marine foraging areas, that will support conservation for the species. Specific areas in the NWHI include all beach areas, sand spits and islets, including all beach crest vegetation to its deepest extent inland, lagoon waters, inner reef waters, and including marine habitat through the water's edge, including the seafloor and all subsurface waters and marine habitat within 33 ft (10 m) of the seafloor, out to the 656 ft (200 m) depth contour line around the following 10 areas: Kure Atoll, Midway Islands, Pearl and Hermes Reef, Lisianski Island, Laysan Island, Maro Reef, Gardner Pinnacles, French Frigate Shoals, Necker Island, and Nihoa Island. Specific areas in the MHI include marine habitat from the 656 ft (200 m) depth contour line, including the seafloor and all subsurface waters and marine habitat within 33 ft (10 m) of the seafloor, through the water's edge 16 ft (5 m) into the terrestrial environment from the shoreline between identified boundary points on the islands of: Kaula, Niihau, Kauai, Oahu, Maui Nui (including Kahoolawe, Lanai, Maui, and Molokai), and Hawaii. In areas where critical habitat does not extend inland, the designation ends at a line that marks mean lower low water.

3.4.8.1.5.7 Ringed Seal Critical Habitat

Critical habitat for the ringed seal was designated on April 1, 2022 (87 FR 19232) and includes areas of the Bering, Chukchi and Beaufort Seas. The area includes all the contiguous marine waters from the coastline of Alaska to an offshore limit within the U.S. EEZ, but excludes an area north of the Beaufort Sea continental shelf. Critical habitat for the ringed seal is within the AK proposed action area (Figure 3-9). The following PBFs are essential to the conservation of the Arctic ringed seal in the United States:

- Snow-covered sea ice habitat suitable for the formation and maintenance of subnivean birth lairs used for sheltering pups during whelping and nursing, which is defined as waters 10 ft (3 m) or more in depth (relative to MLLW) containing areas of seasonal landfast (shorefast) ice or dense, stable pack ice, that have undergone deformation and contain snowdrifts of sufficient depth to form and maintain birth lairs (typically at least 21 in [54 cm] deep).
- Sea ice habitat suitable as a platform for basking and molting, which is defined as areas containing sea ice of 15 percent or more concentration in waters 10 ft (3 m) or more in depth (relative to MLLW).
- Primary prey resources to support Arctic ringed seals, which are defined to be small, often schooling, fishes, in particular Arctic cod, saffron cod, and rainbow smelt; and small crustaceans, in particular, shrimps and amphipods.

3.4.8.1.5.8 Steller Sea Lion Critical Habitat

Critical habitat was designated in 1993 for the Steller sea lion (58 FR 45269; August 27, 1993) Western DPS. In Alaska, the Western DPS generally occurs west of Cape Suckling, Alaska (144° W longitude) and the Eastern DPS generally occurs east of Cape Suckling. Critical habitat extends 3,000 ft (915 m) landward, an air zone that extends 3,000 ft (915 m) above, and an aquatic zone that extends 3,000 ft (915 m) seaward of each major rookery and haulout. Critical habitat also includes an aquatic zone that extends 20 nm (37 km) seaward in State and federally-managed waters from each major rookery and haulout located in the AK proposed action area (Figure 3-9). Large movements by individual Steller sea lions occur, and Western DPS individuals are expected to occur in Southeast Alaska north of Sumner Strait (Jemison et al. 2013; NMFS 2013b).

3.4.8.1.5.9 Polar Bear Critical Habitat

The critical habitat designation only applies to the lands and waters of the United States. There are two polar bear populations that occur on U.S. territory: the Chukchi Sea population and the Southern Beaufort Sea population. Designated critical habitat for the polar bear (75 FR 76085; December 7, 2010) encompasses three areas or units: barrier islands, sea ice, and terrestrial denning habitat. The total area designated covers 187,157 mi^2 (484,734 km^2) and is within the AK proposed action area (Figure 3-9). About 96 percent of the designated critical habitat area is sea ice. Characteristics of these areas include:

- The barrier island habitat includes coastal barrier islands and spits along Alaska's northern coast.
- Terrestrial denning habitat includes lands within 20 mi (32 km) of the northern coast of Alaska between the Canadian border and the Kavik River and within 5 mi (8 km) between the Kavik River and Barrow. In each case, these boundaries are informed by polar bear distribution data and encompass areas where 95 percent of bears were found to occur.

- Sea ice habitat is located over the continental shelf, and includes ice over water up to 984 ft (300 m) in depth extending to the outer limits of the U.S. EEZ, 200 nm (321 km) from shore.

3.4.8.1.6 Critical Habitat Maps

Critical habitat maps are provided below.

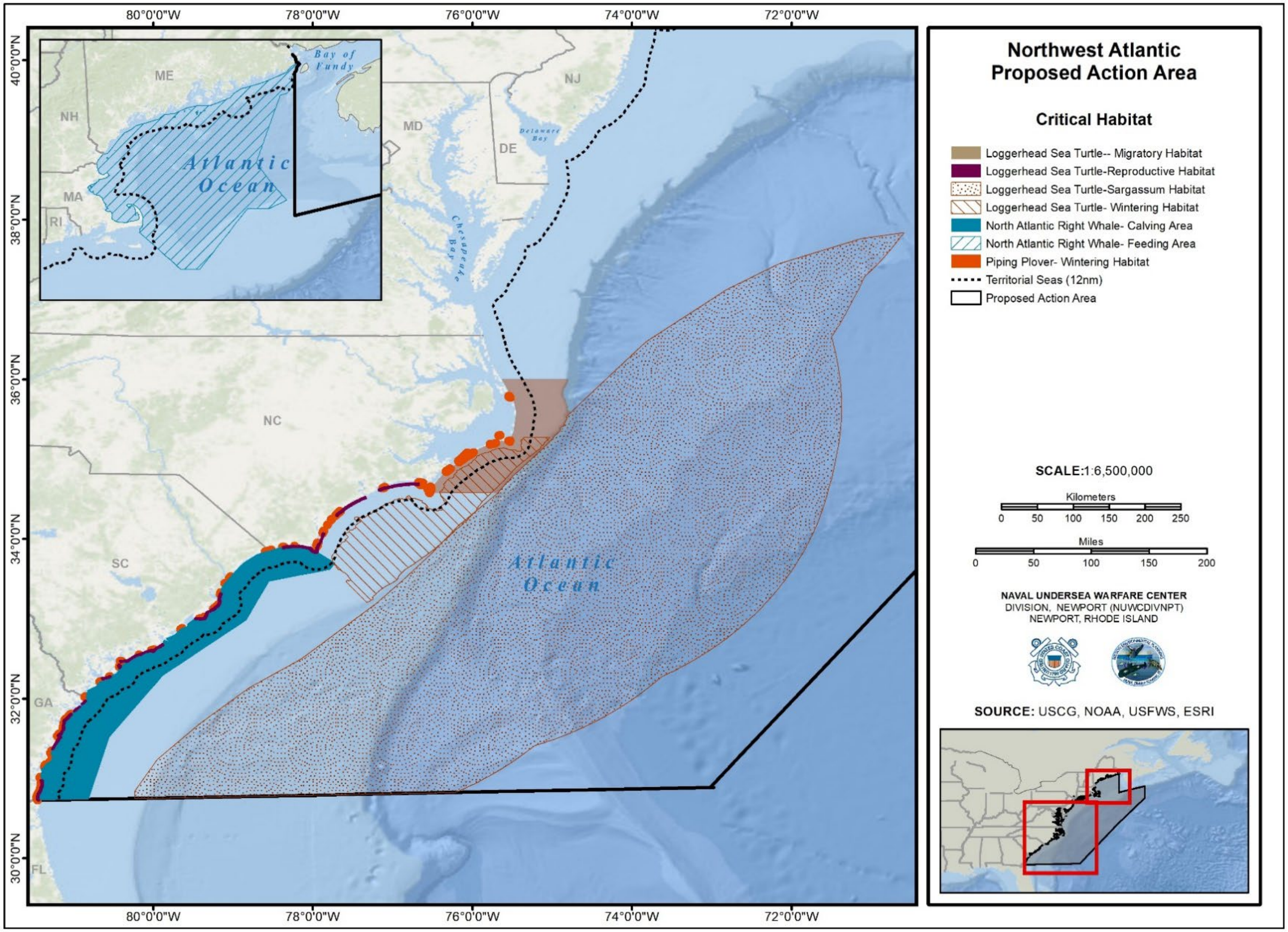


Figure 3-3. Critical Habitat within the NW-ATL Proposed Action Area

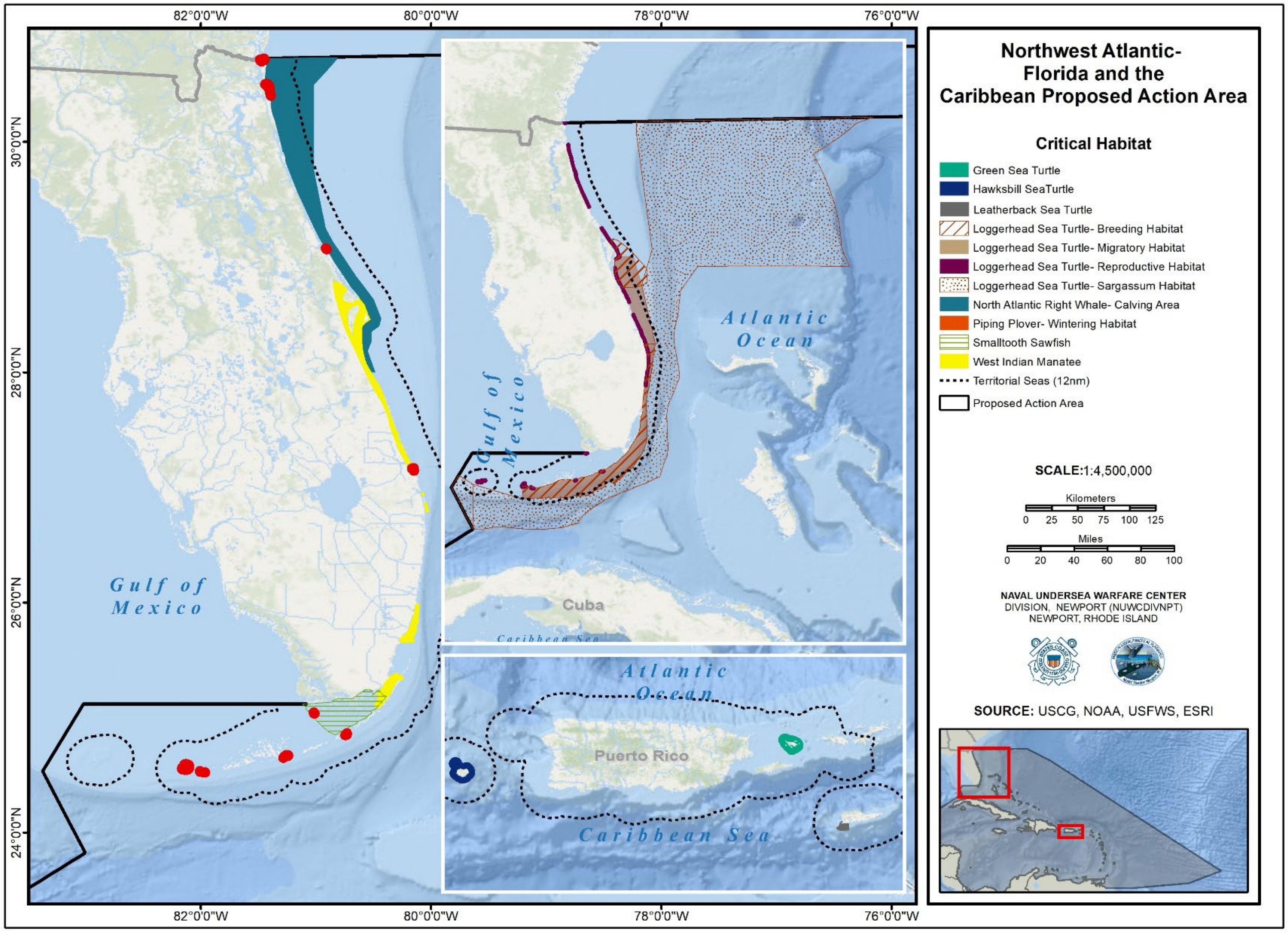


Figure 3-4. Critical Habitat within the NW-ATL-Florida and the Caribbean Proposed Action Area

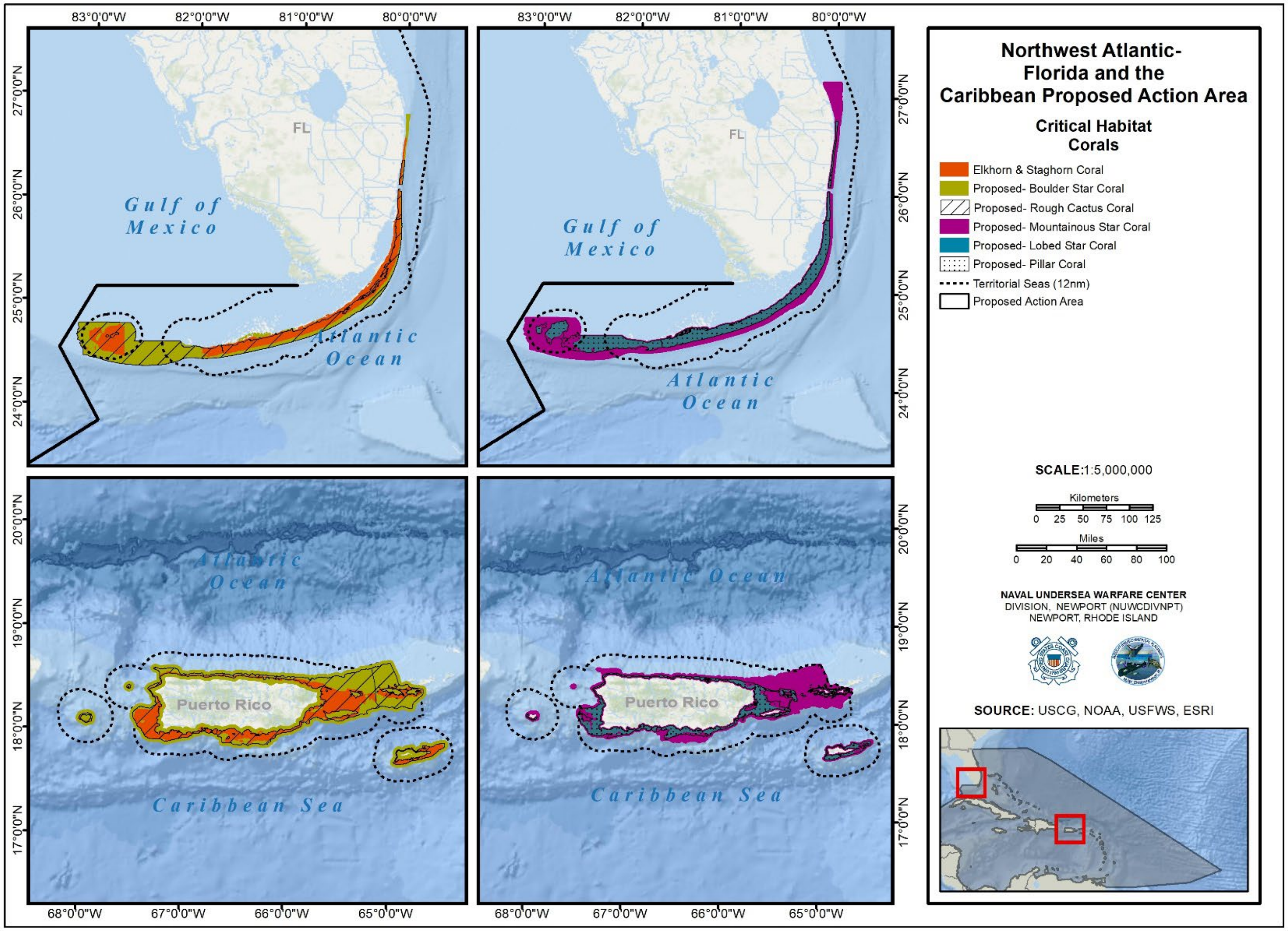


Figure 3-5. Critical Habitat for Corals within the NW-ATL-Florida and the Caribbean Proposed Action Area

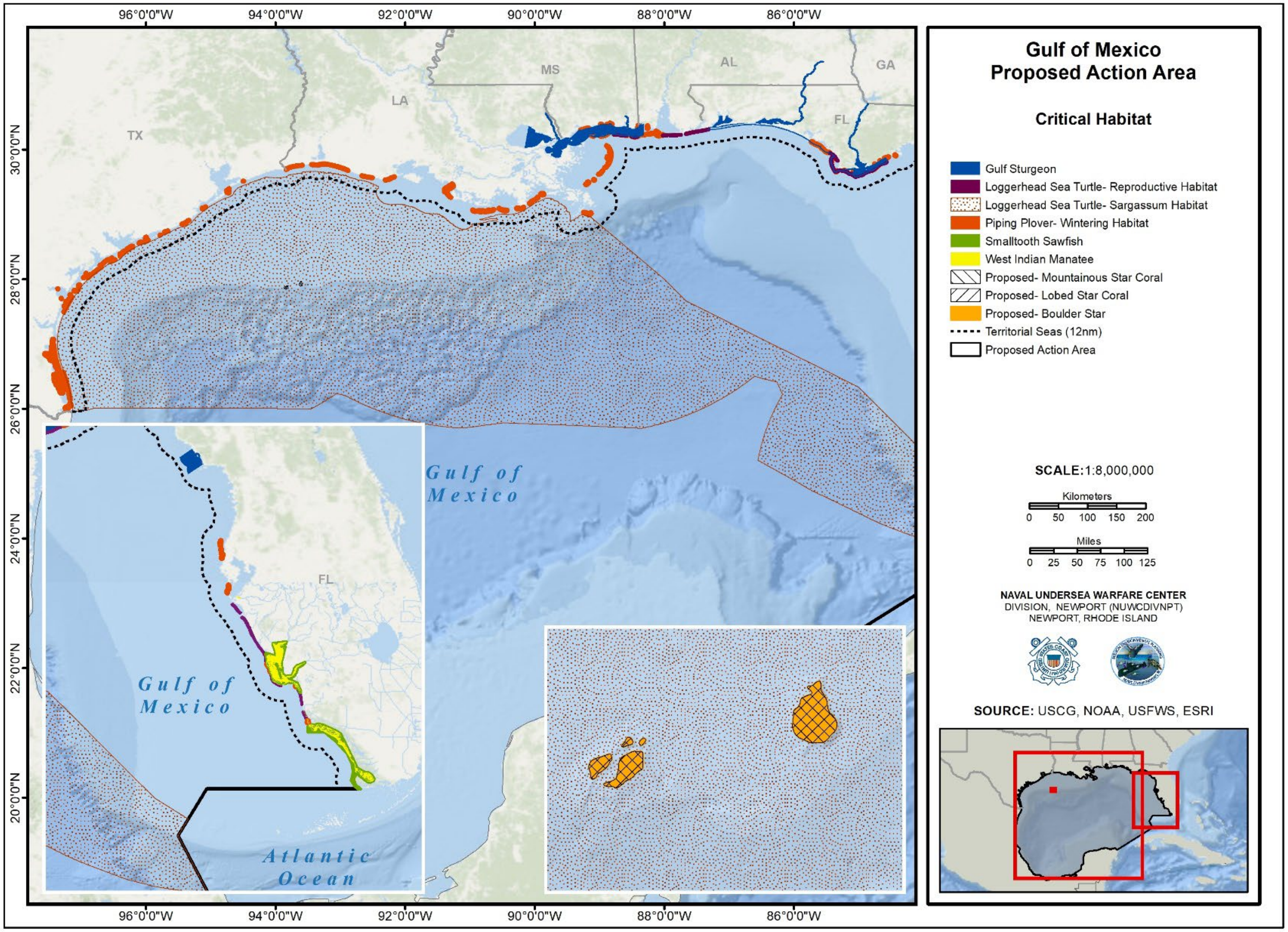


Figure 3-6. Critical Habitat within the GoMEX Proposed Action Area

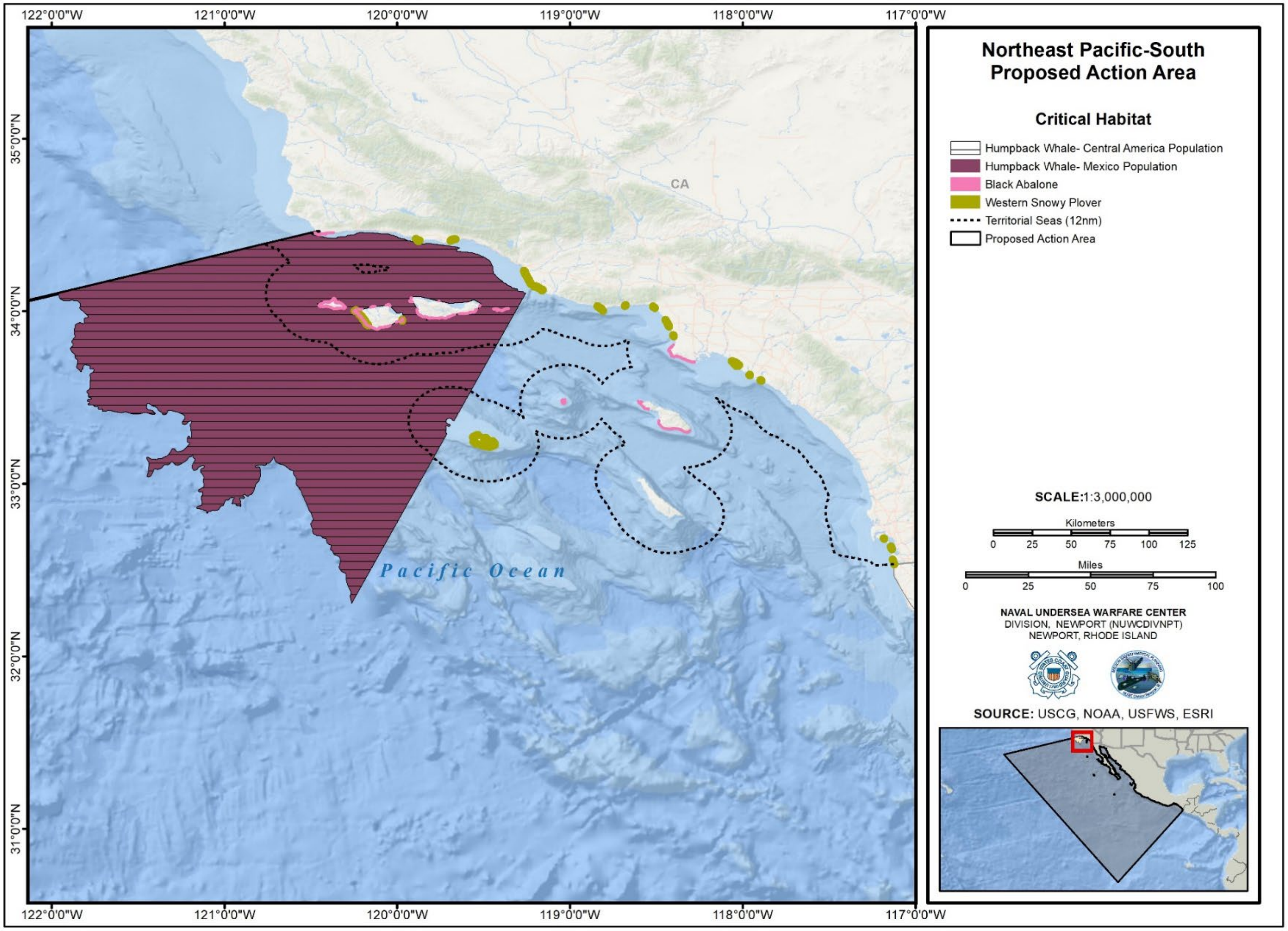


Figure 3-7. Critical Habitat within the NEPAC-South Proposed Action Area

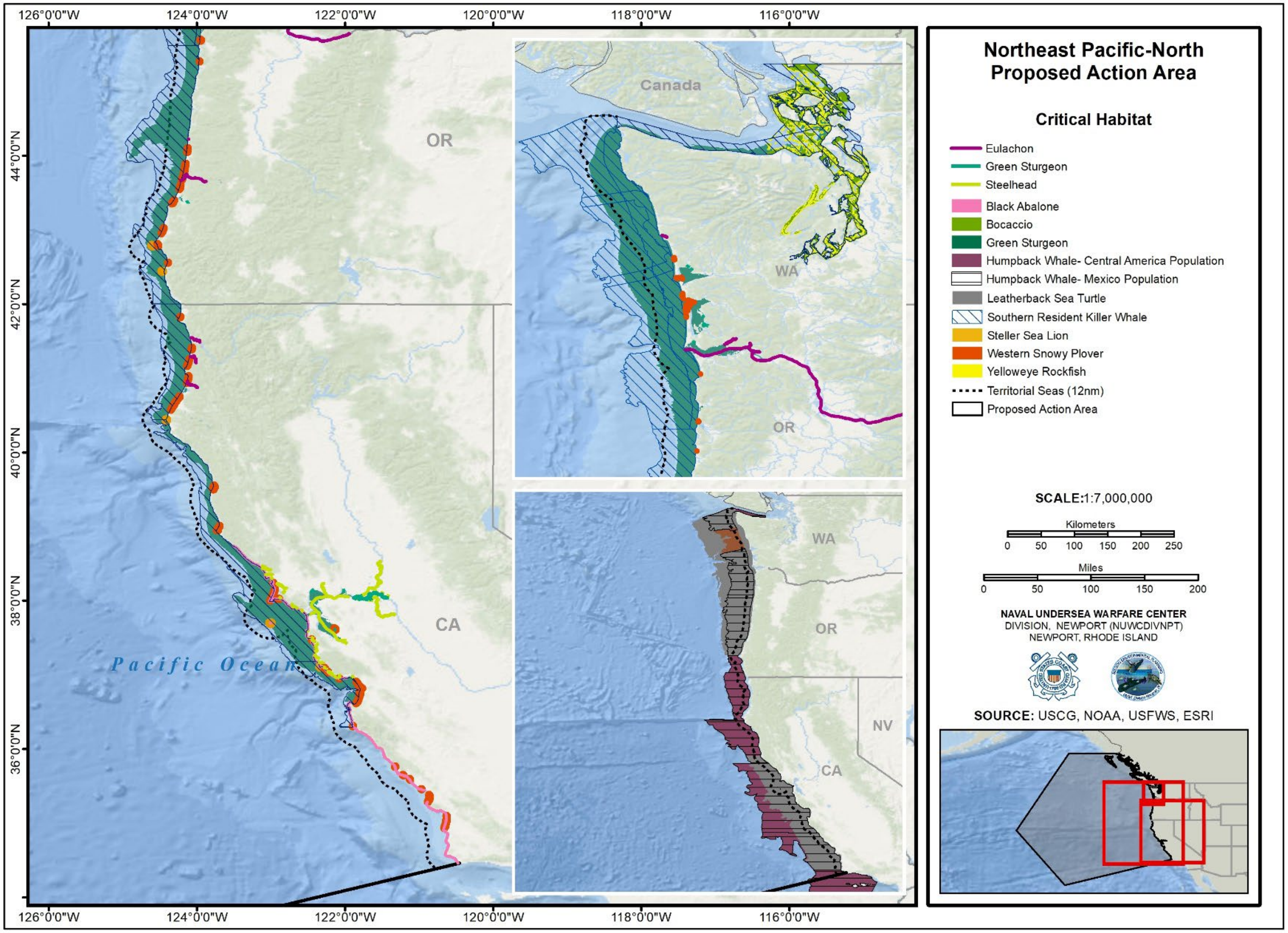


Figure 3-8. Critical Habitat within the NEPAC-North Proposed Action Area

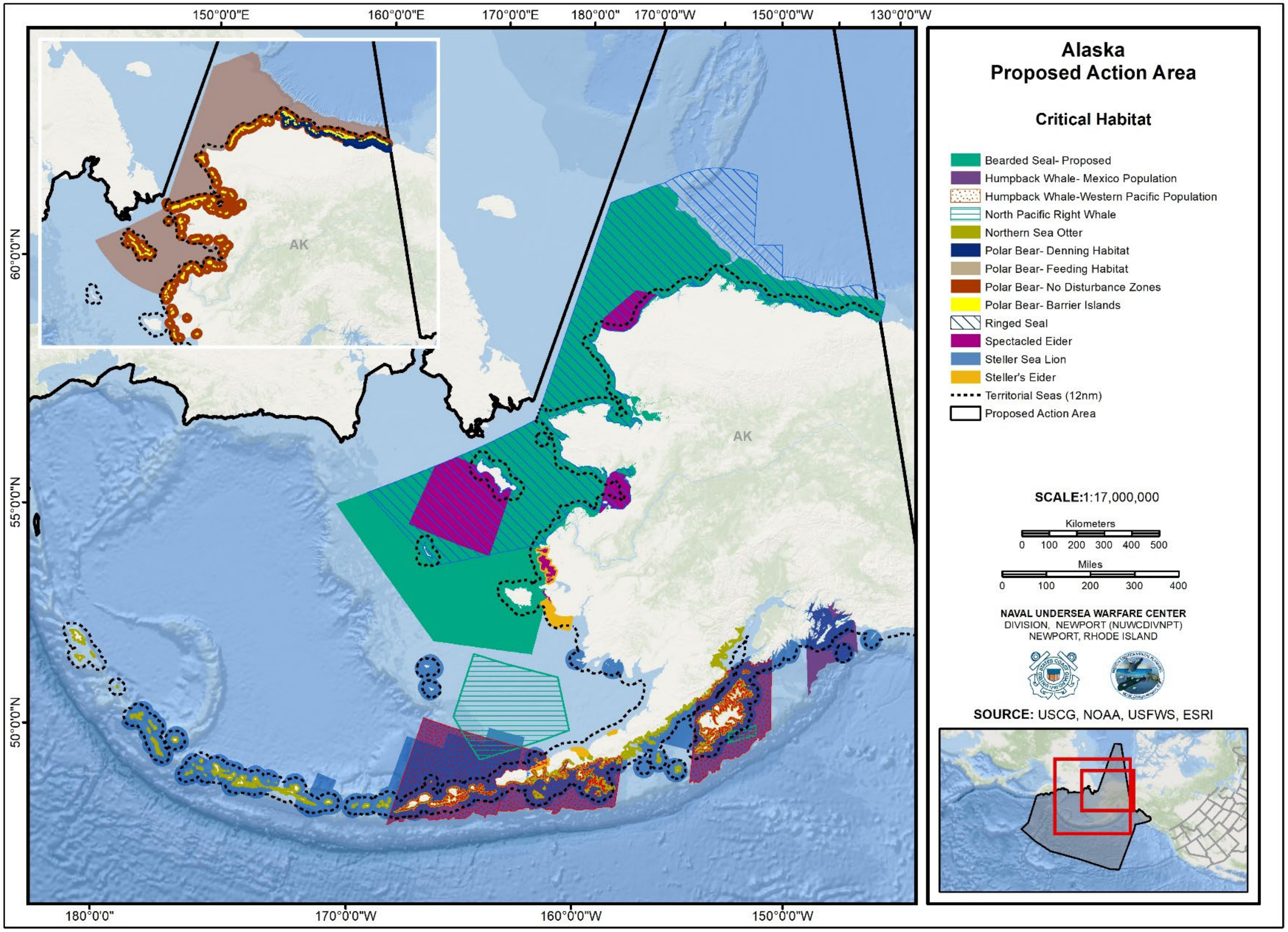


Figure 3-9. Critical Habitat within the AK Proposed Action Area

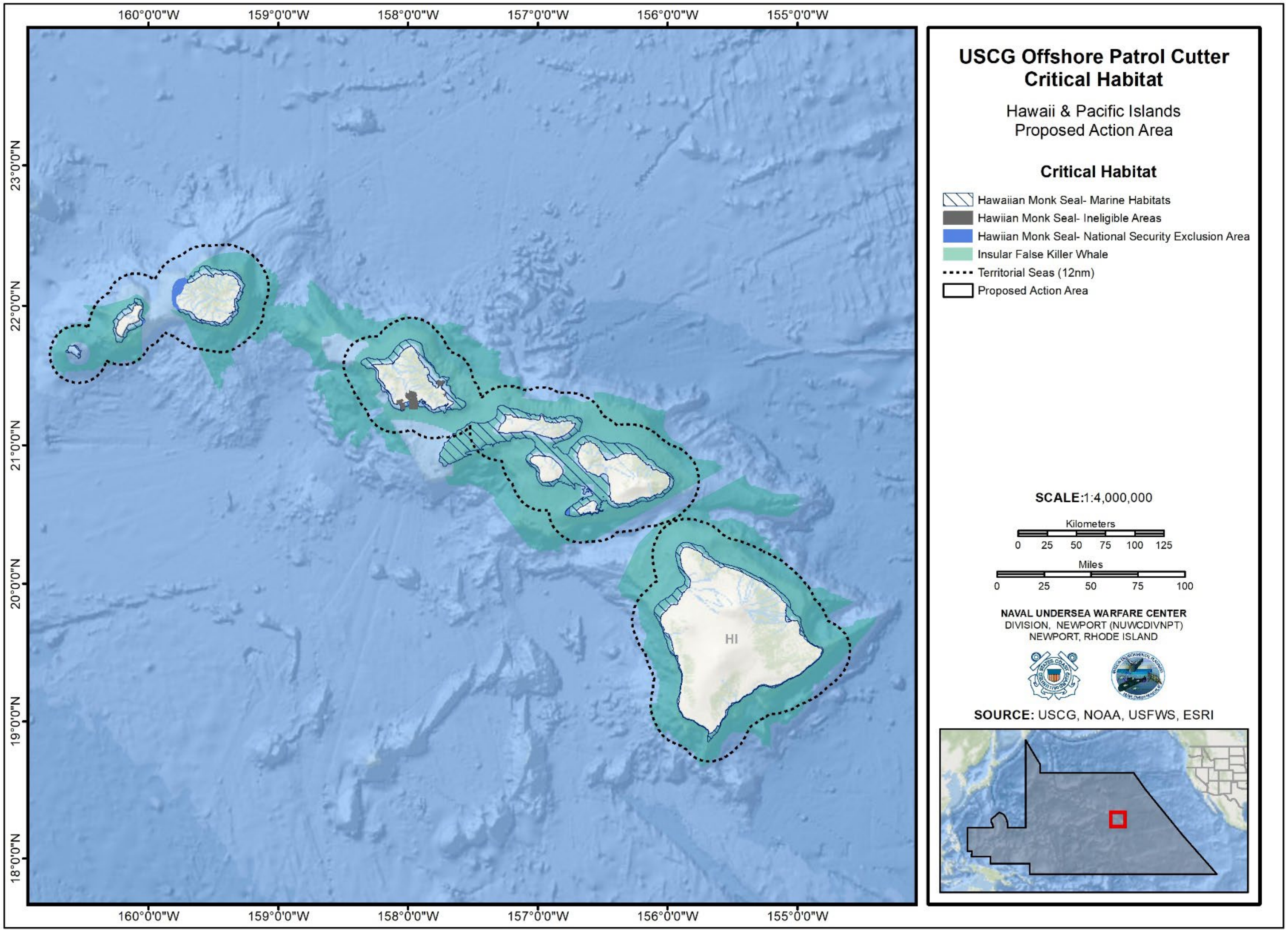


Figure 3-10. Critical Habitat within the HI-PAC Proposed Action Area

3.4.8.2 Environmental Consequences to Federally-Designated Critical Habitat

Much of the federally-designated critical habitat is located within 12 nm (22 km) of the coast, which would only be expected to overlap with an OPC as it transits to and from its respective homeport as part of the Proposed Action. This means that critical habitat for the ESA-listed black abalone, elkhorn coral, staghorn coral, *Acropora globiceps, A. jacquelineae, A. retusa, A. speciosa, Euphillia paradivisa, Isopora crateriformis, Seriatopora aculeate,* pillar coral, piping plover, Steller's eider, Western snowy plover, bocaccio, eulachon, green surgeon, Gulf sturgeon, smalltooth sawfish, steelhead trout, yelloweye rockfish, green sea turtle, hawksbill sea turtle, northern sea otter, and West Indian manatee would only be subject to the stressors of the Proposed Action during the transit of OPCs. Since the duration of these stressors is expected to be brief as OPCs transit through the critical habitats from a port to their operational area, there would not typically be any impact to PCEs or PBFs of the critical habitat as a result of fathometer and Doppler speed log noise, vessel noise, or vessel movement. These stressors would not cause the destruction or adverse modification of critical habitat in transit or operational areas, which includes critical habitat for the ESA-listed black abalone, elkhorn coral, *Orbicella annularis* complex coral, rough cactus coral, staghorn coral, piping plover, Steller's eider, Western snowy plover, bocaccio, eulachon, green surgeon, Gulf sturgeon, smalltooth sawfish, steelhead trout, yelloweye rockfish, green sea turtle, hawksbill sea turtle, northern sea otter, polar bear, and West Indian manatee.

Federally-designated critical habitat located in the OPC transit and operational areas, beyond 12 nm (22 km) from the coast, includes critical habitat for the ESA-listed spectacled eider, leatherback sea turtle, loggerhead sea turtle, humpback whale, North Atlantic right whale, North Pacific right whale, false killer whale, southern resident killer whale, bearded seal (proposed), Hawaiian monk seal, ringed seal, polar bear (feeding habitat), and Steller sea lion. Although critical habitat for all species would potentially overlap with OPC Proposed Action activities, these would cover the extent of the entire proposed action areas. Gunnery training would not occur within federally-designated critical habitat. Therefore, there would be no impact to critical habitat as a result of MEM.

3.4.8.3 Impacts Alternative 1 (Preferred Alternative)

Any potential impacts to critical habitat, in particular to PCEs or PBFs, were previously analyzed under Section 3.3 and 3.4. Therefore, any potential impacts to critical habitat under Alternative 1, from the fathometer and Doppler speed log noise, vessel noise, aircraft noise, gunnery noise, vessel movement, aircraft movement, and MEM associated with the Proposed Action would not result in significant impact or harm to critical habitat.

Under Alternative 1, the Proposed Action may affect, but is not likely to adversely affect federally-designated critical habitat for ESA-listed species (Table 3-25). Alternative 1 would not destroy or adversely modify the critical habitat features essential for the conservation of ESA-listed species (Table 3-25).

3.4.8.4 Impacts Under Alternatives 2–3

Under Alternatives 2–3, any potential impacts to critical habitat would be similar to those discussed for activities under Alternative 1. Under Alternatives 2–3, fathometer and Doppler speed log noise, vessel noise, aircraft noise, gunnery noise, vessel movement, aircraft movement, and MEM associated with the Proposed Action would not result in significant impact or harm to critical habitat.

Under Alternatives 2–3, the Proposed Action may affect, but is not likely to adversely affect federally-designated critical habitat for ESA-listed species (Table 3-25). Alternatives 2–3 would not destroy or adversely modify the critical habitat features essential for the conservation of ESA-listed species (Table 3-25).

3.4.8.5 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, the physical and acoustic impacts would not be introduced into the marine environment, with the exception of OPCs 1–5. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. No significant impact or harm to critical habitat would occur with implementation of the No Action Alternative. Under the No Action Alternative, there would be no effect to federally-designated critical habitat for ESA-listed species (Table 3-25) as a result of the Proposed Action.

3.4.9 Summary of Impacts to the Biological Environment

Impacts to the biological environment were analyzed for the fathometer and Doppler speed log noise, vessel noise, aircraft noise, gunnery noise, vessel movement, aircraft movement, and military expended materials associated with the Proposed Action. The analysis for biological resources under Alternative 1 and Alternatives 2–3 are detailed in Table 3-26. No significant impact or harm to the biological environment would occur with implementation of the No Action Alternative.

Table 3-26. Summary of Impacts to Biological Resources Under Alternative 1 and Alternatives 2-3

Biological Resource	***Impacts as a Result of Alternative 1***	***Impacts as a Result of Alternatives 2-3***	***Detailed Section***
Marine vegetation	No significant impact or harm	No significant impact or harm	Section 3.4.1.2
Marine invertebrates	No significant impact or harm	No significant impact or harm	Section 3.4.2.2
Birds (seabirds and shorebirds)	No significant impact or harm	No significant impact or harm	Section 3.4.3.2
Marine fish	No significant impact or harm	No significant impact or harm	Section 3.4.4.2 and Appendix G
Essential fish habitat	No significant impact or harm	No significant impact or harm	Section 3.4.5.2
Marine reptiles	No significant impact or harm	No significant impact or harm	Section 3.4.6.2
Marine mammals	No significant impact or harm	No significant impact or harm	Section 3.4.7.2

3.4.10 Summary of Impacts to ESA-Listed Species

Impacts to ESA-listed species were analyzed for the fathometer, vessel noise, aircraft noise, gunnery noise, vessel movement, aircraft movement, and military expended materials associated with the Proposed Action. The analysis for biological resources under Alternative 1 and Alternatives 2–3 are detailed in Table 3-27. No significant impacts to the biological environment would occur with implementation of the No Action Alternative. Under the No Action Alternative, there would be no change to baseline conditions that may affect ESA-listed species. Therefore, there would be no effect to ESA-listed species with implementation of the No Action Alternative. Although the Coast Guard offers a "may affect" determination (Table 3-27), this determination should be considered preliminary, since the consultation process under Section 7 of the ESA with NMFS and the USFWS has not been completed.

Table 3-27. Summary of Preliminary Effects Determination for ESA-Listed Species Under Alternative 1 and Alternatives 2-3

ESA-Listed Species	*Effect as a Result of Alternative 1*	*Effect as a Result of Alternatives 2-3*
ESA-Listed Marine Invertebrates		
Black abalone	NLAA	NLAA
White abalone	NLAA	NLAA
Chambered nautilus	NLAA	NLAA
Giant clam	NLAA	NLAA
Queen conch	NLAA	NLAA
Staghorn coral	NLAA	NLAA
Elkhorn coral	NLAA	NLAA
Acropora globiceps	NLAA	NLAA
Acropora jacquelineae	NLAA	NLAA
Acropora retusa	NLAA	NLAA
Acropora speciose	NLAA	NLAA
Euphyllia paradivisa	NLAA	NLAA
Isopora crateriformis	NLAA	NLAA
Orbicella annularis complex	NLAA	NLAA
Rough cactus coral	NLAA	NLAA
Pillar coral	NLAA	NLAA
Seriatorpora aculeate	NLAA	NLAA
Siderastea glynni	NLAA	NLAA
ESA-Listed Birds		
Band-rumped storm petrel	NLAA	NLAA
California least tern	NLAA	NLAA
Marbled murrelet	NLAA	NLAA
Newell's townsend's shearwater	NLAA	NLAA
Piping plover	NLAA	NLAA
Red knot	NLAA	NLAA
Roseate tern	NLAA	NLAA
Short-tailed albatross	NLAA	NLAA
Spectacled eider	NLAA	NLAA
Steller's eider	NLAA	NLAA
Western snowy plover	NLAA	NLAA
ESA-Listed Marine Fish		
Atlantic sturgeon	NLAA	NLAA
Bocaccio	NLAA	NLAA
Chinook salmon	NLAA	NLAA
Chum salmon	NLAA	NLAA
Coho salmon	NLAA	NLAA
Eulachon	NLAA	NLAA
Giant manta ray	NLAA	NLAA
Green sturgeon	NLAA	NLAA
Gulf sturgeon	NLAA	NLAA
Largetooth sawfish	NLAA	NLAA
Nassau grouper	NLAA	NLAA

ESA-Listed Species	*Effect as a Result of Alternative 1*	*Effect as a Result of Alternatives 2-3*
Oceanic whitetip shark	NLAA	NLAA
Scalloped hammerhead shark	NLAA	NLAA
Shortnose sturgeon	NLAA	NLAA
Smalltooth sawfish	NLAA	NLAA
Sockeye salmon	NLAA	NLAA
Steelhead trout	NLAA	NLAA
Yelloweye rockfish	NLAA	NLAA
ESA-Listed Marine Reptiles		
Green sea turtle	NLAA	NLAA
Hawksbill sea turtle	NLAA	NLAA
Kemp's ridley sea turtle	NLAA	NLAA
Leatherback sea turtle	NLAA	NLAA
Loggerhead sea turtle	NLAA	NLAA
Olive ridley sea turtle	NLAA	NLAA
ESA-Listed Marine Mammals		
Blue whale	NLAA	NLAA
Bowhead whale	NLAA	NLAA
Bryde's whale	NLAA	NLAA
Fin whale	NLAA	NLAA
Gray whale	NLAA	NLAA
Humpback whale	NLAA	NLAA
Right whale (North Pacific and North Atlantic)	NLAA	NLAA
Sei whale	NLAA	NLAA
False killer whale	NLAA	NLAA
Southern resident killer whale	NLAA	NLAA
Sperm whale	NLAA	NLAA
Bearded seal	NLAA	NLAA
Guadalupe fur seal	NLAA	NLAA
Hawaiian monk seal	NLAA	NLAA
Ringed seal	NLAA	NLAA
Steller sea lion	NLAA	NLAA
Sea otter	NLAA	NLAA
Polar bear	NLAA	NLAA
West Indian manatee	NLAA	NLAA

3.5 Socioeconomic Environment

Socioeconomic resources include those that provide economic value to the communities within the proposed action areas. For the Proposed Action, these industries are commercial fishing, marine construction, mineral extraction, oil and gas extraction, marine recreation and tourism, renewable energy, research, transportation and shipping, and subsistence.

These resources may be found nearshore (within 3 nm of shore), coastally (more than 3 nm offshore but less than 12 nm offshore), and offshore (more than 12 nm offshore). To evaluate the Proposed Action, the Coast Guard considered the area from shore to 12 nm as the area where an OPC would be expected to transit to and from its respective homeport to the operational area. The operational area of the OPC, therefore, would be defined as more than 12 nm from shore within each proposed action area. The

Coast Guard analyzed the patterns of existing and emerging ocean uses in the U.S. waters similar to D'Iorio et al. (2015), summarizing the overall footprint of marine uses throughout state (0–3 nm) and federal (3–200 nm) waters. The horizontal zones in D'Iorio et al. (2015) include many zones (e.g., shoreline, intertidal, nearshore, coastal, and oceanic). For the purposes of the analysis in this PEIS/POEIS, only nearshore, coastal, and oceanic zones are presented as reference points for the zones in which OPCs would be expected to transit or conduct operational activities. Table 3-28 provides an overview of how each socioeconomic resource (or ocean use) occupies various ocean spaces: from coastline to 3 nm, 3–12 nm from shore, and greater than 12 nm from shore.

Table 3-28. Socioeconomic Uses of the Proposed Action Areas by Distance from Shore

Socioeconomic Resource	***Transiting Area***		***Operational Area***
	Coastline to 3 nm	***3-12 nm From Shore***	***> 12 nm From Shore***
	Frequency of Occurrence		
Commercial Fishing			
Commercial fishing	sometimes	often	often
Marine Construction			
Marine construction	often	sometimes	rarely
Mineral Extraction			
Oil and Gas	often	often	often
Sand	often	sometimes	rarely
Marine Recreation and Tourism			
Non-commercial fishing (benthic fixed gear)	sometimes	often	rarely
Non-commercial fishing (benthic mobile gear)	sometimes	often	sometimes
Recreational fishing from boats (benthic species)	sometimes	often	sometimes
Recreational fishing from boats (pelagic species)	sometimes	often	sometimes
Recreational dive fishing	sometimes	sometimes	rarely
Kayak fishing	often	rarely	never
Recreational fishing from shore	always	never	never
Recreational intertidal harvest	always	never	never
Motorized boating	sometimes	often	rarely
Cruise travel	sometimes	often	sometimes
Paddling	often	sometimes	rarely
Sailing	sometimes	often	sometimes
Scuba/snorkeling	often	sometimes	rarely
Surface board sports	often	rarely	never
Swimming	often	rarely	never
Tide pooling	always	never	never
Wildlife viewing at sea	sometimes	often	sometimes
Renewable Energy			
Hydroelectric	always	never	never
Wind	rarely	often	rarely
Research			
Research cruises	rarely	sometimes	often
Transportation and Shipping			
Transportation	often	sometimes	rarely
Shipping	rarely	sometimes	often

Socioeconomic Resource	***Transiting Area***		***Operational Area***
	Coastline to 3 nm	***3-12 nm From Shore***	***> 12 nm From Shore***
	Frequency of Occurrence		
Subsistence			
Fishing	often	rarely	rarely
Hunting	often	rarely	rarely

NOAA provides a range of socioeconomic information along the U.S. Coast and in coastal waters. NOAA's Economics: National Ocean Watch (ENOW) data set (NOAA Office for Coastal Management 2020) details six economic sectors that depend on the oceans and Great Lakes, providing data for about 400 U.S. coastal counties, 30 coastal states, and 8 regions. The data set produced by NOAA's Office for Coastal Management (2005 and onward) using information from the Bureau of Labor Statistics and the Bureau of Economic Analysis. Available data allow six economic sectors to be broken out within the proposed action areas. These sectors are: marine construction, living resources, offshore mineral extraction, ship and boat building, tourism and recreation, and marine transportation. For the purposes of this analysis, these data were used to discuss the potential economic impact from the Proposed Action to marine construction, offshore mineral extraction, tourism and recreation, and marine transportation sectors. In some cases, quantitative economic data were not available for a particular socioeconomic resource discussed below. In addition, portions of the proposed action areas contain waters outside the purview of the United States and when ENOW data were used, these data did not include any contributions from foreign nations to the economic value of the proposed action area as a whole.

3.5.1 Commercial Fishing

3.5.1.1 Affected Environment

Commercial and recreational fisheries may take resources from some of the same stocks, most of which are managed by NOAA and regional entities, such as the regional fishery management councils. Determining whether a catch is considered a commercial or recreational depends on how the catch is used—if sold for profit at the port (e.g., to a processor), the catch would be considered commercial, while if the catch is retained by the fisher (e.g., self-caught or caught on a chartered trip), it would be considered recreational and is discussed in Section 3.5.5.1.4. Commercial fishing often targets more than one species with landings in multiple ports (depending on the season) to maximize economic return. As a result, the port where commercial catch is landed is not always representative of the body of water where the fish was caught.

Commercial fishing takes place throughout much of the proposed action areas, including waters adjacent to the mainland and offshore islands, waters of the continental slope and shelf, and deeper waters within the High Seas. Many different types of fishing gear are used by commercial fisherman in the proposed action areas, including gillnets, longline gear, troll gear, trawls, seines, traps or pots, harpoons, and hook and line (California Department of Fish and Wildlife 2015; NMFS 2009b). Fishing activities may be seasonal and could occur at varying degrees of intensity and duration throughout the year.

Commercial fishing occurs in federally-managed waters (3–200 nm) and within state waters (out to 3 nm, or 9 nm for the Gulf Coast of Texas and Florida). Each state's natural resources or wildlife management department manages fisheries in state waters using an organizational structure similar to the structure used by federal managers. In federal waters, NMFS regulates commercial fisheries in cooperation with regional fishery management councils. The Coast Guard enforces laws applicable to the U.S. commercial fishing fleet and works in collaboration with NOAA's Office of Law Enforcement who enforces domestic laws and international treaty requirements designed to ensure global fisheries resources are maintained at healthy levels for the future. As part of that effort, NMFS assesses the status of fisheries stocks to assist marine resources managers in maintaining sustainable fisheries as well as healthy ecosystems and productive coastal communities.

The regional management of fisheries allows participation by knowledgeable individuals with a stake in fishery management. Eight regional fishery management councils are responsible for developing FMPs for the fisheries in their jurisdiction. Regional NMFS offices manage these species and engage stakeholders and governmental groups in the management of these species at both domestic and international levels. Within each region, the FMPs focus on the status of the fishery in waters seaward of state waters. Nationwide, 44 FMPs provide a framework for managing the harvest of 230 major fish stocks or stock complexes (Section 3.4.5) that make up roughly 90 percent of the commercial harvest. Highly migratory species (e.g., tunas, swordfish, sharks, and billfish) have been designated in fisheries regulations, are found throughout the Atlantic and Pacific Oceans and in the Gulf of Mexico, and migrate across council jurisdictional boundaries.

The NMFS Office of Science and Technology maintains commercial landing data derived from comprehensive surveys of all coastal states' landings (NMFS 2018c). The number of pounds of fish caught in the United States has been roughly steady for the last two decades. Both the total catch and total value of the catch has trended gradually upwards, while value per pound has remained roughly stable at $0.50–$0.55 per pound (NMFS 2018c). Commercial fisheries landings by year are shown in Table 3-29 and are provided by weight (in pounds [lbs]) and by value (in U.S. dollars [USD]).

Table 3-29. U.S. Commercial Fisheries Landings by Year, 2008–2017

Total U.S. Commercial Landings of Fish and Shellfish		
Year	***Landings by Weight (in Millions of Lbs)***	***Landings by Value (in Millions USD)***
2008	8,325	$4,383
2009	8,031	$3,891
2010	8,231	$4,520
2011	9,858	$5,289
2012	9,634	$5,103
2013	9,870	$5,466
2014	9,486	$5,448
2015	9,718	$5,203
2016	9,572	$5,312
2017	9,916	$5,421

Table 3-30 breaks down U.S. commercial fisheries landings by proposed action area. State-based data from NMFS (NMFS 2018c) were sorted by proposed action area. NMFS provides a split for Florida, allowing the Florida catch to be partitioned to the appropriate GoMEX or NW-ATL-Florida and the Caribbean proposed action area. NMFS does not provide a division of the data for the state of California; therefore, California catch data is included only in the NEPAC-North proposed action area, although some of the catch is landed in Southern California ports, which are in the NEPAC-South proposed action area. Data from Mexico (Martínez-Estrada et al. 2017) is included in Table 3-30 for reference because most of the fish caught in the NEPAC-South proposed action area are likely landed in Mexico (a majority of NEPAC-South proposed action area extends into Mexico) and Mexican commercial fisheries are dependent primarily on fishing grounds within this proposed action area. Mexico's total landings are roughly one third of those for the United States, and the vast majority of this arrives at ports in the Gulf of California or on the Pacific Ocean (Martínez-Estrada et al. 2017; McEachran and Fechhelm 2005).

The AK proposed action area is responsible for the vast majority of the total catch landed in the United States, accounting for over 60 percent of the catch by volume in 2017, followed by New England and the Gulf of Mexico (NMFS 2018c). The NW-ATL-Florida and the Caribbean and HI-PAC proposed action areas have the smallest total landings, with catch in these regions representing less than 0.5 percent of total U.S. catch by volume. These areas comprise a smaller portion of the U.S. EEZ, which accounts for their lower contribution; however, commercial fishing remains an important industry in portions of these proposed action areas, particularly for the islands of Hawaii, the Pacific, and the Caribbean. In terms of value per pound, the NW-ATL proposed action area leads by a long margin, and it is the only region with a value exceeding $1 per pound, propelled by high value species such as American lobster (*Homarus americanus*) and sea scallop (*Placopecten magellanicus*) (NMFS 2018c).

Table 3-30. Total Commercial Landings by State and Proposed Action Area

Proposed Action Area	*2016 Landings*		*2017 Landings*	
	Thousands of Lbs	*Thousands USD*	*Thousands of Lbs*	*Thousands USD*
NW-ATL	***1,247,634***	***$1,995,997***	***1,254,309***	***$1,896,924***
Connecticut	12,369	$15,086	10,118	$13,717
Delaware	4,980	$10,097	4,729	$9,140
Georgia	6,357	$11,886	9,416	$16,834
Maine	247,947	$633,675	208,677	$511,315
Maryland	56,316	$94,644	48,281	$77,403
Massachusetts	244,304	$552,175	242,137	$605,250
New Hampshire	7,926	$33,480	10,621	$35,011
New Jersey	123,607	$193,013	198,602	$190,549
New York[1]	29,155	$47,726	24,741	$47,767
North Carolina	59,330	$94,386	62,587	$97,306
Rhode Island	82,541	$93,869	84,108	$100,768
South Carolina	15,833	$24,645	15,744	$25,495
Virginia	363,326	$203,201	343,964	$183,203
NW-ATL-Florida and the Caribbean	***28,447***	***$69,810***	***35,914***	***$93,224***
Florida[2]	28,447	$69,810	34,185	$83,816
Puerto Rico	not available	not available	956	$4,267
U.S. Virgin Islands	not available	not available	773	$5,141
GoMEX	***1,716,140***	***$856,946***	***1,385,574***	***$855,590***
Alabama	24,869	$50,797	31,396	$64,532
Florida[2]	69,127	$178,894	64,859	$182,359

Proposed Action Area	*2016 Landings*		*2017 Landings*	
	Thousands of Lbs	*Thousands USD*	*Thousands of Lbs*	*Thousands USD*
Louisiana	1,244,403	$407,222	890,575	$354,301
Mississippi	304,054	$29,405	311,027	$30,425
Texas	73,687	$190,628	87,717	$223,973
Mexico[3] (est.)	645,597	$347,600	644,732	$347,000
NEPAC-North	***937,749***	***$688,922***	***1,177,043***	***$670,651***
California[4]	176,403	$216,139	214,663	$209,846
Oregon	209,486	$151,711	296,485	$147,058
Washington	551,860	$321,072	665,895	$313,747
NEPAC-South	***176,403***	***$216,139***	***214,663***	***$209,846***
California[4]	176,403	$216,139	214,663	$209,846
Mexico[3]	2,582,390	$1,390,400	2,578,927	$1,388,000
AK	***5,585,905***	***$1,550,840***	***6,004,883***	***$1,764,462***
HI-PAC	***35,051***	***$118,134***	***41,808***	***$122,400***
American Samoa	NA	NA	4,224	$4,929
CNMI	NA	NA	92	$263
Guam	NA	NA	330	$840
Hawaii	35,051	$118,134	37,162	$116,368
Total, United States	***9,522,479***	***$5,210,839***	***9,863,617***	***$5,310,027***
Total, Mexico	***3,227,987***	***$1,738,000***	***3,223,659***	***$1,735,000***

[1] Landings data for New York excludes landings from the Great Lakes region.
[2] Landings data for Florida was split into the GoMEX and NW-ATL-Florida and the Caribbean proposed action areas.
[3] Landings data for Mexico was estimated based on data in (Melgoza-Rocha et al. 2018). Estimated Mexican landings not included in the proposed action area subtotals.
[4] Landings data for California was included only in the NEPAC-North proposed action area.
NA = not available

Landings can be further subdivided by port. Based on the landings of the top 50 ports in each proposed action area (Table 3-31), the AK proposed action area has the greatest landings by weight and volume, followed by the GoMEX and NW-ATL proposed action areas. The greatest number of top ports in the United States (by both metrics) are in the NW-ATL proposed action area.

Table 3-31. Landings in Each Proposed Action Area (Based on the Top 50 Port Landings)

Proposed Action Area	*Percentage of Ports in the Top 50 (by Weight)*	*Weight Total (Millions of Lbs)*	*Percentage of Ports in the Top 50 (by Value)*	*Value Total (Millions USD)*
NW-ATL	32%	905	28%	$939
NW-ATL-Florida and the Caribbean	2%	15	2%	$58
GoMEX	24%	984	24%	$564
NEPAC-North	10%	448	14%	$259
NEPAC-South	4%	134	4%	$79
AK	26%	2,782	26%	$1,119
HI-PAC	2%	34	2%	$104

The top ports in the United States for landings by weight and by value are listed in Table 3-32. While the AK proposed action area has the greatest total weight and value, the port of New Bedford, Massachusetts lands twice the value of the next highest port in terms of value (Dutch Harbor, Alaska), despite not reaching the top 10 when ranked by weight. In the NW-ATL-Florida and the Caribbean and HI-PAC proposed action areas, only Key West, Florida and Honolulu, Hawaii make the top 50 ranking, and no ports in the U.S. territories in these two proposed action areas make the list.

Table 3-32. Top U.S. Ports for Commercial Fisheries Landings by Proposed Action Area

Port	Landings by Weight (Millions of Lbs)		Port	Landings by Value (Millions USD)
NW-ATL Proposed Action Area				
Reedville, VA	320		New Bedford, MA	$390
New Bedford, MA	111		Cape May/Wildwood, NJ	$81
Cape May/Wildwood, NJ	102		Hampton Roads Area, VA	$58
NW-ATL-Florida and the Caribbean Proposed Action Area				
Key West, FL	15		Key West, FL	$58
GoMEX Proposed Action Area				
Pascagoula/Moss Point, MS	301		Empire/Venice, LA	$100
Empire/Venice, LA	294		Brownsville/Port Isabel, TX	$63
Intracoastal City, LA	198		Bayou La Batre, AL	$59
NEPAC-North Proposed Action Area				
Astoria, OR	151		Westport, WA	$64
Westport, WA	150		Newport, OR	$53
Newport, OR	112		Astoria, OR	$40
NEPAC-South Proposed Action Area				
Port Hueneme/Oxnard/Ventura, CA	91		Port Hueneme/Oxnard/Ventura, CA	$53
Los Angeles, CA	43		Los Angeles, CA	$26
AK Proposed Action Area				
Dutch Harbor, AK	769		Dutch Harbor, AK	$173
Aleutian Islands (Other), AK	552		Naknek, AK	$154
Kodiak, AK	530		Kodiak, AK	$152
Alaska Peninsula (Other), AK	268		Alaska Peninsula (Other), AK	$112
Naknek, AK	187		Aleutian Islands (Other), AK	$106
HI-PAC Proposed Action Area				
Honolulu, HI	34		Honolulu, HI	$104

VA = Virginia; MA = Massachusetts; NJ = New Jersey; FL = Florida; MS = Mississippi; LA = Louisiana; TX = Texas; AL = Alabama; OR = Oregon; WA = Washington; CA = California; AK = Alaska; HI = Hawaii

Landings that depend on weight versus value produce similar rankings, but depending on the species landed in each port, they may be different. Landings can also be categorized by the species caught. Table 3-33 shows the top commercial finfish species landed in the United States. This data has not been sub-divided by proposed action area because doing so would not provide an accurate picture of where fish are caught. For example, tremendous quantities of fish are landed at ports such as Dutch Harbor, AK and New Bedford, Massachusetts, which cannot possibly be supported exclusively by local fish stocks (Table 3-32). Fishing vessels, particularly larger commercial vessels, often travel hundreds or even thousands of miles away from their homeports to fish. Therefore, the national level data has been retained as it was presented by NMFS (NMFS 2018c).

Table 3-33. Top Ten Commercially Landed Species by Weight and Value

Ranking	*Species*	*2017 Landings by Weight (Thousands of Lbs)*	*Species*	*2017 Landings by Value (Thousands USD)*
1	Pollock (all)	3,395,783	Salmon, Pacific	$687,770
2	Menhaden	1,413,104	Crabs (all)	$610,377
3	Salmon, Pacific	1,008,198	Lobsters	$593,874
4	Hakes	791,027	Shrimp (all)	$530,977
5	Cod	659,178	Scallops	$511,945
6	Flatfish, Pacific	528,620	Pollock (all)	$419,425
7	Shrimp (all)	283,272	Cod	$160,815
8	Crabs (all)	274,578	Tuna (all)	$154,392
9	Squid (all)	207,409	Sablefish	$143,424
10	Sea Herring	181,794	Halibut (all)	$125,785

The largest commercial landings among finfish species groups are gadoids (e.g., cod, haddock, and pollock) followed by clupeids (e.g., menhaden, alewife, and herring), Pacific salmon, and hakes, comprising roughly 45, 17, 12, and 7 percent of the total finfish caught, respectively. Apart from salmon, these species are generally low value, commanding prices between $0.1 and $0.25 per pound. The groups generating the most landings value are Pacific salmonids, followed by pollock, tuna, sablefish, and halibut. Salmon achieves its position at the top of the economic value pyramid through a combination of high landings (over one billion pounds per year) and moderate price (roughly $0.70 per pound). Pollock is the second highest revenue generator due to having the largest landings by weight (3.3 billion pounds). Tuna, sablefish, and halibut are also high value species, which, despite comparatively modest landings, are economically important because their price per pound is in excess of ten times the average price for all species. Shellfish, despite making up only about 11 percent of the total catch by volume, are responsible for more than half (53 percent) of the value. For shellfish, squid have the third largest landings by weight, but they account for only 4 percent of landings by value. These differences in species' value likely result in the different ranking of port landings in Table 3-32 when species are ranked by weight versus value.

3.5.1.2 Environmental Consequences to Commercial Fishing

The predominant socioeconomic impact of the Proposed Action would potentially result from an increase in Coast Guard presence in the proposed action areas. Coast Guard missions supported by the OPC that would benefit commercial fisheries include law enforcement, living marine resources, marine safety, and SAR. OPC assets would support the prevention of over-fishing, reduction in mortality of protected species, and protection of marine habitats by enforcing domestic fishing laws and regulations (LMR); enforcement of foreign fishing vessel laws (OLE); patrolling the U.S. EEZ boundary areas to reduce the threat of foreign poaching of U.S. fish stocks (OLE); and monitoring compliance with international living marine resource regimes and international agreements OLE); and deterring and enforcement efforts to eliminate fishing using large drift-nets (OLE, LMR). Coast Guard would also support mariners, including commercial fishermen should an emergency arise; however, an emergency response is not covered under the Proposed Action. Additionally, outreach and educational programs conducted by the Coast Guard within the proposed action areas would facilitate communication between Coast Guard and the people they serve.

Conversely, potential negative impacts to commercial fishing would be indirect impacts to fish from fathometer and Doppler speed log noise, vessel noise, vessel movement, and MEM associated with the

Proposed Action. As discussed in Section 3.4.4.2, there would be no significant impact or harm to commercial fishing. Coast Guard would follow SOPs (Appendix C) to mitigate potential impacts to commercial fishing activities that may occur near OPC trainings and operations.

3.5.1.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to commercial fishing as a result of Alternative 1.

3.5.1.2.2 Impacts Under Alternatives 2–3

Similar to Alternative 1, under Alternatives 2–3, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to commercial fishing as a result of Alternatives 2–3.

3.5.1.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, with the exception of OPCs 1–5, Coast Guard offshore presence could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the offshore environment could decrease. However, there would be no significant impact or harm to commercial fishing with implementation of the No Action Alternative.

3.5.2 Marine Construction

3.5.2.1 Affected Environment

Marine construction may include nearshore projects, such as the construction of marinas, port improvements (including channel dredging and pier or seawall construction), and beach renourishment. Offshore marine construction projects may include the construction of oil and gas platforms, pipelines, and wind turbines.

In this PEIS/POEIS, oil and gas are discussed in Section 3.5.4. Renewable energy (e.g., wind turbines) is discussed in Section 3.5.6. The major ports for transportation and shipping are discussed in Section 3.5.8. The development of coastal areas typically relates to tourism, which is discussed in Section 3.5.5.

In terms of economics, ENOW describes six economic sectors that depend on the oceans, including marine construction. The marine construction information was gathered from 2005 to 2017 and uses data from the Bureau of Labor Statistics and the Bureau of Economic Analysis (NOAA Office for Coastal Management 2020). Table 3-34 shows the impact of the marine construction industry in coastal counties on states' employment and gross domestic product (GDP). Values in the table are compiled from averages over the 2005 through 2017 data collection period for this data in order to provide a conservative estimate of the impact marine construction has on the economy as it fluctuates over time. In some cases, counties or states did not have values to report; therefore, these data were excluded from the averages.

Table 3-34. Economic Influence of Marine Construction by Proposed Action Area

Proposed Action Area	*Business Establishments**	*Employment**	*Annual Wages* (in million USD)*	*GDP* (in million USD)*
NW-ATL	1,077	11,726	$773.0	$1,470
NW-ATL-Florida and the Caribbean[1]	379	4,161	$217.4	$463.8
GoMEX[2]	499	126,413	$548.5	$986.7
NEPAC-North	352	5,892	$471.0	$903.8
NEPAC- South[3]	157	3,524	$274.8	$539.8
AK	43	485	$44.9	$80.5
HI-PAC	33	689	$63.6	$124.9

* Values are averages across the states and/or counties (roughly within the proposed action areas) as reported from 2005–2017.
[1] NW-ATL-Florida and the Caribbean proposed action area only includes counties in Florida on the East Coast.
[2] GoMEX proposed action area includes the counties in Florida on the West Coast.
[3] NEPAC-South includes only the counties in southern California.

In terms of GDP, the NW-ATL proposed action area sees the greatest economic benefit from marine construction projects, followed by the GoMEX proposed action area, and the NEPAC-North proposed action area. Marine construction benefits these regions not only by providing employment and wages to residents, but also by drawing in consumers. Likely, as coastal marine construction is typically related to projects such as port improvements, beach renourishment, and the development of marinas, consumers could be businesses in the tourism (Section 3.5.5) and transportation and shipping (Section 3.5.8) sectors.

It should be noted that portions of many of the proposed action areas are located outside of the United States. In OPC operational areas within foreign EEZs, marine construction would likely also occur. In most locations, the projects would be similar to those in the United States. While exact economic impact values are not available for Russia (AK proposed action area), Canada (NEPAC-North proposed action area), the West Coast of Mexico (NEPAC-South proposed action area), the Pacific Islands (HI-PAC proposed action area), or the portions of Mexico and Central America and the Caribbean islands (NW-ATL-Florida and the Caribbean proposed action area), it should be assumed that the values presented in Table 3-34 for these proposed action areas would increase due to the additional marine construction occurring coastally in foreign EEZs.

3.5.2.2 Environmental Consequences to Marine Construction

The predominant socioeconomic impact of the Proposed Action would potentially result from an increase in Coast Guard presence in the proposed action areas. Coast Guard missions supported by the OPC that would benefit marine construction include ports, waterways, and coastal security; marine safety; and SAR. OPC assets would support port security patrols and surveillance of port approaches (PWCS). Coast Guard would support marine construction workers, should an emergency arise; however, an emergency response is not covered under the Proposed Action. Additionally, outreach and educational programs conducted by the Coast Guard within the proposed action areas would facilitate communication between Coast Guard and the people they serve. Coast Guard would follow SOPs (Appendix C) to mitigate any potential impacts to marine construction activities that may occur near OPC trainings and operations. As a result, there would be no significant impact or harm to marine construction as a result of the Proposed Action.

3.5.2.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to marine construction as a result of Alternative 1.

3.5.2.2.2 Impacts Under Alternatives 2–3

Similar to Alternative 1, under Alternatives 2–3, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to marine construction as a result of Alternatives 2–3.

3.5.2.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, with the exception of OPCs 1–5, Coast Guard offshore presence could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the offshore environment could decrease. However, there would be no significant impact or harm to marine construction with implementation of the No Action Alternative.

3.5.3 Mineral Extraction

3.5.3.1 Affected Environment

Until recently, sand was extracted from terrestrial areas, primarily in land quarries and riverbeds; however, a shift to marine and coastal aggregates mining has occurred due to the decline of terrestrial resources (Peduzzi 2014). Globally, the United States is the top producer of sand and is also the top exporter. The United States also imports sand, and was amongst the top twelve importers worldwide from 2010 through 2014 (Gavriletea 2017). In the United States, the federal Outer Continental Shelf (OCS) represents a source of industrial minerals and materials (e.g., titanium, phosphate), as well as sand and gravel. These resources are under the jurisdiction of the Minerals Management Service, a bureau within the U.S. Department of the Interior. The Bureau of Ocean Energy Management (BOEM) leases areas (Figure 3-11, Figure 3-12, and Figure 3-13) within the OCS containing sand, gravel, or shell resources (Drucker et al. 2004). Offshore sand and gravel extraction is performed by one of two methods of suction dredging. Marine aggregates (naturally occurring sediment deposits found coastally or on the OCS) are used mostly in the construction industry (Section 3.5.2), but also for beach replenishment and shore protection, land reclamation, and in other fill-related uses (Garel et al. 2009).

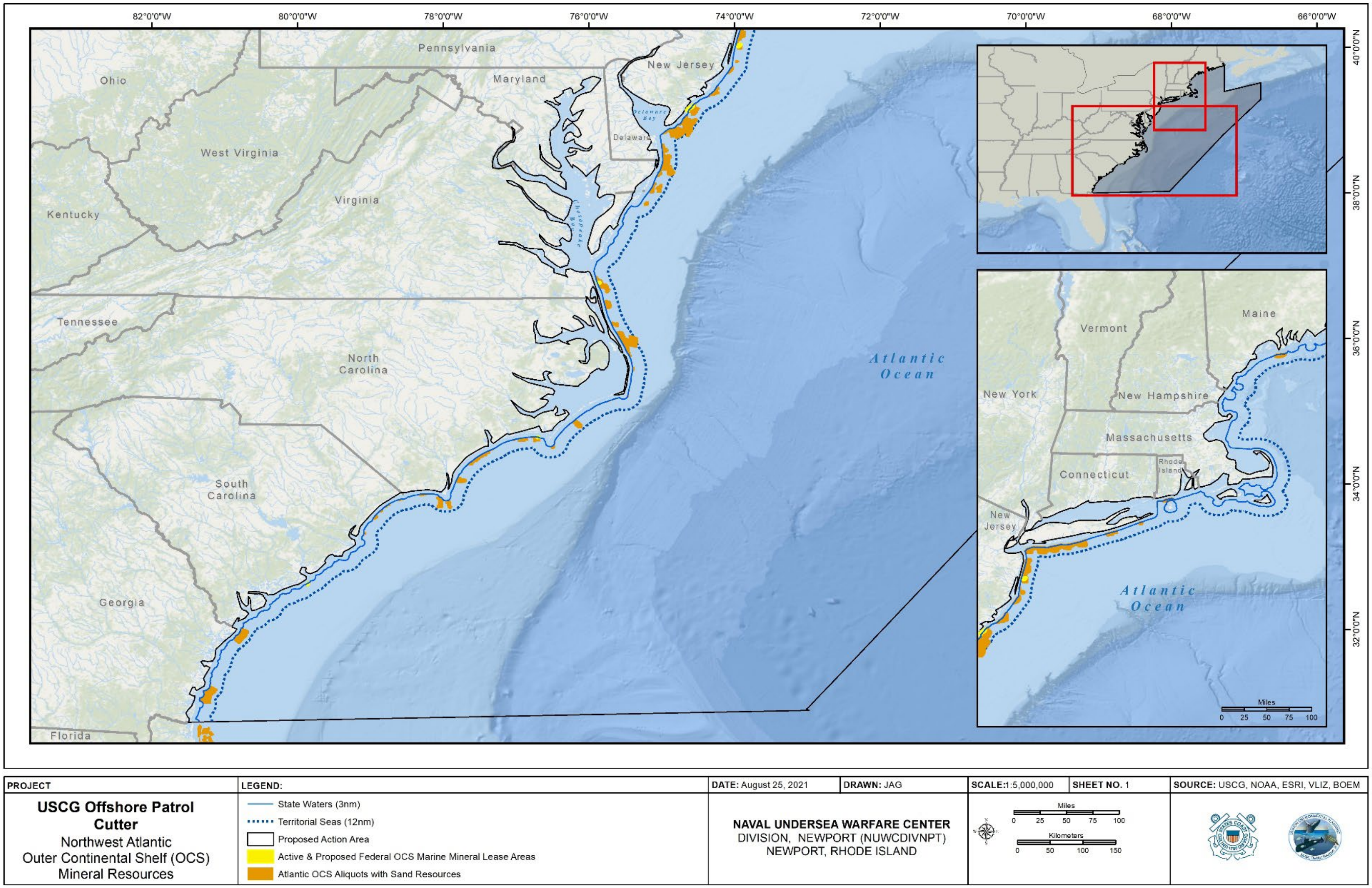


Figure 3-11. Mineral Lease Areas in the NW-ATL Proposed Action Area

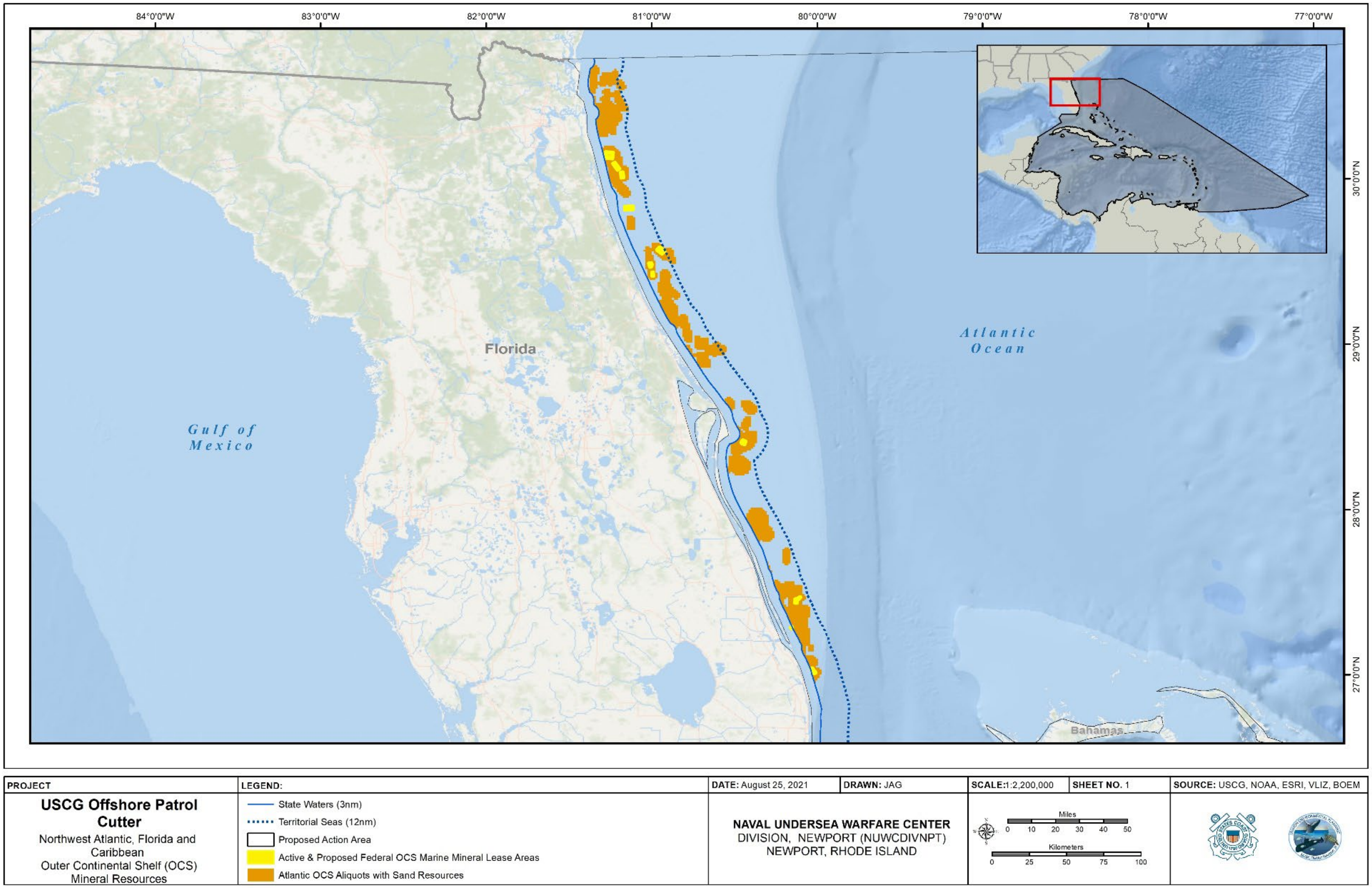


Figure 3-12. U.S. Mineral Lease Areas in the NW-ATL-Florida and the Caribbean Proposed Action Area

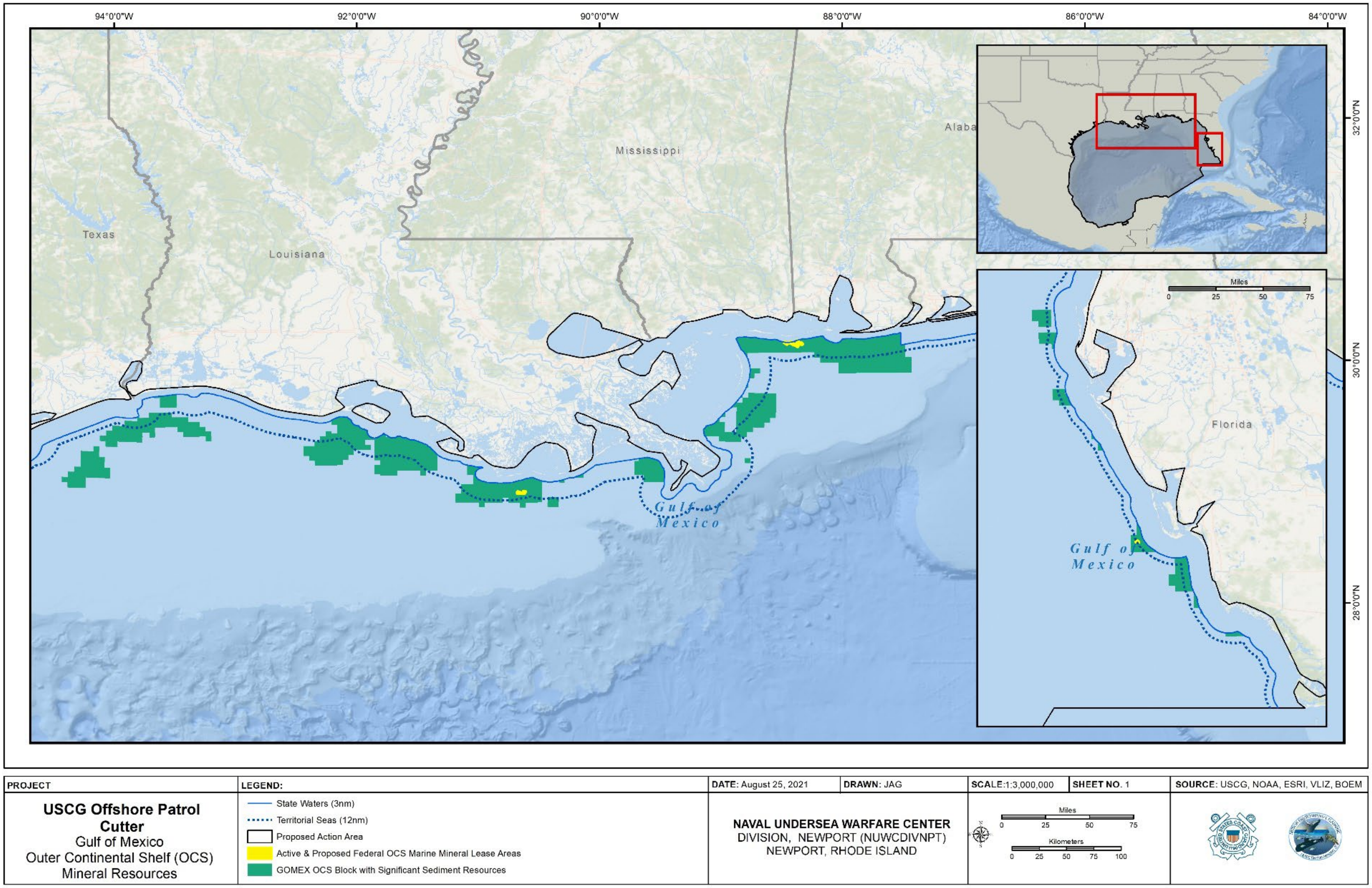


Figure 3-13. Mineral Lease Areas in the GoMEX Proposed Action Area

The identification of marine aggregate resources is based on both research and offshore prospecting surveys (Garel et al. 2009), such as those conducted by BOEM on the Atlantic continental shelf in the wake of Hurricane Sandy. Garel et al. (2009) state that, in 2002, the U.S. extracted 254 million cubic ft (ft^3; 7.2 million cubic meters [m^3]) of sand from the continental shelf. According to BOEM, the bulk of mineral extraction areas are within roughly 12 nm of the coast of the United States (Figure 3-11, Figure 3-12, and Figure 3-13).

In terms of economics, the ENOW describes marine extraction as that of oil and gas and sand and gravel. Table 3-35 shows the impact of the marine extraction industry in coastal counties on states' employment and GDP. Values in the table are compiled from averages over the 2005 through 2017 data collection period for this data in order to provide a conservative estimate of the impact marine extraction has on the economy as it fluctuates over time. In some cases, counties or states did not have values to report; therefore, these data were excluded from the averages. Oil and gas extraction occurs in only a few of the proposed action areas: the GoMEX, AK, and the NEPAC-South proposed action areas. Therefore, in the remaining areas, the economic impact can be inferred to be only from the extraction of sand and gravel, rather than a combination of sand and gravel and oil and gas.

Table 3-35. Economic Influence of Mineral Extraction by Proposed Action Area

Proposed Action Areas	*Business Establishments**	*Employment**	*Annual Wages* (in million USD)*	*GDP* (in million USD)*
NW-ATL	539	3,104	$194.9	$665.4
NW-ATL-Florida and the Caribbean[1]	134	443	$20.1	$55.8
GoMEX[2,4]	878	291,712	$2,050	$10,070
NEPAC-North	242	2,283	$148.8	$427.3
NEPAC-South[3,4]	257	3,081	$261.6	$916.2
AK[4]	159	11,959	$1,460	$11,900
HI-PAC	11	121	$11.4	$34.4

* Values are averages across the states and/or counties (roughly within the proposed action areas) as reported from 2005–2017.
[1] Florida and the Caribbean only includes the East Coast Florida counties.
[2] Gulf of Mexico includes the counties in Florida on the West Coast.
[3] Northeast Pacific-South includes only the counties in southern California.
[4] Totals include extraction of not only sand and gravel, but also oil and gas.

The regions in the United States with the highest levels of mineral extraction are the GoMEX and AK proposed action areas, followed closely by the NEPAC-South proposed action area—all regions where multiple resources are extracted. The NW-ATL and NEPAC-South proposed action areas lead the regions that have historically had the highest rates of sand and gravel extraction.

It should be noted that portions of many of the proposed action areas are located outside of the United States. In the waters within foreign EEZs where the OPC would operate, mineral extraction would likely also occur. While exact economic impact values are not available for Russia (AK proposed action area), Canada (NEPAC-North proposed action area), the West Coast of Mexico (NEPAC-South proposed action area), the Pacific Islands (HI-PAC proposed action area), or the portions of Mexico and Central America and the Caribbean Islands (NW-ATL-Florida and the Caribbean proposed action area), it should be assumed that the values presented in Table 3-35 for these proposed action areas would increase due to the additional mineral extraction that may occur in these foreign EEZs.

The NEPAC-South proposed action area includes southern California and the West Coast of Mexico. In 2003, the Los Angeles Times stated that U.S. firms estimate that anywhere from 10 to 40 percent of the sand and gravel used in southern California was imported from Mexico (Gorman 2003). However, most of the sand mined in Baja California comes from riverbeds, rather than the ocean (Gorman 2003). In the Canadian portion of the NEPAC-North proposed action area, sand and gravel is the third largest non-metal commodity by value (roughly 1,900 million Canadian dollars in 2018) and volume (about 216,799 tonnes in 2018). Oil and gas extraction, however, are not extracted in the Canadian waters of NEPAC-North (Natural Resources Canada 2019). In the HI-PAC proposed action area, aggregate mining of sand, rubble, gravel, rock, shells, and reef materials occurs in waters less than 25 m deep (Tuqiri 2001) in Kiribati, the Federated States of Micronesia, and American Samoa (Seidel and Lal 2010). These aggregates are used for cement manufacture, building material, or fill (The World Bank 2000). The economic value of mining to these island communities is difficult to estimate as much of the mining is done on a small scale (i.e., manually by households), though some is done industrially by companies (Seidel 2010). In Kiribati, it is estimated that 2,472,027 ft^3 (70,000 m^3) of aggregates are being mined coastally for housing projects (Greer Consulting Services 2007). As roughly 2 percent of mining is done by non-residents, the economic value is low (Seidel and Lal 2010).

In the Caribbean islands (part of the NW-ATL-Florida and the Caribbean proposed action area), there are mining operations for a variety of products. While it is unknown what volume of extraction occurs in marine versus terrestrial areas, Table 3-36 presents commodities mined for on a number of the Caribbean islands, according to a U.S. Geological Service report (Wacaster 2010). It should be noted that every foreign EEZ in the NW-ATL-Florida and the Caribbean proposed action area was not included in this report, but the countries included are listed in Table 3-36. While the value added to the economy for each area is not available, the report does state that the percentage of gross value added to the economy of the Bahamas, where only salt and stone are mined, was just 0.4 percent from the mining sector in 2007. On islands, such as the Dominican Republic, where far more products are mined, it is assumed this percentage would be greater than that of the Bahamas.

Table 3-36. Caribbean Island Mining Operations in 2007 (Wacaster 2010)

Caribbean Island	*Natural Gas*	*Petroleum*	*Sand and Gravel*
Aruba	-	x	-
Bahamas	-	-	-
Barbados	x	x	x
Dominican Republic	-	x	x
Guadalupe	-	-	-
Haiti	-	-	x
Jamaica	-	-	x
Martinique	-	-	-
Netherlands Antilles	-	-	-
St. Kitts and Nevis	-	-	x
Trinidad and Tobago	x	-	-

3.5.3.2 Environmental Consequences to Mineral Extraction

The predominant socioeconomic impact of the OPC program would potentially result from an increase in Coast Guard presence in the proposed action areas. Replacement of the aging MEC fleet would facilitate the Coast Guard's ability to support their missions offshore. Coast Guard missions that would benefit mineral extraction include marine safety and SAR. Coast Guard would also support workers on vessels or oil and gas platforms, should an emergency arise; however, an emergency response is not covered under the Proposed Action. Additionally, outreach and educational programs conducted by the Coast Guard within the proposed action areas would facilitate communication between Coast Guard and the communities that they serve. Coast Guard would follow SOPs (Appendix C) to mitigate potential impacts to mineral extraction activities that may occur near OPC trainings and operations. As a result, there would be no significant impact or harm to mineral extraction as a result of the Proposed Action.

3.5.3.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to mineral extraction as a result of Alternative 1.

3.5.3.2.2 Impacts Under Alternatives 2–3

Similar to Alternative 1, under Alternatives 2–3, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to mineral extraction as a result of Alternatives 2–3.

3.5.3.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, with the exception of OPCs 1–5, Coast Guard offshore presence could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the offshore environment could decrease. However, there would be no significant impacts to mineral extraction with implementation of the No Action Alternative.

3.5.4 Oil and Gas Extraction

3.5.4.1 Affected Environment

Oil and gas production is a major contributor to daily life and the U.S. economy. In 2016, oil and gas accounted for approximately two thirds of all energy consumed within the United States, and total consumer energy payments account for more than seven percent of the GDP (Bureau of Ocean Energy Management 2018). Economic data, including GDP, wages, and jobs for each proposed action area are combined with mineral extraction data in the GoMEX, NEPAC-South, and AK proposed action areas and are presented in Table 3-35.

States control oil and gas extraction within their state waters, from the coast to 3 nm for most states. Oil and gas development within state waters currently occurs in most Gulf of Mexico states as well as California and Alaska. Many other states have banned oil and gas exploration and production within state waters. Table 3-37 provides the status of oil and gas development within state waters by proposed action area.

Table 3-37. Status of Oil and Gas Extraction within State Waters

State	*Oil and Gas in State Waters*	*Legislation*
NW-ATL Proposed Action Area		
Maine	banned	Me. Rev. Stat. tit. 12, § 1862(14) (2020)
New Hampshire	banned	N.H. Rev. Stat. Ann. § 146-A:2-a (2020)
Connecticut	ban proposed	H.B. 588, Gen. Assemb., Jan. Sess. (Conn. 2019)
Massachusetts	ban proposed	H. 2852, 191st Leg., Reg. Sess. (Mass. 2019)
Rhode Island	ban proposed	H. 7250, Gen. Assemb., Jan. Sess. (R.I. 2018)
New York	banned	N.Y. Environmental Conservation Law § 23-1105 (2020)
New Jersey	banned	N.J. Stat. Ann. § 13:19-49 (2018)
Delaware	banned	Del. Code Ann. tit. 7, § 7003 (2020)
Virginia	banned	S.B. 795, Gen. Assemb., Reg. Sess. (Va. 2020)
North Carolina	ban proposed	H. 544, Gen. Assemb., 2019-2020 Sess. (N.C. 2019)
South Carolina	ban proposed	H. 3087, S.C. Leg., Sess. 123 (S.C. 2020)
Georgia	passed resolution opposing offshore drilling, but no ban proposed	
NW-ATL-Florida and the Caribbean Proposed Action Area		
Florida (Atlantic Coast)[1]	banned	Fla. Const. art. II, § 9-7
GoMEX Proposed Action Area		
Texas[1]	active leases	
Florida (Gulf Coast)[1]	banned	Fla. Const. art. II, § 9-7
Louisiana	active leases	
Alabama	active leases	
Mississippi	no active leases	
NEPAC-South Proposed Action Area		
Southern California	no new leases since 1969, but active old leases exist; ban on new leases	Cal. Pub. Resources Code § 6245 (2019)
NEPAC-North Proposed Action Area		
Northern California	banned	Cal. Pub. Resources Code § 6245 (2019)
Oregon	banned	Or. Rev. Stat. § 274.712 (2020)
Washington	none, but permitted	
AK Proposed Action Area		
Alaska	active leases	
HI-PAC Proposed Action Area		
Hawaii	none	

Just like for mineral extraction (Section 3.5.3), beyond state waters, BOEM manages leases for oil and gas extraction on the OCS. While OCS oil and gas contributes only a small percentage of domestic production (16 percent of oil and 3 percent of natural gas) (Bureau of Ocean Energy Management 2020c), offshore federal production generated 683 million barrels of oil and 1.03 trillion ft^3 of gas in fiscal year 2019 (Bureau of Ocean Energy Management 2020c). In recent years novel on-shore development techniques have become more cost-effective for developers, but offshore production remains an important component of the U.S. energy sector (Bureau of Ocean Energy Management 2016).

BOEM manages OCS leases under five-year programs and is currently operating under the 2017–2022 National OCS Oil and Gas Leasing Program (2017–2022 Program) (Bureau of Ocean Energy Management 2020b). However, based on strategies identified in EO 13795 (82 FR 20815; May 3, 2017), BOEM is currently in the process of designing a new National OCS Program for 2019–2024 that would greatly expand the area available for lease sales (Bureau of Ocean Energy Management 2020b). Development of discovered resources begins approximately 10 years after exploration and continues for 30 years or more, so development expansion from the proposed 2019–2024 National OCS Oil and Gas Leasing Program (2019–2024 Program) could occur during the design service life of the OPCs in the Proposed Action. Although the number and location of lease sales may change from the proposed 2019–2024 Program as the BOEM planning process continues, this PEIS/POEIS considers the proposals presented in the 2018 draft proposed program.

The BOEM leasing programs divide the OCS region into BOEM Planning Areas. Table 3-38 provides the most recent overview of the total existing lease blocks throughout the OCS as of May 1, 2021 (updated monthly) by BOEM Planning Area.

Table 3-38. OCS Oil and Gas Leases (as of May 1, 2021)

Planning Area	*Total Blocks*	*Total Acres*	*Number of Active Leases*[1]	*Acreage of Active Leases*	*Number of Producing Leases*[2]	*Acreage of Producing Leases*
GoMEX Proposed Action Area						
Western	5,240	28,576,813	246	1,397,762	27	153,211
Central	12,409	66,446,351	1,958	10,320,475	499	2,568,018
Eastern	11,537	64,357,859	18	103,680	0	0
Region Subtotal	29,186	159,381,023	2,222	11,821,917	526	2,721,229
NEPAC-South Proposed Action Area						
Southern California	16,164	88,979,051	32	158,956	32	158,956
AK Proposed Action Area[3]						
Beaufort Sea	11,876	65,075,663	19	79,301	3	10,424
Totals	***57,226***	***313,435,737***	***2,273***	***12,060,174***	***561***	***2,890,609***

[1] An active lease is a lease that has been executed, has an effective date, and has not been relinquished, expired, or terminated.
[2] A producing lease is an active lease that has produced product (e.g., oil or gas).
[3] Cook Inlet leases were excluded from this table as OPC vessels would not enter Cook Inlet.
Source: (Bureau of Ocean Energy Management 2020a)

The 2017–2022 Program calls for lease sales only in the three Gulf of Mexico BOEM Planning Areas. Details on locations and history of leases are provided in Sections 3.5.4.1.1 and 3.5.4.1.2 below. The proposed 2019–2024 Program would call for lease sales in every BOEM Planning Area (Table 3-39). Oil and gas development is also prevalent in some of the foreign EEZs within the proposed action areas, particularly for Mexico's EEZ in the Gulf of Mexico (Table 3-40).

Table 3-39. Number of Leases in the Proposed 2019–2024 Program by Proposed Action Area

BOEM Planning Area	***2019–2024 Program Lease Sales***
NW-ATL Proposed Action Area	
North Atlantic	2
Mid-Atlantic	3
South Atlantic[1]	3
NW-ATL-Florida and the Caribbean Proposed Action Area	
South Atlantic[1]	3
Straits of Florida	1
GoMEX Proposed Action Area	
Western, Central, and Eastern combined	12
NEPAC-South Proposed Action Area	
Southern California[1]	2
NEPAC-North Proposed Action Area	
Washington/Oregon	1
Northern California	2
Central California	2
Southern California[1]	2
AK Proposed Action Area	
Beaufort Sea	3
Chukchi Sea	3
Hope Basin	1
Norton Basin	1
St. Matthew-Hall	1
Navarin Basin	1
Aleutian Basin	1
St. George Basin	1
Bower’s Basin	1
Aleutian Arc	1
Shumagin	1
Kodiak	1
Gulf of Alaska	1

[1] BOEM Planning Area is split between two proposed action areas and are included here in both proposed action areas.

Table 3-40. Oil and Gas Extraction in the Waters of Foreign EEZs by Proposed Action Area

Proposed Action Area	*Oil and Gas Development Status*
NW-ATL	Exploratory permits have been issued by Canada for waters off of Nova Scotia, although no active development currently occurs in the portion of the Canadian EEZ that is within this proposed action area (Bureau of Ocean Energy Management 2018).
NW-ATL-Florida and the Caribbean	Minimal offshore production has occurred off Central and South America (French and Schenk 1997), except for off Venezuela's coast (Zaremba 2017) and recent promising exploration off Guyana and Suriname (Zaremba 2017). The Caribbean Islands have not been major contributors to oil and gas development, except for Trinidad and Tobago (French and Schenk 1997; Zaremba 2017). Some island nations, such as Cuba and the Commonwealth of the Bahamas, have begun soliciting foreign investors to explore for offshore hydrocarbon resources (Bureau of Ocean Energy Management 2018; Zaremba 2017).
GoMEX	Like the United States, Mexico has extensive oil and gas wells within its Gulf of Mexico EEZ (Bureau of Ocean Energy Management 2018).
NEPAC-South	none
NEPAC-North	Since 1972, the waters off of British Columbia, Canada have been subject to an oil and gas development moratorium (Bott 2004).
AK	Most of Russia's offshore oil and gas development is currently focused in the Arctic and Far East (Sea of Okhotsk) regions (Henderson and Grushevenko 2019; Russian Oil & Gas Technologies 2019), outside of the proposed action area.
HI-PAC	This region lacks known hydrocarbon resources, so oil and gas development does not occur.

3.5.4.1.1 GoMEX Proposed Action Area

Nearly all offshore oil and gas production in the U.S. EEZ occurs within the Gulf of Mexico. The region contains abundant oil and gas resources, broad industry interest, and well-established infrastructure to support exploration, development, and emergency response (Bureau of Ocean Energy Management 2016). The 2017–2022 Program makes available the entire leasable Gulf of Mexico OCS (those areas not subject to a moratorium).

The Gulf of Mexico OCS is divided into three BOEM planning areas: the Western, Central, and Eastern Gulf of Mexico Planning Areas. These planning areas cover approximately 160 million acres (647,500 km^2) (Bureau of Ocean Energy Management 2018). Oil and gas production has been proceeding in the Central and Western Planning Areas (located adjacent to Alabama, Mississippi, Louisiana, and Texas state waters) for more than 60 years (Bureau of Ocean Energy Management 2018). Although the Eastern Planning Area has largely been under a production moratorium, lease sales still occur in the portions not under a moratorium, and leases exist that were sold prior to the moratorium (Bureau of Ocean Energy Management 2018). The lease sale moratorium in the Eastern Planning Area ends in 2022 (Bureau of Ocean Energy Management 2018). Since 1953, there have been more than 100 lease sales in the Gulf of Mexico Planning Areas (Bureau of Ocean Energy Management 2016). Figure 3-14 depicts federal oil and gas leases within the GoMEX proposed action area.

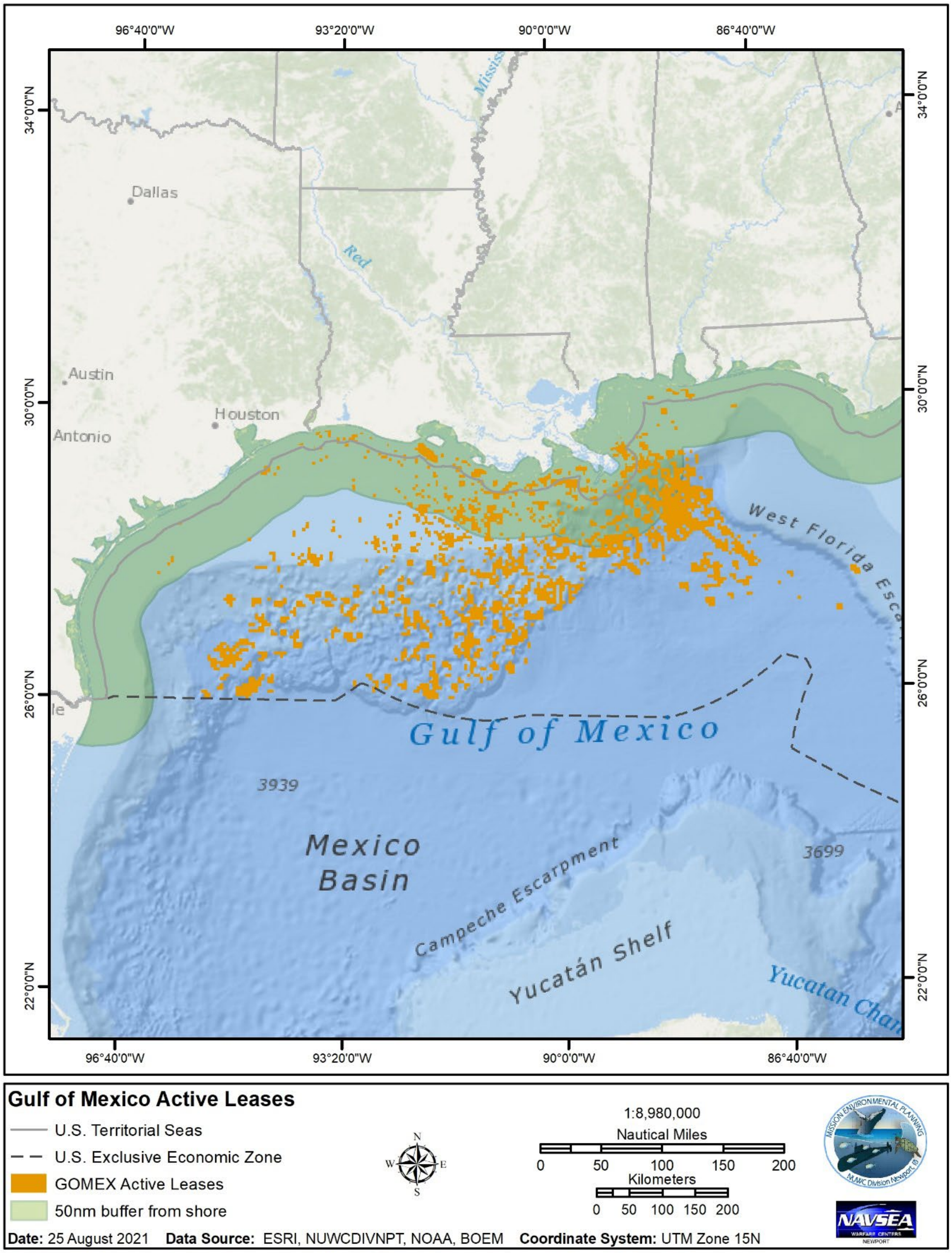


Figure 3-14. Active Federal Oil and Gas Leases within the GoMEX Proposed Action Area

The 2017–2022 Program proposes 10 lease sales within the three Gulf of Mexico Planning Areas, opening all leasable areas to sales during each annual sale (Bureau of Ocean Energy Management 2016).

BOEM (2016) estimated that the net economic value of the 2017–2022 Program's proposed lease sales within the Gulf of Mexico (versus sourcing the same oil and gas from other sources) would be between $2.4 and $170 billion, depending upon the market prices. The proposed 2019–2024 Program would call for 12 region-wide lease sales in the Gulf of Mexico region, including two sales for portions of the region currently under moratorium after that moratorium ends in 2022 (Bureau of Ocean Energy Management 2018).

3.5.4.1.2 AK Proposed Action Area

The Alaska OCS includes 15 BOEM planning areas, the largest total planning area within the United States, covering more than 1,035 million acres combined (Bureau of Ocean Energy Management 2018). Lease sales have been held in eight of these planning areas in the past, most recently in 2017 in Cook Inlet, which is outside of the proposed action area, (Bureau of Ocean Energy Management 2018). Federal leases currently exist in the Beaufort Sea Planning Area (Bureau of Ocean Energy Management 2018). Leases were previously issued in the Chukchi Sea, but all have since been relinquished (Bureau of Ocean Energy Management 2018). Four planning areas (Aleutian Arc, Aleutian Basin, Bowers Basin, and St. Matthew-Hall) have been determined to have negligible oil and gas resource potential (Bureau of Ocean Energy Management 2018). The North Aleutian Basin was withdrawn from consideration for development pursuant to the OCS Lands Act (43 U.S.C. § 1341(a)) (Bureau of Ocean Energy Management 2018). Active federal leases exist within the Cook Inlet and Beaufort Sea BOEM Planning Areas, however the OPCs would not enter Cook Inlet, so those leases are not considered further.

Active oil and gas leases exist just beyond state waters of northern Alaska in the Beaufort Sea (Figure 3-15). Prior to the 2017–2022 Program development, 10 lease sales had been held in the Beaufort Sea Planning Area since 1979 (Bureau of Ocean Energy Management 2016). Exclusion areas around Barrow and Kaktovik have been designated since 2015, withdrawing these areas from leasing due to considerations for subsistence fishing and hunting (Bureau of Ocean Energy Management 2016). The largest lease sale to occur in Alaska to date was a 2008 sale of a region in the Chukchi Sea Planning Area, which generated over $2.6 billion in revenue (Bureau of Ocean Energy Management 2018). BOEM (2018) estimates that the Chukchi Sea has the greatest quantity of unleased hydrocarbon resources outside of the Gulf of Mexico.

In developing the 2017–2022 Program, BOEM considered planning areas in the Beaufort and Chukchi Seas, but these regions were not recommended for lease sales because of the distance from oil and gas market and the harsh environmental conditions (Bureau of Ocean Energy Management 2016). Instead, the 2017–2022 Program calls for only a single lease sale in Cook Inlet, which as mentioned above is outside of the AK proposed action area (Bureau of Ocean Energy Management 2016). The proposed 2019–2024 Program would call for 17 lease sales in the Alaska region (excluding Cook Inlet), as shown in Table 3-39 (Bureau of Ocean Energy Management 2018). However, it is unclear whether industry would purchase leases if offered in the remote regions of the Arctic OCS. After Shell Global's challenges with their 2015 drilling season, the number of active leases in the Arctic OCS declined by over 90 percent, and many companies relinquished their leases entirely (Bureau of Ocean Energy Management 2016). In the 2017–2022 Program's proposed final plan, BOEM (2016) noted that advances in onshore oil and gas development technology caused a decrease in interest in development in remote and challenging locations like the Arctic OCS. However, in the 2019–2024 Program's draft proposed program, BOEM (2018) noted that industry has expressed interest in acquiring leases in all identified lease areas, including these remote Arctic regions.

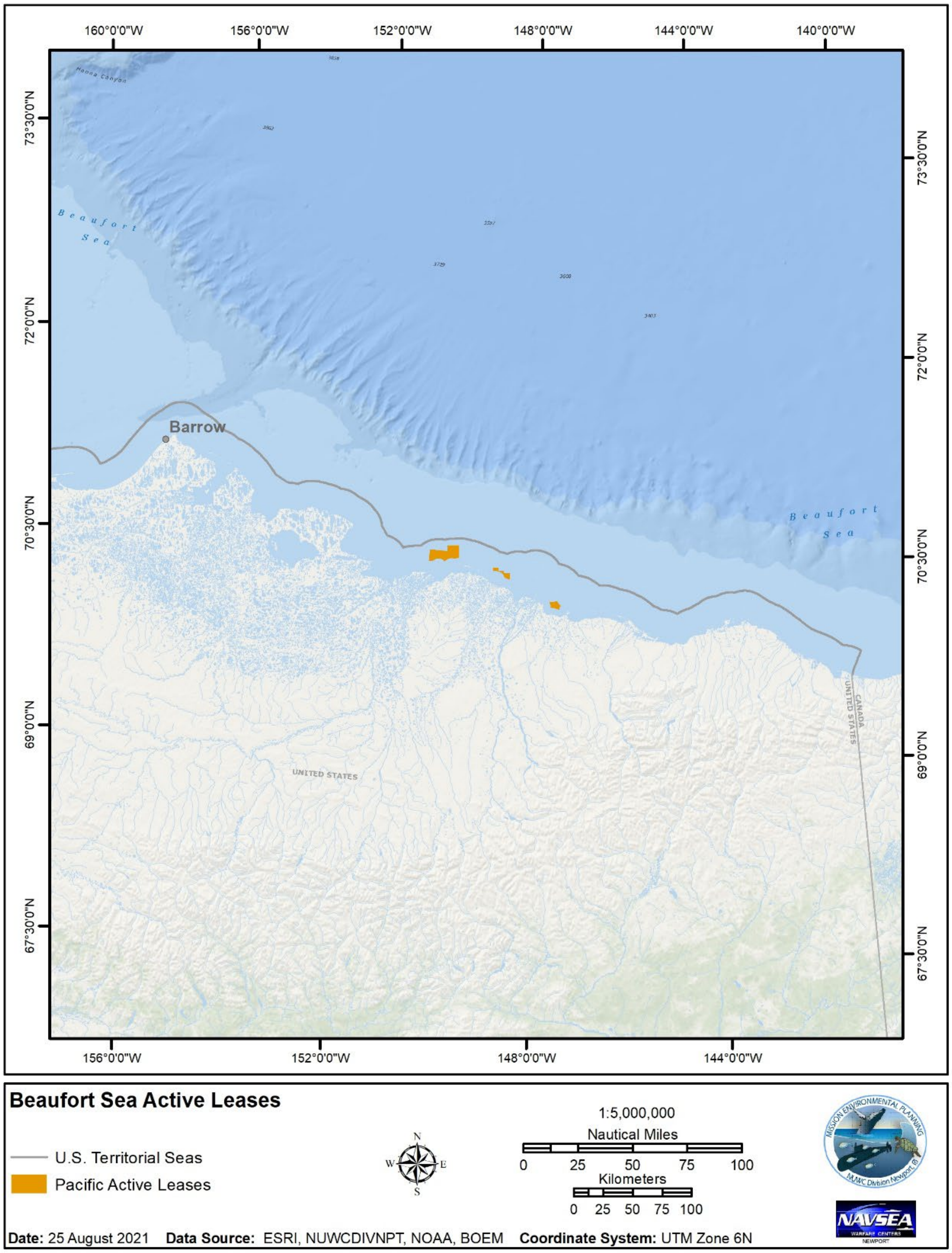


Figure 3-15. Active Federal Oil and Gas Leases within the Beaufort Sea, Alaska

3.5.4.2 Environmental Consequences to Oil and Gas Extraction

The predominant socioeconomic impact of the OPC program would potentially result from an increase in Coast Guard presence in the proposed action areas. Replacement of the aging MEC fleet would facilitate the Coast Guard's ability to support their missions offshore. Coast Guard missions that would benefit oil and gas extraction include marine safety and SAR. Coast Guard would also support workers on vessels or oil and gas platforms, should an emergency arise; however, an emergency response is not covered under the Proposed Action. Additionally, outreach and educational programs conducted by the Coast Guard within the proposed action areas would facilitate communication between Coast Guard and the communities that they serve. Coast Guard would follow SOPs to mitigate potential impacts to oil and gas extraction activities that may occur near OPC trainings and operations (Appendix C). As a result, there would be no significant impact or harm to oil and gas extraction as a result of the Proposed Action.

3.5.4.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to oil and gas extraction as a result of Alternative 1.

3.5.4.2.2 Impacts Under Alternatives 2–3

Similar to Alternative 1, under Alternatives 2–3, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to oil and gas extraction as a result of Alternatives 2–3.

3.5.4.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, with the exception of OPCs 1–5, Coast Guard offshore presence could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the offshore environment could decrease. However, there would be no significant impact or harm to oil and gas with implementation of the No Action Alternative.

3.5.5 Recreation and Tourism

3.5.5.1 Affected Environment

Marine recreation and tourism include the full range of tourism, leisure, and recreationally-oriented activities that take place in the transiting and operational areas as well as associated development (e.g., hotels, resorts, restaurants, food industry, vacation homes, second homes, retail businesses, marinas, fishing tackle stores, dive shops, fishing piers, and recreational fishing facilities) (National Oceanic and Atmospheric Administration 1998). Major marine recreational uses include: scuba/snorkeling, swimming, pelagic fishing, surface board sporting, paddling, sailing, kayak fishing, motorized boating, dive fishing, wildlife viewing at sea, fishing from shore, tide pooling, gathering from shore, shore use, and commercial cruising (Wahle and Townsend 2013). Additionally, there are various cultural uses of the shore and waters.

The majority of recreational uses occur almost exclusively in the coastal areas and are short-term activities. Even charter boat tours, wildlife tours at sea, and offshore recreational fishing trips are usually no more than one day in duration. Therefore, the dominant use area is in the nearshore (coastline to 3 nm) and coastal (3–12 nm) environments, as indicated in Table 3-28. The data in Table 3-28 applies broadly to all of the proposed action areas with the exception of the AK proposed action area, which would have fewer marine recreational uses due to seasonal inaccessibility or ice coverage. With the exception of fishing, sailing, and cruises, which occasionally occur in the operational area, the majority of recreational fishing, recreational boating, sailing, and wildlife viewing would likely occur in the transit area to and from the OPC's homeport. Available data show that tourism activities bring billions of dollars to communities within coastal states. Benefits from tourism include direct spending as well as indirect benefits from contributions to key business sectors such as food, lodging, arts, culture, and music. In the United States, expenditures on recreational fishing, whale watching, and diving are estimated to be roughly $30 billion per year (Cisneros-Montemayor and Sumaila 2010). Based on data from 144 coastal countries, Cisneros-Montemayor and Sumalia (2010) performed a meta-analysis to calculate the yearly global benefits of ecosystem-based marine recreation activities in terms of expenditure, participation, and employment as presented in Table 3-41.

Table 3-41. Summary of Yearly Global Benefits of Marine Recreation

Category	*Recreational Fishing*	*Whale Watching*	*Diving and Snorkeling*	*Total*
Expenditure in 2003 (billions USD)	$39.7	$1.6	$5.5	$46.8
Participation (millions)	58	13	50	121
Employment (thousands)	954	18	113	1,085

According to the ENOW data set, the tourism and recreation sector includes recreational fisheries, boat sales and boat rentals, charter fishing trips, eating and drinking establishments, hotels and lodging, marinas, recreational vehicle parks and campsites, scenic water tours and transportation, sporting goods rental and instruction, amusement parks, zoos, and aquaria. In the United States, almost 2.4 million people were employed by the U.S. ocean-based tourism and recreation economy in 2016, earning about $58.7 billion in annual wages and contributing approximately $124 billion in GDP to the national economy (National Oceanic and Atmospheric Administration 2019). From 2015 to 2016, tourism and recreation gained 73,000 jobs (6.3 percent growth)—growing significantly faster than the U.S. economy grew as a whole (1.7 percent growth) and accounting for most of the employment growth in the ocean economy (National Oceanic and Atmospheric Administration 2019). Table 3-42 presents ENOW data by proposed action area specific to the recreation and tourism sector for 2017 (NOAA Office for Coastal Management 2020).

Table 3-42. Economic Influence of Recreation and Tourism by Proposed Action Area

Proposed Action Areas	*Business Establishments**	*Employment**	*Annual Wages* (in million USD)*	*GDP* (in million USD)*
NW-ATL	120,264	1,947,868	$50,989	$107,718
NW-ATL-Florida and the Caribbean	8,719	203,726	$5,223	$10,986
GoMEX[1]	22,989	481,339	$10,014	$21,230
NEPAC-North	25,256	421,936	$11,293	$24,948
NEPAC-South[2]	9,537	230,669	$6,112	$12,473
AK	3,232	43,797	$1,049	$2,110
HI-PAC	8,179	219,635	$7,413	$15,598

- *Values reported are from 2017.

[1] NW-ATL-Florida and the Caribbean proposed action area only includes counties in Florida on the East Coast.
[2] GoMEX proposed action area includes the counties in Florida on the West Coast.
[3] NEPAC-South includes only the counties in southern California.

Based on a follow-on study in Hawaii, an additional 15,000 ocean-dependent jobs and nearly 1,400 establishments beyond those already included in the ENOW industries were identified in the Hawaiian Islands (National Oceanic and Atmospheric Administration 2018). These were identified because a wide variety of economic activities that are not typically ocean-dependent for other coastal areas tend to be partially or completely ocean-dependent on an island. For example, island rental car companies exist almost solely to service sightseeing along the coast. Tourism is vital to many small islands in the NW-ATL-Florida and the Caribbean and HI-PAC proposed action areas. Tourism in small island economies can account for more than one-quarter of the GDP in these economies and is often closely linked to both fisheries and marine recreation (Smith and Zeller 2016). For example, tourism is the primary industry in the Commonwealth of the Bahamas, accounting for 50 percent of the GDP (Official Website of the Government of The Bahamas 2020). The tourism and recreation industry surrounding recreational boating is significant along the coast of the NW-ATL, GoMEX, and HI-PAC proposed action areas. The NW-ATL-Florida and the Caribbean proposed action area is a very popular destination for marine-based tourism. As is true in almost all coastal regions, eating and drinking establishments and hotels and lodging in the U.S. Virgin Islands and Puerto Rico account for the majority of economic activity within the ENOW-defined recreation and tourism sector (Clements et al. 2016b).

Scuba diving is another popular recreational activity in several of the proposed action areas due to the occurrence of numerous reefs and shipwrecks (Section 3.5.5.1.2). Typical considerations for recreational scuba divers, which are relevant to all proposed action areas, are dive depth limitations. Specifically, the Professional Association of Diving Instructors suggests that certified open-water divers limit their dives to 60 ft (18 m) while more experienced divers are generally limited to 100 ft (30 m) (Professional Association of Diving Instructors 2011). Many shipwrecks and artificial reefs that are popular diving spots, particularly in the NW-ATL-Florida and the Caribbean proposed action area, are at depths ranging from 50 to 90 ft (15 to 27 m) (Associated Oceans LLC 2011). Therefore, most scuba diving would occur in areas where water depth is less than 100 ft (30 m).

3.5.5.1.1 Whale Watching

The practice of observing marine mammals in their natural environment, often referred to as whale watching, frequently includes not just whales, but also dolphins, porpoises and even pinnipeds. Hoyt (2001) conducted the most recent, comprehensive survey of whale watching globally and estimated it is a $1 billion per year industry that attracts more than 9 million participants annually in 87 countries and territories. In the United States, approximately 4.3 million people participated in the whale watching industry in 1998, contributing nearly $357 million in sales across 90 communities (Hoyt 2001). According to Hoyt (2001), total expenditures (the amount whale watchers spent on the tours, as well as travel, food, hotels, and souvenirs) in 1998 in Alaska was $122.7 million, New England $107.1 million, California $49.1 million, Hawaii $27–54.0 million, Eastern United States and the Gulf of Mexico $15.5 million, Washington $9.6 million, and Oregon $4.5 million. Even though the whale watching regions do not completely align with the proposed action areas, it could be inferred that the AK proposed action area would have the most commercial whale watching followed by the NW-ATL, HI-PAC, NW-ATL-Florida and the Caribbean, GoMEX, and the NEPAC-North proposed action areas. Although data is not available to represent the boundaries of the NEPAC-South proposed action area, California is the third most popular whale watching region in the United States, and Mexico generated roughly $42 million in total expenditure from whale watching in 1998, thus making this proposed action area among the top three (Hoyt 2001).

Most whale watch operators offer two trips per day, which limits how far these vessels go offshore. In the Pacific Northwest, most of the wildlife viewing trips occur within state waters, but some operators travel further offshore. In the northeast, the industry focuses on the various whales summering in waters off New England, particularly Massachusetts, including Stellwagen Bank National Marine Sanctuary, which sits at the mouth of Massachusetts Bay. Cruises for seal watching are also available in the NW-ATL proposed action area, particularly in Maine, Massachusetts, Rhode Island, and Connecticut. In the southeast, concentrations of the whale watching industry are highest in South Carolina (e.g., Hilton Head) and Florida (e.g., St. Petersburg, Panama City, Jupiter, Ft. Lauderdale, and Miami), but some commercial whale watch companies also operate from Cape May and ports in Chesapeake Bay. There are some dolphin watching operators along the East Coast and Gulf Coast. In the HI-PAC proposed action area, year-round whale watch operations target several species of toothed whales and dolphins and also seasonal species like humpback whales in Hawaiian waters, but no data is available for the Pacific Islands.

Globally, 47.8 percent of whale watching occurs in the United States (Hoyt 2001). For areas outside of the United States, limited information is available. In British Columbia, Canada (within the NEPAC-North proposed action area), the majority of whale watching is concentrated around Vancouver Island. In Baja California Sur, along the West Coast of Mexico (within the NEPAC-South proposed action area), prime humpback and gray whale presence coincides with the peak winter tourism season (Hoyt 2001). Total expenditure from whale watching in the NW-ATL-Florida and the Caribbean proposed action area is highly variable, ranging in value from $8,000 (in the St. Lucia) to $5,200,000 (in the Dominican Republic). Available data from IFAW (2009) detailing total expenditures from whale watching in 2008 for the foreign EEZs in the NW-ATL-Florida and the Caribbean proposed action area are presented in Table 3-43. Hoyt did not provide data for every Caribbean Island or mainland Central American country; therefore, only those for which data were provided are included in Table 3-43.

Table 3-43. Total Expenditures from Whale Watching in the Caribbean

Location	*Total Expenditures[1] in 2008 (in USD)*
Caribbean Islands	
Antigua and Barbuda	$47,500
Bahamas	$3,983,310
Bermuda	$31,900
British Virgin Islands	$8,000
Dominica	$1,785,000
Dominican Republic	$8,927,000
Grenada	$285,900
Jamaica	$2,500
Martinique	$612,000
Puerto Rico	$977,000
St. Lucia	$1,577,010
St. Vincent and the Grenadines	$206,400
Turks and Caicos	$32,600
U.S. Virgin Islands	$18,500
Mainland Central America	
Belize	$194,000[2]
Costa Rica	$21,161,037[2]
Guatemala	$152,000[2]
Nicaragua	$2,044,608[2]
Panama	$3,140,375[2]

[1] Total expenditures is the sum of direct and indirect expenditures. Indirect expenditures are all the additional money spent by whale watch participants, including food, travel, accommodation, film, special clothing, and souvenirs, but not international air travel.
[2] Total Expenditures based on 2006 records.

3.5.5.1.2 Recreation and Tourism in Protected Areas

Much of the marine recreational economy depends on thriving national marine sanctuaries, parks, and marine protected areas. National marine sanctuaries are multiple-use areas committed to balancing protection and stewardship with the economic value these places hold. Across the National Marine Sanctuary Program and the National Parks system, diverse activities like scuba diving/snorkeling, recreational fishing, wildlife watching, and other recreational activities help support local, coastal, and ocean-dependent economies. Table 3-44 outlines the national marine sanctuaries, marine monuments, and marine-based national parks by proposed action area, as well as the types of recreational activities that typically occur there.

Some of these areas are more accessible than others, bringing in more tourists and economic income. For example, the Olympic Coast National Marine Sanctuary (OCNMS), in the NEPAC-North proposed action area, is a year-round destination for both tourist and resident visitors in Washington State. In 2014, approximately $102 million was generated from direct spending in the OCNMS (Leeworthy et al. 2016). Three million people visit the nearby Olympic National Park each year in order to experience a wide range of recreational activities and the coast's natural beauty (National Parks Service 2020), which may increase visitation to the OCNMS. Cabo Pulmo National Park, which is off the coast of Baja California but is less accessible by tourists, welcomed 22,000–37,000 visitors with a mean per capita tour price of $100 (Cisneros-Montemayor et al. 2020). The HI-PAC proposed action area, which is a top tourism destination, includes the Papahanaumokuakea Marine National Monument—one of the largest fully protected conservation areas in the United States containing a vast array of natural and cultural resources. However, public access to Papahanaumokuakea is limited to the isolated Midway Atoll, but socioeconomic impacts to the region are expected due to the recovery of fish and wildlife populations in the area after the designation of this expanded area as a monument. This can be contrasted with the NW-ATL-Florida and the Caribbean proposed action area, which includes the Florida Keys—a major tourist attraction internationally known for its abundant fishing, numerous coral reefs, and historic underwater archaeological sites. Florida Keys National Marine Sanctuary is home to the world's third-largest barrier coral reef, extensive seagrass beds, mangrove islands, and more than 6,000 species of marine life (National Marine Sanctuaries 2020). Many recreational activities, including scuba diving, snorkeling, fishing, and boating are allowed within the Florida Keys National Marine Sanctuary. Recreational and tourist uses of marine protected areas within each proposed action area are further detailed in Table 3-44.

Table 3-44. National Marine Sanctuaries and Protected Areas by Proposed Action Area

Proposed Action Area	*National Marine Sanctuary System*	*Recreational/Tourist Activity*
NW-ATL	Gerry E. Studds/Stellwagen Bank National Marine Sanctuary	whale watching
	Gray's Reef National Marine Sanctuary	snorkeling/scuba diving
	Mallows Bay-Potomac National Marine Sanctuary	boating, kayaking, scuba diving, and shipwreck viewing
	Monitor National Marine Sanctuary	scuba diving, shipwreck viewing
NW-ATL-Florida and the Caribbean	Florida Keys National Marine Sanctuary	fishing (in designated area), swimming, and snorkeling/scuba diving
	Dry Tortugas National Park	fishing (in designated areas), swimming, snorkeling/scuba diving, boating (with permit), kayaking, and wildlife viewing
	Buck Island Reef National Monument	snorkeling and boating; fishing is prohibited throughout the entire monument
	Virgin Islands Coral Reef National Monument	
GoMEX	Flower Garden Banks National Marine Sanctuary	sport-fishing carters, swimming, and snorkeling/scuba diving
NEPAC-North	Cordell Bank National Marine Sanctuary	wildlife viewing; fishing for most groundfish species is prohibited
	Greater Farallones National Marine Sanctuary	whale watching and kayaking
	Monterey Bay National Marine Sanctuary	fishing, diving, kayaking, boating, and surfing
	Olympic Coast National Marine Sanctuary	sport-fishing carters, shellfish gathering, beach-going, hiking, camping, sightseeing, wildlife watching (from shore) surfing, boating, kayaking, and scuba diving
NEPAC-South	Channel Islands National Marine Sanctuary	fishing, scuba diving, and shipwreck viewing
	Bahia de Loreto National Park	swimming, scuba diving, snorkeling, and kayaking
	Cabo Pulmo National Park	fishing, scuba diving, boating, windsurfing, kayaking, swimming, and wildlife viewing
	Islas Marietas National Park	
	Revillagigedo Archipelago National Park	whale watching and boating; fishing is prohibited in marine protected zones

Proposed Action Area	***National Marine Sanctuary System***	***Recreational/Tourist Activity***
	San Lorenzo Marine Archipelago National Park	whale watching, boating, and wildlife viewing
AK	numerous state managed special areas	fishing, boating, wildlife viewing
HI-PAC	Papahanaumokuakea Marine National Monument	only by permit, limited visitation; recreational activities (Midway Atoll)
	Hawaiian Island Humpback Whale National Marine Sanctuary	boat tours, whale watching
	Marianas Trench Marine National Monument	only by permit, limited visitation
	Pacific Remote Islands National Marine Monument	only by permit, limited visitation

While there are no national marine sanctuaries in Alaska, the Alaska Department of Fish and Game designates numerous state-managed special areas including wildlife refuges, sanctuaries, and critical habitat. More than half of all U.S. marine protected areas are in Alaska, including natural heritage, cultural heritage, and sustainable production marine protected areas.

3.5.5.1.3 Cruise Travel

The cruise travel sector in the United States consists of the cruise lines, airlines, travel agents, port service providers, and local businesses (e.g., hotels, restaurants) that are directly impacted by passenger and crew spending. For the purposes of analysis, cruise ship transit is considered along with other marine transportation (e.g., ferries, commercial shipping vessels) in Section 3.5.8.

The cruise industry has been growing over the past decade, but could face significant long-term declines due to the 2020 global coronavirus pandemic. From 2016 to 2018, cruise passenger embarkations from U.S. ports increased by 8.8 percent and the direct cruise industry expenditures by cruise lines and port service providers in the United States rose by over 10 percent (Business Research and Economic Advisors 2019). The direct expenditures generated by the international cruise industry and their total economic impacts in each of the states in 2018 are shown in Table 3-45 based on data from the Business Research and Economic Advisors (2019).

Table 3-45. Economic Impacts of the International Cruise Industry in 2018 by Proposed Action Area

State	Direct Purchase		Employment		Income	
	Total (in Millions USD)	U.S. Share of Total	Total (in Millions USD)	U.S. Share of Total	Total (in Millions USD)	U.S. Share of Total
NW-ATL Proposed Action Area						
Connecticut	$206	0.9	$1,585	0.4	$135	0.6
Delaware	$35	0.1	$279	0.1	$17	0.1
Georgia	$752	3.1	$13,802	3.3	$761	3.3
Maine	$73	0.3	$1,077	0.3	$39	0.2
Maryland	$260	1.1	$4,471	1.1	$253	1.1
Massachusetts	$393	1.6	$6,031	1.4	$428	1.8
New Hampshire	$36	0.2	$387	0.1	$23	0.1
New Jersey	$530	2.2	$9,649	2.3	$584	2.5
New York	$1,295	5.4	$17,240	4.1	$1,123	4.9
North Carolina	$307	1.3	$4,387	1	$213	0.9
Rhode Island	$30	0.1	$426	0.1	$19	0.1
South Carolina	$170	0.7	$3,375	0.8	$136	0.6
Virginia	$238	1	$3,563	0.8	$217	0.9
Washington DC	$52	0.2	$319	0.1	$47	0.2
NW-ATL-Florida and the Caribbean Proposed Action Area						
Florida[1]	$8,485	35.4	$154,646	36.7	$7,689	33.2
GoMEX Proposed Action Area						
Alabama	$185	0.8	$2,869	0.7	$135	0.6
Florida[1]	$8,485	35.4	$154,646	36.7	$7,689	33.2
Louisiana	$477	2	$8,966	2.1	$386	1.7
Mississippi	$50.4	0.2	$695	0.2	$27	0.1
Texas	$1,511	6.3	$26,241	6.2	$1,749	7.6
NEPAC-North and NEPAC-South Proposed Action Areas						
California[2]	$2,501	10.4	$49,369	11.7	$3,260	14.1
Oregon	$196	0.8	$5,151	1.2	$252	1.1
Washington	$837	3.5	$19,189	4.6	$1,082	4.7
AK Proposed Action Area						
Alaska	$1,242	5.2	$22,447	5.3	$1,156	5
HI-PAC Proposed Action Area						
Hawaii	$445	1.9	$6,732	1.6	$246	1.1

[1] Florida is split from east to west between the NW-ATL-Florida and the Caribbean and GoMEX proposed action areas.

[2] California is split at Point Conception between the NEPAC-North and NEPAC-South proposed action areas.

Of the top ten states with the most direct expenditures generated by the international cruise industry in 2018, eight (Florida, California, Texas, New York, Alaska, Washington, New Jersey, and Louisiana) have significant cruise ports. Cruise ship passengers and overnight visitors participate in a variety of activities when visiting ports. Going to the beach, recreational fishing, chartering yachts, shopping, snorkeling, scuba diving, and boating (day trips/tours and boat rentals) are all popular cruise excursion activities. Many of these activities have a significant impact on the local economy.

Florida remains the center of cruising in the United States, accounting for over 59 percent of all U.S. embarkations. This is largely due to its proximity to the Caribbean region (part of the NW-ATL-Florida and the Caribbean proposed action area), which is the number one cruise destination in the world (roughly 32 percent of all ocean-going cruises) (Business Research and Economic Advisors 2019; Cruise Lines International Association 2020). The five largest cruise ports (i.e., Miami, Port Canaveral, Port Everglades, Galveston, and Long Beach) accounted for 66 percent of the passenger embarkations in the United States in 2018 (Business Research & Economic Advisors 2019). Cruises departing from Texas and Louisiana typically make stops in the United States, Mexico, and the Caribbean, while those leaving from the northeast United States likely make port calls in the southern United States, Bahamas, and other Caribbean islands (Rodrigue and Notteboom 2012). Cruises departing from California typically travel to the U.S. West Coast, Hawaii, Canada, or Mexico (Port of San Diego 2020). Alaska benefits from the cruise industry primarily as a destination market, typically departing from the West Coast of the United States or Canada (Business Research & Economic Advisors 2019). Alaska accounts for 5 percent of all ocean-going cruises (Cruise Lines International Association 2020); however the vessels rarely, if ever, reach areas of Alaska north of the Aleutian Islands. Some smaller cruise ships sail regularly between Nome, Alaska; Greenland; Russia; Norway; and other global destinations.

3.5.5.1.4 Recreational Fishing

Recreational fishing (fishing for sport or pleasure, in salt or fresh water) can be contrasted with commercial fishing (selling fish for profit) and subsistence fishing (retaining fish to meet basic nutritional needs for individuals, communities, or ceremonial purposes). Commercial and recreational fisheries may take resources from some of the same stocks, most of which are managed by NMFS and regional entities, such as the regional fishery management councils. In 2016, nearly 9.8 million saltwater anglers took 63.3 million fishing trips generating $67.9 billion in sales impacts, $38.7 billion in value-added impacts, $24.3 billion in income impacts, and supporting 472,000 jobs across the United States (NMFS 2018b).

Participation in recreational fishing in the United States has continued its 11-year upward trajectory, adding 300,000 participants in 2018, reaching its highest number of participants since 2007 (Recreational Boating & Fishing Foundation and Outdoor Foundation 2019). The USFWS publishes the number of state-licensed anglers annually in each of the fifty states. USFWS (2019a) calculations are summarized in Table 3-46 based on state level data. It should be noted that freshwater fishing has remained the most popular type of fishing over time, with nearly double the number of participants as saltwater and fly-fishing combined (Recreational Boating & Fishing Foundation and Outdoor Foundation 2019). Therefore, it is important to note that the data presented in Table 3-46 includes freshwater data, although no freshwater waterbodies are included in the proposed action areas.

Table 3-46. Fishing Licenses by State and Proposed Action Area (USFWS Data, 2021)

State	***Total Number of Fishing Licenses***	***Gross Cost of Fishing Licenses (in USD)***
NW-ATL Proposed Action Area		
Connecticut	296,062	$4,319,645
Delaware	98,211	$1,359,936
Georgia	1,444,041	$13,188,550
Maine	268,464	$8,184,184
Maryland	401,738	$8,015,365
Massachusetts	378,815	$4,589,638
New Hampshire	178,738	$6,193,737
New Jersey	260,638	$4,616,402
New York	1,209,421	$20,691,537
North Carolina	918,461	$22,195,568
Rhode Island	81,816	$912,553
South Carolina	691,181	$6,493,685
Virginia	870,090	$14,089,028
Washington DC	6,525	$80,274
NW-ATL-Florida and the Caribbean Proposed Action Area		
Florida	2,198,044	$39,882,280
GoMEX Proposed Action Area		
Alabama	752,923	$14,514,627
Florida[1]	2,198,044	$39,882,280
Louisiana	977,431	$11,429,298
Mississippi	370,925	$5,566,486
Texas	2,287,436	$60,424,124
NEPAC-North and NEPAC-South Proposed Action Areas		
California[2]	2,486,928	$64,390,117
Oregon	865,874	$26,566,374
Washington	1,645,505	$34,802,922
AK Proposed Action Area		
Alaska	628,739	$23,820,397
HI-PAC Proposed Action Area		
Hawaii	4,700	$23,749

[1] Florida is split east to west between the NW-ATL-Florida and the Caribbean proposed action area and the GoMEX proposed action area.
[2] California is split at Point Conception between the NEPAC-North and NEPAC-South proposed action areas.

The 2018 U.S. marine recreational finfish catch, including fish kept and fish released (discarded) on the Atlantic, Gulf, and Pacific Coasts (including Alaska, Hawaii, and Puerto Rico), was estimated at 397 million fish weighing 447 million pounds, combined (NMFS 2020b). Freire et al. (2020) reconstructed preliminary estimates of marine recreational catches (based on independent reconstructions for 125 countries) and estimated that total recreational catches from marine waters amounted to around 900,000 tons per year for 2014. Marine recreational catches thus account for slightly less than 1 percent of total global marine catches (Freire et al. 2020) and roughly 13 percent of the total weight of U.S. harvest of finfish for states covered by NMFS' Marine Recreational Information Program (MRIP)[20].

For 2018, no data are available for Puerto Rico or Alaska and data collection efforts have been suspended in the Caribbean region as the territory rebuilds following Hurricane Maria. Data collection ceased in the U.S. Virgin Islands in 2000 resulting in incomplete or inaccurate data (NOAA Fisheries 2017). In Louisiana, LA Creel serves as a certified alternative to the MRIP surveys. In Texas, marine recreational fishing is monitored by the Texas Parks and Wildlife Department and in Alaska, marine recreational fishing is monitored by the Alaska Department of Fish and Game. On the Pacific Coast, marine recreational fishing is monitored by the Pacific Coast Recreational Fisheries Information Network, which administers surveys from Washington to California. The estimated harvests (numbers and weight of fish) for the continental United States and Hawaii are presented in Table 3-47. Harvest by weight data is not available for Texas or Louisiana. Estimates from all sources discussed above are presented in Table 3-47 below were produced from data collected in 2018.

[20] MRIP is a state-regional-federal partnership that develops, improves, and implements a network of surveys to measure total recreational fishing catch in the United States. MRIP collected recreational fishing data of the United States using the Coastal Household Telephone Survey, the For-Hire Survey, and the Access Point Angler Intercept Survey.

Table 3-47. Recreational Finfish Harvested and Released in 2018 by State and Proposed Action Area

State	Pounds Harvested (Thousands Lbs)	Number Harvested (Thousands)	Number Released [1,2] (Thousands)
NW-ATL Proposed Action Area			
Connecticut	6,042	4,446	17,644
Delaware	1,131	549	3,646
Georgia	7,932	8,873	13,486
Maine	2,088	3,228	2,968
Maryland	11,121	7,939	20,361
Massachusetts	16,606	11,378	18,336
New Hampshire	1,690	2,400	1,611
New Jersey	27,820	10,195	34,959
New York	16,877	10,628	42,097
North Carolina	20,065	16,167	62,468
Rhode Island	7,129	5,664	10,569
South Carolina	8,960	7,099	29,166
Virginia	11,671	16,558	24,771
NW-ATL-Florida and the Caribbean Proposed Action Area			
Florida[1]	141,672	180,619	271,825
GoMEX Proposed Action Area			
Alabama	23,129	16,933	29,385
Louisiana[2]	-	6,337	-
Mississippi	11,991	12,091	16,920
Texas[3]	-	1,717	-
NEPAC-North and NEPAC-South Proposed Action Areas			
California[4]	14,548	12,517	7,375
Oregon[5]	2,316	541	156
Washington[5]	2,124	400	93
HI-PAC Proposed Action Area			
Hawaii	24,093	10,362	1,286
Total	***359,007***	***346,642***	***609,121***

[1] Florida is split from east to west into the GoMEX and NW-ATL-Florida and the Caribbean proposed action areas, but is not represented in the GoMEX proposed action area here.
[2] Texas only estimates harvest (no weight or release data) and includes only private and for-hire fisheries.
[3] Louisiana only estimates harvest (no weight or release data).
[4] California is split at Point Conception between the NEPAC-North and NEPAC-South proposed action areas.
[5] Oregon and Washington estimates include only private and for-hire fisheries.

According to the data in Table 3-47, recreational fishing, as measured in pounds harvested, is most popular in Florida, followed by New Jersey, Hawaii, Alabama, North Carolina, New York, Massachusetts, and California, which coincides with the NW-ATL-Florida and the Caribbean, NW-ATL, HI-PAC, GoMEX, NEPAC-North, and NEPAC-South proposed action areas, respectively.

While MRIP does not categorize recreational fishing data based on location, recreational harvest by distance from shore is available. Nationally, the majority of recreational catch (nearly 55 percent in numbers of fish) comes from inland waters (estuarine), more than 35 percent from state territorial seas, and more than 10 percent from the EZZ (NMFS 2020b). In 2018, the majority of Atlantic, Gulf, and Pacific

Coast trips fished primarily in inland waters. Table 3-48 illustrates the U.S. recreational harvest by distance from shore based on the primary area fished. Estimated harvests by primary fishing area: inland (in sounds, rivers, and bays), state territorial seas (defined as the shore to 3 nm offshore, except for Texas and Florida's Gulf Coasts where territorial seas extend to 9 nm offshore), and EEZ (defined as from the outer edge of the state territorial seas to 200 nm offshore) are presented in Table 3-48 for the top 10 species.

Table 3-48. Top Ten Recreational Harvest Species Categorized by Distance from Shore

<table>
<tr><th>Ranking by Harvested Weight</th><th>Species Harvested Inland</th><th>Species Harvested in State Waters</th><th>Species Harvested within the EEZ</th></tr>
<tr><td>1</td><td>Striped bass</td><td>Bluefish</td><td>Dolphinfishes</td></tr>
<tr><td>2</td><td>Scup*</td><td>Striped bass</td><td>Red snapper</td></tr>
<tr><td>3</td><td>Spotted seatrout</td><td>"Other" fishes*</td><td>Yellowfin tuna</td></tr>
<tr><td>4</td><td>Red drum</td><td>Spanish mackerel</td><td>"Other" fishes*</td></tr>
<tr><td>5</td><td>Sheepshead</td><td>Red drum</td><td>"Other" tunas/mackerels*</td></tr>
<tr><td>6</td><td>"Other" herrings</td><td>King mackerel*</td><td>King mackerel*</td></tr>
<tr><td>7</td><td>Striped mullet</td><td>"Other" mullets</td><td>Black sea bass</td></tr>
<tr><td>8</td><td>"Other" fishes*</td><td>Kingfishes</td><td rowspan="2">Epinephelus groupers* and Mycteroperca groupers*</td></tr>
<tr><td>9</td><td>Black drum</td><td>Little tunny/Atlantic bonito</td></tr>
<tr><td>10</td><td>Summer flounder</td><td>Blue runner</td><td>Greater amberjack</td></tr>
</table>

Data are from National Marine Fisheries Service (2020b).
* Fish included in these groups are not equivalent to those with similar names listed in the commercial fisheries data.

In general, recreational catches were the highest along the East Coast and in the Gulf of Mexico (Freire et al. 2020). Recreational catches on the West Coast have decreased considerably since the 1990s, while recreational catches around Hawaii have increased considerably since the early 1990s (Freire et al. 2020). Freire et al. (2020) found that recreational catches in the United States were dominated by *Scombridae* (mackerels, tunas and bonitos), *Sciaenidae* (croakers), and *Pomatomidae* (bluefishes), which jointly accounted for about 40 percent of total recreational catches. In addition to these species, other key U.S. recreational species include Atlantic croaker, Atlantic spot, Pacific halibut, rockfishes, scorpionfishes, Pacific salmon, seatrout, sharks, striped bass, and summer flounder (NMFS 2018b). Excluding Puerto Rico and Alaska, in 2016, seatrouts (36.4 million fish), Atlantic croaker and spot (19.3 million fish), and summer flounder (14.2 million fish), were the most frequently species caught by recreational fishermen in the United States (NMFS 2018b).

The U.S. recreational catch data had the best taxonomic resolution of any data in a global study. Analogous data for foreign portions of the proposed action areas, including Mexico, the Pacific Islands, and Caribbean countries, were not readily available (Freire et al. 2020). NMFS reports the economic impact of recreational fishing activities in the United States in terms of employment, sales, and value-added impacts. These are discussed in each section below, by proposed action area. "Sales" refers to the gross value of all sales by regional businesses affected by an activity, such as recreational fishing. The category includes both the direct sales made by the angler and sales made between businesses and households resulting from that original sale by the angler. "Income" includes personal income (wages and salaries) and proprietors' income (income from self-employment). "Value-added" is the contribution made to the GDP in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the purchases made by anglers (NMFS 2018b). Recreational fishing and economic performance of recreational fisheries within each proposed action area is discussed in further detail below.

3.5.5.1.4.1 NW-ATL Proposed Action Area

Of all the states in the NW-ATL proposed action area, New Jersey generated the biggest economic impact from recreational fishing expenditures. Recreational angling in New Jersey accounted for 4.3 million trips and generated 15,400 jobs, $1.8 billion in sales, $746.2 million in income, and $1.2 billion in value-added impacts (NMFS 2018b). According to the 2018 NMFS marine recreational fishing data, the Atlantic Coast accounted for the majority of angler trips (67 percent) and catch (nearly 60 percent) nationally, but the majority (56 percent) of trips fished primarily in inland waters (NMFS 2020b). The largest harvests by weight were of striped bass, dolphinfish, bluefish, scup, and black sea bass, but the species most commonly caught on trips in the NW-ATL proposed action area that fished primarily in federally-managed waters (offshore) were black sea bass, tomtate, red snapper, summer flounder, and dolphinfish (NMFS 2020b).

3.5.5.1.4.2 NW-ATL-Florida and the Caribbean Proposed Action Area

According to the 2018 NMFS marine recreational fishing data, recreational anglers along eastern Florida took 8.8 million trips, generated 36,100 jobs, $4.1 billion in sales, $1.5 billion in income, and $2.5 billion in value-added impacts (NMFS 2018b). The top five recreational species by total harvest in Florida are: blue runner, herring, mullet, pinfish, and Atlantic thread herring (Marine Recreational Information Program 2017). The top five recreational species by total harvest in Puerto Rico are: bigeye scad, herring, blue runner, yellowtail snapper, and schoolmaster (Marine Recreational Information Program 2017). Currently no data is available in the U.S. Virgin Islands.

There are multiple countries in the Caribbean with different laws and methods for monitoring recreational fisheries data. Very often, tropical nearshore fisheries of the Caribbean are data poor, in that they lack conventional, scientific data (Bentley and Stokes 2009). Using a reconstruction approach, Smith and Zeller (2016) performed a comprehensive accounting of fisheries catches in the Bahamas from commercial and noncommercial sectors for 1950–2010 and found that recreational fishing accounted for 55 percent of reconstructed total catches. The U.S. Virgin Islands is known for its world-class recreational blue marlin fishery. The fishery is estimated to benefit the economy on St. Thomas by $354,000 to $3.9 million in total expenditures (Stoffle et al. 2011). Recreational boat owners visit this area specifically to catch blue marlin and other billfish and to participate in the U.S. Virgin Islands' Game Fishing Club's annual blue marlin tournament (Clements et al. 2016b). According to a 2011 report by NMFS, this tournament brings in as much as $75,000 to the island of St. Thomas each year (Stoffle et al. 2011).

3.5.5.1.4.3 GoMEX Proposed Action Area

According to the 2018 NMFS marine recreational fishing data, the Gulf Coast accounted for 29 percent of angler trips and more than 37 percent of the catch nationally, but the majority of trips fished primarily in inland waters (NMFS 2020b). The largest harvests by weight were for red snapper, spotted seatrout, red drum, striped mullet, sheepshead, and Spanish mackerel, but the species most commonly caught on trips the in GoMEX proposed action area that fished primarily in federally-managed waters were red snapper, red grouper, white grunt, vermilion snapper, and sand perch. In 2016, recreational fishing expenditures across the Gulf of Mexico region (limited to Texas, Louisiana, Mississippi, Alabama, and western Florida) totaled $11 billion. In the same region (excluding Mexico), the greatest employment impacts from expenditures on saltwater recreational fishing in the Gulf of Mexico region were generated in western Florida (60,200 jobs), followed by Alabama (16,100 jobs). Western Florida and Texas had the largest sales impacts ($6.8 billion and $2 billion, respectively), the greatest income impacts ($2.6 billion and $746 million, respectively), and the greatest value added impacts ($4.1 billion and $1.2 billion, respectively) (NMFS 2018b).

Outside of the United States, the National Fisheries Institute in Mexico only collects data on the magnitude and value of commercial catches, not recreational fishing data. Additionally, the Mexican national tourism sector has never specifically looked at the direct contributions of sport fishing to tourism revenues. Roughly 3,500 vessels are registered in the Gulf of Mexico and the Caribbean (Food and Agriculture Organization of the United Nations 2003). Billfishes, dolphinfish, and Atlantic tarpon are the main species sought by recreational fishermen (Food and Agriculture Organization of the United Nations 2003).

3.5.5.1.4.4 NEPAC-North Proposed Action Area

According to recreational fishery data from the California Department of Fish and Wildlife, the most harvested species (by metric tons retained) in southern California in 2019 were vermilion rockfish, ocean whitefish, California scorpionfish, black rockfish, and Pacific herring (Pacific Coast Recreational Fisheries Information Network 2019). It should be noted that this recreational fishery report included coastal areas (and inland areas where marine fish are caught), but did not include pacific halibut, salmon, or highly migratory species from California waters. Southern California marine protected areas from Point Conception to the California-Mexico border are the southernmost component of a statewide marine protected area network. This network manages fishing, implementing special closures, prohibiting take of any resources, or limiting take of resources.

As stated above, Mexico only collects data on the magnitude and value of commercial catches. The majority of the marine recreational fishing vessels (7,500) are registered at ports in the Pacific Coast of Mexico (Food and Agriculture Organization of the United Nations 2003). Billfishes, dolphinfish and Atlantic tarpon are the main species sought by recreational fishermen (Food and Agriculture Organization of the United Nations 2003). During the last 20 years, the recreational billfish industry in Baja California Sur, Mexico has grown and surpassed commercial fishing as an industry in the state, particularly in the Los Cabos area (Cisneros-Montemayor et al. 2012). In addition, Loreto Bay, along the Gulf of California in Baja, Mexico, is world-renowned for its sport fishing and historically has been one of the most visited locations by sport anglers in the Gulf of California (Stamieszkin et al. 2009). Larger pelagic species (e.g., billfish, tuna, and dorado), which are often targeted by sport fishermen, reproduce at the mouth of the Gulf of California and then migrate north to feed, aggregating around topographic features such as seamounts, which are protected from fishing pressure in the Loreto Bay National Park (Stamieszkin et al. 2009).

3.5.5.1.4.5 NEPAC-South Proposed Action Area

According to the 2018 NMFS marine recreational fishing data, the Pacific Coast accounted for nearly three percent of angler trips and two percent of the catch nationally, but the majority of trips fished primarily in inland waters (NMFS 2020b). More than 94 percent of the trips taken in 2018 were made in California, followed by nearly four percent in Oregon, and nearly two percent in Washington (NMFS 2020b). By weight, the largest harvests were lingcod, black rockfish, vermilion rockfish, blue rockfish, Chinook salmon, and copper rockfish, but the most commonly caught Pacific Coast species in federally-managed waters were California corbina, California halibut, California lizardfish, California moray, and California scorpionfish (NMFS 2020b).

While southern California is located in the NEPAC-South proposed action area, the rest of the state is in the NEPAC-North proposed action area. Therefore, state level data are presented for Oregon, Washington, and California in order to include the entire region. The greatest economic impacts from expenditures on saltwater recreational fishing in the NEPAC-North proposed action area were generated in California and Washington. These included the greatest impact from employment (17,100 jobs and 4,600 jobs, respectively); sales ($2.1 billion in California and $542.1 million in Washington); income ($819.4 million in California and $209.4 million in Washington); and value-added impacts ($1.3 billion in California and $339.6 million in Washington). For comparison, in Oregon, there were roughly 1.1 million recreational marine fishing trips in 2017 which generated $54.7 million in direct trip spending (The Research Group 2018.).

3.5.5.1.4.6 AK Proposed Action Area

In Alaska, recreational fishing data are collected through an annual mail survey administered by the Alaska Department of Fish and Game. Sport anglers commonly fish for chinook salmon, coho salmon, pink salmon, sockeye salmon, chum salmon, Pacific halibut, rockfish, lingcod, and Pacific cod (Alaska Department of Fish and Game 2020a). Of Alaska's key species and species groups, Pacific halibut (643,000 fish), rockfish species (504,000 fish), and coho salmon (305,000 fish) were most frequently caught by recreational fishermen (NMFS 2018b). The most abundantly harvested of the salmon species were coho and pink salmon (NMFS 2020b). In 2016, economic impacts from recreational fishing activities in Alaska generated 4,865 jobs, $539.4 million in sales, $195.1 million in income, and $315.5 million in value-added impacts (NMFS 2018b).

3.5.5.1.4.7 HI-PAC Proposed Action Area

According to the 2018 NMFS marine recreational fishing data, the largest harvests in Hawaii by weight were yellowfin tuna, dolphinfish, wahoo, skipjack tuna, blue marlin, and giant trevally (NMFS 2020b). In 2016, economic impacts from recreational fishing activities in Hawaii generated 854 jobs, $105.4 million in sales, $33.3 million in income, and $54.7 million in value-added impacts (NMFS 2018b). Zeller et al. (2015b), synthesized fisheries catch reconstruction studies for 25 Pacific island countries, states, and territories and estimated the recreational fishing sector is the smallest component (two percent of total catches), most of which was contributed by the recreational reef and bottom fisheries in Hawaii. Although small in total catch, the recreational fishing sector is likely of economic importance in some areas due to its direct link to tourism income.

3.5.5.2 Environmental Consequences to Recreation and Tourism

The predominant socioeconomic impact of the OPC program would potentially result from an increase in Coast Guard presence in the proposed action areas. Replacement of the aging MEC fleet would facilitate the Coast Guard's ability to support their missions offshore. Coast Guard missions that would benefit recreation and tourism include law enforcement, living marine resources, marine safety, and SAR. Coast Guard would work to prevent over-fishing, reduce mortality of protected species, and protect marine habitats by enforcing domestic fishing laws and regulations (LMR); enforce foreign fishing vessel laws (OLE); enforce the MMPA and ESA (LMR); patrol the U.S. EEZ boundary areas to reduce the threat of foreign poaching of U.S. fish stocks (OLE); monitor compliance with international living marine resource regimes and international agreements OLE); and deter and enforce efforts to eliminate fishing using large drift-nets (OLE, LMR). Coast Guard would support mariners should an emergency arise; however, an emergency response is not covered under the Proposed Action. Additionally, outreach and educational programs conducted by the Coast Guard within the proposed action areas would facilitate communication between Coast Guard and the communities that they serve. Coast Guard would follow SOPs (Appendix C) to mitigate potential impacts to recreation and tourism activities that may occur near OPC trainings and operations.

Conversely, potential negative impacts to recreational fishing would be indirect impacts to fish from fathometer and Doppler speed log noise, vessel noise, vessel movement, and MEM associated with the Proposed Action. As discussed in Section 3.4.4.2, these impacts would not be significant. Potential negative impacts to whale watching would be indirect impacts to marine mammals from fathometer and Doppler speed log noise, vessel noise, vessel movement, and MEM associated with the Proposed Action. As discussed in Section 3.4.7.2, these impacts would not be significant. As a result, there would be no significant impact or harm to recreation and tourism as a result of the Proposed Action.

3.5.5.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to recreation and tourism as a result of Alternative 1.

3.5.5.2.2 Impacts Under Alternatives 2–3

Similar to Alternative 1, under Alternatives 2–3, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to recreation and tourism as a result of Alternatives 2–3.

3.5.5.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, with the exception of OPCs 1–5, Coast Guard offshore presence could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the offshore environment could decrease. However, there would be no significant impact or harm to recreation and tourism with implementation of the No Action Alternative.

3.5.6 Renewable Energy

3.5.6.1 Affected Environment

Renewable energy resources associated with the proposed action areas are those that are constantly and naturally replenished, including wind, solar, and geothermal, among others. Most, if not all, marine renewable energy sources are located within U.S. territorial waters (Table 3-28). Although operational activities associated with the Proposed Action would primarily take place between 50 and 200 nm from shore, marine renewable energy resources have been considered regardless of distance from shore since OPCs would be in transit to and from their respective homeport. For the purpose of this analysis, marine renewable energy has been broken out into water and wind resources.

3.5.6.1.1 Water Renewable Energy

Renewable energy resources in marine waters include wave energy, tidal energy, current energy, and Ocean Thermal Energy Conversion (OTEC). Wave power captures and converts the energy from waves into electricity, while tidal energy takes advantage of the ebb and flow of tides to create electricity. The theoretical annual energy potential of waves off the Atlantic and Pacific Coasts of the United States is estimated to be 2.64 trillion kilowatt-hours, or the equivalent of 64 percent of U.S. electricity generation in 2018 (U.S. Energy Information Administration 2019). Current energy is the creation of electricity using the water movement caused by ocean currents. OTEC is a process for producing energy by harnessing the temperature differences between ocean surface waters and deep ocean waters.

There is not currently any widespread technology in use for generating these marine renewable energies in the United States. Various government, research, and private entities are currently working to develop technology to harness this renewable energy source, including the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy. While there are institutions across the United States that are developing and testing the viability of these methods for creating renewable energy from the ocean, none are at a large enough scale to be commercially viable for energy production. These institutions are summarized in Table 3-49.

Table 3-49. Marine Renewable Energy Research Institutions in the United States

Institution	*Location*	*Proposed Action Area*	*Primary Research Objectives Relating to Marine Renewable Energy*
Southeast National Marine Renewable Energy Center	Boca Raton, FL	NW-ATL-Florida and the Caribbean	Focus on ocean currents and offshore thermal resources, including an experimental ocean current turbine, which is under development (Southeast National Marine Renewable Energy Center 2013).
Hawaii National Marine Renewable Energy Center	Honolulu, HI	HI-PAC	Facilitate the development of commercial wave energy systems, including implementation of a grid-connected wave energy test site at Marine Corps Base Hawaii to allow developers to prove their devices and advance designs toward commercial readiness. Additionally, establish and maintain a testing site for OTEC demonstrations and studies (Hawaii National Marine Renewable Energy Center 2020).
Pacific Marine Energy Center	Newport, OR	NEPAC-North	Works on research and development of technologies and monitoring, and tests marine renewable energy technologies in partnership with multiple universities. Research includes multiple projects under the following categories: marine energy resource characterization, wave energy conversion technology, current energy and turbine technology, marine operations, environmental effects of marine energy technologies, and the sociopolitical effects of marine energy (Pacific Marine Energy Center 2020).

Additionally, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy funds projects related to marine and hydrokinetic energy. These projects are broken out into four areas that represent strategic approaches to addressing challenges faced by U.S. marine and hydrokinetic energy stakeholders: data sharing and analysis ($9.30 million in 2019), foundational and crosscutting research and development ($9.14 million in 2019), reducing barriers to testing ($20.60 million in 2019), and technology-specific system design and validation ($30.95 million in 2019) (U.S. Department of Energy Water Power Technologies Office 2020).

3.5.6.1.2 Wind Energy

Wind energy is derived from the force of moving air that causes large wind turbine blades to rotate. The blades are connected to an electric generator that converts the mechanical energy from the wind into electricity, which is then transferred to the electrical power grid. The first commercial offshore wind farm in the United States, located in state waters off Block Island, Rhode Island, came online and reached commercial operation in December 2016. The Block Island Wind Farm was developed by Deepwater Wind, LLC (which was purchased by Orsted in 2018) and is capable of generating 30 megawatts of power using five wind turbines. The construction of the Block Island Wind Farm employed over 300 local workers (Orsted 2020).

A National Offshore Wind Strategy: Creating an Offshore Wind Energy Industry in the United States was prepared in 2011 to support development of a world-class offshore wind industry in the United States (U.S. Department of Energy, 2011). BOEM developed a regulatory framework to review proposed offshore wind projects in federal waters, and proposed a process for the renewable energy program that occurs in four distinct phases (Bureau of Ocean Energy Management 2017):

1. Planning and Analysis – this phase seeks to identify suitable areas for wind energy leasing consideration through collaborative, consultative, and analytical processes that engage stakeholders, tribes, and state and federal government agencies. During this phase, BOEM conducts environmental compliance reviews and consultations with tribes, states, and natural resource agencies.
2. Leasing – this phase results in the issuance of a commercial wind energy lease, either through a competitive or noncompetitive process. Leases grant lessees the right to use the lease area to develop plans, but does not grant the right to construct any facilities.
3. Site Assessment – this phase includes the submission of a Site Assessment Plan (SAP), which includes the lessee's detailed proposal for the construction of a meteorological tower and/or the installation of meteorological buoys on the leased area. The SAP must be approved by BOEM before any site assessment activities occur.
4. Construction and Operations – this phase consists of the submission of a Construction and Operations Plan (COP), which is a detailed plan for the construction and operation of a wind energy project on the lease. BOEM conducts environmental and technical reviews of the COP and decides whether or not to approve the COP.

Action regarding the development of offshore wind farms has only been taken in the NW-ATL proposed action area and the HI-PAC proposed action area. Offshore wind energy has not been established in any other proposed action area. Although there are efforts to determine the viability of offshore wind energy in all other proposed action areas (i.e., determination of three potential lease sites off the coast of California), there are none currently past the planning and analysis stage. For example, BOEM recently funded two projects looking at the feasibility of marine renewable energy, including offshore wind energy, in the Gulf of Mexico (Musial et al. 2020; Musial et al. 2019). While these studies indicate that capacity for offshore wind in the Gulf of Mexico is large (especially in shallow waters less than 197 ft [60 m] deep), no lease sites have been identified, nor has a lease sale been held. No offshore wind farms currently exist in any foreign countries whose EEZs may overlap one or more of the proposed action areas.

3.5.6.1.2.1 NW-ATL Proposed Action Area

Since 2009, BOEM's Office of Renewable Energy Programs has issued commercial wind energy leases for offshore wind farm development for projects located within the Northwest Atlantic proposed action area (Table 3-50).

Table 3-50. Current BOEM Offshore Wind Leases in the NW-ATL Proposed Action Area (Bureau of Ocean Energy Management 2019)

Lessee	*State*	*Area in Acres (Hectares)*	*Lease Number, Year*	*Current Status/Next Step*
Garden State Offshore Energy I	Delaware	70,098 (28,368)	OCS-A 0482, 2012	SAP
Deepwater Wind New England	Rhode Island/Massachusetts	97,498 (39,456)	OCS-A 0486, 2013	COP
Deepwater Wind New England	Rhode Island/Massachusetts	67,252 (27,216)	OCS-A 04887, 2013	COP
Virginia Electric and Power Company	Virginia	112,799 (45,648)	OCS-A 0483, 2013	COP
US Wind	Maryland	79,707 (32,256)	OCS-A 0490, 2014	COP
Vineyard Wind	Massachusetts	166,866 (67,536)	OCS-A 0501, 2015	COP
Bay State Wind	Massachusetts	187,523 (75,888)	OCS-A 0500, 2015	COP
Ocean Wind	New Jersey	160,480 (64,944)	OCS-A 0498, 2016	COP
Atlantic Shores Offshore Wind	New Jersey	183,353 (74,200)	OCS-A 0499, 2016	SAP
Equinor	New York	79,350 (32,112)	OCS-A 0512, 2017	COP
Avangrid Renewables	North Carolina	122,405 (49,536)	OCS-A 0508, 2017	SAP
Skipjack	Delaware	26,332 (10,656)	OCS-A 0519, 2018	COP
Equinor	Massachusetts	128,811 (52,128)	OCS-A 0520, 2018	SAP
Mayflower Wind	Massachusetts	127,388 (51,552)	OCS-A 0521, 2018	SAP
Vineyard Wind	Massachusetts	132,370 (53,568)	OCS-A 0522, 2018	SAP

COP = Construction and Operations Plan, SAP = Site Assessment Plan

BOEM grants rights-of-way allowing developers to build electricity transmission lines connecting commercial windfarms and other offshore renewable energy installations to the on-shore electrical grid. BOEM executed a right-of-way grant in 2014 for a cable project that supported the Block Island Wind Farm. BOEM expects to receive additional unsolicited applications for right-of-way grants in the future, such as the application by Pure New Energy Wind to lease an area totaling 40,920 acres (16,560 hectares) near the New York Wind Energy area (Bureau of Ocean Energy Management 2020b). Other offshore windfarm projects are expected in the coming years for both research and commercial development in state and federal waters.

3.5.6.1.2.2 HI-PAC Proposed Action Area

Three unsolicited lease applications by two potential developers in Hawaii have been submitted to BOEM. These would all be for offshore floating wind energy facilities with capacities of approximately 40 megawatts each. Each facility would be located off the island of Oahu.

AW Hawaii Wind, LLC (AWH) submitted lease requests for the AWH Oahu Northwest Project and the AWH Oahu South Project. The Oahu Northwest Project would be located 12 mi (19 km) northwest of Kaena Point on Oahu. The Oahu South Project would be located 17 mi (27 km) south of Diamond Head on Oahu. Progression Hawaii Offshore Wind, Inc. submitted a lease request for the Progression South Coast of Oahu Project. The proposed project site would be located 9 mi (14 km) south-southeast of Barber's Point on Oahu, and would cover 77,440 acres (31,339 hectares).

3.5.6.2 Environmental Consequences to Renewable Energy

The predominant socioeconomic impact of the OPC program would potentially result from an increase in Coast Guard presence in the proposed action areas. Replacement of the aging MEC fleet would facilitate the Coast Guard's ability to support their missions offshore. Coast Guard missions that would benefit renewable energy include marine safety and SAR. Coast Guard would also support workers on vessels or at structures, should an emergency arise; however, an emergency response is not covered under the Proposed Action. Additionally, outreach and educational programs conducted by the Coast Guard within the proposed action areas would facilitate communication between Coast Guard and the communities that they serve. Coast Guard would follow SOPs (Appendix C) to mitigate potential impacts to renewable energy activities that may occur near OPC trainings and operations. As a result, there would be no significant impact or harm to renewable energy as a result of the Proposed Action.

3.5.6.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to renewable energy as a result of Alternative 1.

3.5.6.2.2 Impacts Under Alternatives 2–3

Similar to Alternative 1, under Alternatives 2–3, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to renewable energy as a result of Alternatives 2–3.

3.5.6.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, with the exception of OPCs 1–5, Coast Guard offshore presence could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the offshore environment could decrease. However, there would be no significant impact or harm to renewable energy with implementation of the No Action Alternative.

3.5.7 Research

3.5.7.1 Affected Environment

A number of activities that may occur at sea, including research, do not have ocean economy data consistently compiled or publicly available. For the purposes of this analysis, research may include businesses in industry, academia (higher education institutions), and companies in the public sector. Ocean research is conducted for many purposes, including, but not limited to: the stewardship of natural and cultural ocean resources, increasing resilience to natural hazards and environmental disasters, maritime activities (e.g., fishing, boating, shipping, military operations, energy exploration) and the marine environment, understanding the ocean's role in climate, improving health of marine ecosystems, and enhancing human health. While ocean research may be conducted coastally, or in labs, at-sea research is the focus of this analysis due to the potential overlap with the proposed action areas.

Research cruises may be conducted offshore to collect oceanographic data (e.g., ocean productivity, temperature, salinity, weather), study marine debris, sample fisheries, explore shipwrecks, study ecosystems, and observe/survey marine animals. Table 3-51 provides representative examples of research that may be conducted in each proposed action area. NOAA operates the largest fleet of oceanographic research vessels (NMFS 2020e; NOAA 2020b), though others are run by the U.S. Coast Guard, Office of Naval Research, the University-National Oceanographic Laboratory System, universities, and non-profit organizations. The cruises run by these vessels may be within any of the proposed action areas and are detailed in Table 3-51. Collaborations among the organizations that own and operate the vessels are common.

As listed in Table 3-51, there are several Research Vessels (R/Vs) used for offshore research. Any number of these vessels could be at sea conducting research at any given time. In addition, it is not uncommon for an organization to conduct research on a private vessel, such as conducting sea scallop surveys aboard a private fishing vessel (NMFS 2021). According the U.S. Coast Guard 2018 Domestic Annual Report, there were 55 active R/Vs and School Ships, which make up 0.3 percent of all U.S. inspected vessels and are inspected under 46 CFR Subchapters U (research vessels) and R (school ships) (USCG 2018). Not all active research vessels have offshore research capabilities. Furthermore, manned and unmanned submarines, research buoys, platforms, and remotely operated vehicles are also used for offshore research. These may be deployed off of an R/V for brief periods or deployed and left offshore for continuous data collection for a longer period of time.

It should be noted that portions of many of the proposed action areas are located outside of the United States. In OPC operational areas within foreign EEZs, research would likely also occur. In most locations, the research would be similar to that conducted in U.S. waters. In addition, research vessels flagged in other countries may travel to High Seas or coastal foreign EEZs to conduct this research. For example, a U.S. flagged vessel, like the SSV Corwith Cramer, may conduct research in the Caribbean or off the coast of Canada. Conversely, it would be assumed that vessels flagged in other countries may also visit U.S. waters to study marine science.

Funding for research programs can come from a variety of grants through federal organizations such as the National Sea Grant Program, the National Science Foundation, the National Undersea Research Program, NOAA's Center for Sponsored Coastal Ocean Research, the Environmental Protection Agency, the Federal Emergency Management Agency Hazard Mitigation Grant Program, the U.S. Department of Agriculture, BOEM, and the USFWS (NOAA 2020a). The National Science Foundation, for example, awarded more than 7.5 million dollars to the U.S. in Fiscal Year 2019 for research support, education resources, and major research equipment (National Science Foundation 2019). The monetary value varies and depends upon the funding source and organization.

Table 3-51. Research Organizations with Offshore Research Potential by Proposed Action Area

Representative Research Organizations	***Representative Example of Research***	***Current Research Vessels***
NW-ATL Proposed Action Area		
NOAA Fisheries	Longline fishery research; fishery management (NMFS 2020a)	NOAA Ship Henry B. Bigelow; NOAA Ship Gloria Michele; NOAA Ship Ferdinand R. Hassler; NOAA Ship Nancy Foster; NOAA Ship Okeanos Explorer; NOAA Ship Ronald H. Brown; NOAA Ship Thomas Jefferson (NOAA 2020b)
Woods Hole Oceanographic Institution	Oil spill research (WHOI 2011); archaeology	R/V Atlantis[1]; R/V Neil Armstrong[1]; R/V Tioga (WHOI 2020)

Representative Research Organizations	***Representative Example of Research***	***Current Research Vessels***
Marine Biological Laboratory (Affiliated with the University of Chicago)	Microbiomes and microbial diversity and ecology in a variety of ocean habitats	R/V Gemma
Sea Education Association	*Sargassum* seaweed research; marine debris (Sea Education Association 2020)	SSV[2] Robert C. Seamans; SSV Corwith Cramer
University of Rhode Island's Graduate School of Oceanography	General scientific research and educational training	R/V Resolution[3]
University of Delaware	Ocean acidification	R/V Hugh R. Sharp (Thomas 2018)
Columbia University's Lamont-Doherty Earth Observatory	Sediment cores; climate variations throughout the Earth's history (Lamont-Doherty Earth Observatory Columbia University Earth Institute 2018)	R/V Marcus G. Langseth (Lamont-Doherty Earth Observatory Columbia University Earth Institute 2018)
University of Georgia's Skidaway Institute of Oceanography	Hydrothermal vent plumes (University of Georgia 2020)	R/V Savannah (Skidaway Institute of Oceanography 2020)
NW-ATL-Florida and the Caribbean Proposed Action Area		
NOAA Fisheries' Caribbean Marine Research Center	Coral reef ecology; marine carbonate geology and related microbiological processes (NOAA 2020c)	NOAA Ship Okeanos Explorer (NOAA 2020b)
University of Miami	Shallow water environment research and diving operations	R/V Walton Smith (Rosenstiel School of Marine and Atmospheric Science Uniersity of Miami 2020)
Shedd Aquarium's floating research station, Bahamas	Queen conch and Nassau grouper population surveys; coral health; shark demographics (Shedd Aquarium 2020)	R/V Coral Reef II
GoMEX Proposed Action Area		
NOAA Fisheries	Fisheries, plankton, and marine mammal surveys; ecosystem research	NOAA Ship Gordon Gunter; NOAA Ship Oregon II; NOAA Ship Pisces (NOAA 2020b)
NEPAC-North Proposed Action Area		
NOAA Fisheries (including the Environmental Research Division)	California current system (NMFS 2020g).	NOAA Ship Bell M. Shimada; NOAA Ship Oscar Elton Sette; NOAA Ship Rainier (NOAA 2020b)
NOAA Pacific Marine Environmental Laboratory	Deep-ocean assessment and reporting of tsunamis technology (NOAA 2020d)	
University of Washington	Fisheries and oceanographic research	R/V Thomas G. Thompson; R/V Rachel Carson (University of Washington 2020)
University of Oregon	Adjective and diffusive transport in the ocean and atmosphere (Oregon State University 2020)	R/V Taani
NEPAC-South Proposed Action Area		
NOAA Fisheries	Fish, marine mammal, seabird, and turtle surveys	NOAA Ship Reuben Lasker (NOAA 2020b)

Representative Research Organizations	*Representative Example of Research*	*Current Research Vessels*
University of California San Diego's Scripps Institution of Oceanography	Plate tectonics; marine biodiversity (UC San Diego Scripps Institution of Oceanography 2020)	R/V Roger Revelle; R/V Sally Ride; R/V Robert Gordon Sproul; R/V Bob and Betty Beyster; R/V New Horizon
AK Proposed Action Area		
NOAA Fisheries	Fisheries surveys; marine mammal and seabird surveys; marine ecosystems	NOAA Ship Fairweather; NOAA Ship Oscar Dyson (NOAA 2020b)
University of Alaska Fairbanks' College of Fisheries and Ocean Sciences	Sea ice research; collection of sediment samples from the seafloor (The University of Alaska Fairbanks 2020)	R/V Sikuliaq (The University of Alaska Fairbanks 2020)
HI-PAC Proposed Action Area		
University of Hawaii's Marine Center	Oceanographic research in coastal and deep ocean areas; geophysical, physical oceanographic, meteorological, and radioisotope research (Monoa 2020)	R/V Kilo Moana (Monoa 2020)

[1] Owned by the Office of Naval Research (ONR)
[2] SSV = Sailing School Vessel
[3] Anticipated in 2022

3.5.7.2 Environmental Consequences to Research

The predominant socioeconomic impact of the OPC program would potentially result from an increase in Coast Guard presence in the proposed action areas. Replacement of the aging MEC fleet would facilitate the Coast Guard's ability to support their missions offshore. Coast Guard missions that would benefit research include marine safety and SAR. Coast Guard would also support researchers on vessels, should an emergency arise; however, an emergency response is not covered under the Proposed Action. Additionally, outreach and educational programs conducted by the Coast Guard within the proposed action areas would facilitate communication between Coast Guard and the communities that they serve. Coast Guard and the communities that they serve. Coast Guard would follow SOPs (Appendix C) to mitigate potential impacts to research activities that may occur near OPC trainings and operations. As a result, there would be no significant impact or harm to research as a result of the Proposed Action.

3.5.7.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to research as a result of Alternative 1.

3.5.7.2.2 Impacts Under Alternatives 2–3

Similar to Alternative 1, under Alternatives 2–3, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to research as a result of Alternatives 2–3.

3.5.7.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, with the exception of OPCs 1–5, Coast Guard offshore presence could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the offshore environment could decrease. However, there would be no significant impacts to research with implementation of the No Action Alternative.

3.5.8 Transportation and Shipping

3.5.8.1 Affected Environment

A wide variety of vessels transit through the proposed action areas. These vessels may include container ships bringing products to markets; tankers and dry bulk vessels bringing ore, oil, gas, and other commodities to and from their points of production; fishing vessels; passenger and tourism vessels (3.5.5); and research vessels (Section 3.5.7). While many smaller vessels (e.g., fishing, passenger, and research vessels), use a variety of ports throughout the country (Section 3.5.1 and Section 3.5.5), commercial cargo vessels, especially those that operate in international trade, tend to utilize major shipping ports. Table 3-52 provides information on major commercial shipping ports located within the proposed action areas. For this PEIS/POEIS, major commercial shipping ports are defined as the top 25 ranked U.S. ports for each of tonnage, containers, or dry bulk as listed by the U.S. Department of Transportation Bureau of Transportation Statistics (2020). Some ports are included even though they are a short distance up a river from the coastal shoreline (outside of the proposed action areas) because the majority of vessels that transit to-and-from the ports would transit through the proposed action areas.

Table 3-52. Major Commercial Shipping Ports by Proposed Action Area

Port	*Location*	*2018 Total Tonnage Throughput (short tons)*[1]	*2018 Top 25 Ranked Port for Tonnage, Containers, or Dry Bulk?*	*Notes on Port Economics*
NW-ATL Proposed Action Area				
Port of Boston	Boston, MA	16,163,552	Containers	As of 2020, the port supports $8.2 billion in economic impact annually and 66,000 jobs (Massport 2020).
Port of New York & New Jersey	New York, NY and nearby New Jersey communities	140,281,992	Tonnage Containers Dry Bulk	In 2016, the port generated over $64 billion in business activity and supported approximately 400,000 jobs (direct, indirect, induced)[2] (Strauss-Wider 2017).
Port of Philadelphia	Philadelphia, PA	26,656,373	Tonnage Containers	As of 2019, annual port revenue was $5.7 million, and the port directly supported over 3,000 jobs (Philadelphia Regional Port Authority 2019).
Port of Wilmington	Wilmington, DE	6,603,444	Containers	As of 2020, the port annually produces $436 million in business revenue and supports 5,900 jobs (direct, indirect, induced) (GT USA Wilmington 2020).

Port	*Location*	*2018 Total Tonnage Throughput (short tons)*[1]	*2018 Top 25 Ranked Port for Tonnage, Containers, or Dry Bulk?*	*Notes on Port Economics*
Port of Baltimore	Baltimore, MD	44,778,259	Tonnage Containers Dry Bulk	In 2017, the port generated $2.6 billion in business revenues; generated $395 million in state, county, and municipal tax revenues; and supported over 37,000 jobs (direct, indirect, induced) (Martin Associates 2018a).
Port of Virginia	Portsmouth, VA	71,774,349	Tonnage Containers Dry Bulk	In 2018, the port had $92.1 billion in output sales, $39.3 billion in Virginia gross state product, and supported approximately 397,000 full- and part-time jobs (Pearson and Swan 2019).
Port of Wilmington	Wilmington, NC	6,039,927	Containers	In fiscal year 2018, the port supported $12.9 million in gross revenues for North Carolina businesses and contributed to over 78,000 jobs (Head et al. 2018).
Port of Charleston	Charleston, SC	24,822,636	Containers	The combined total economic impact of the ports of Charleston and Georgetown is approximately $63.4 billion, and the two ports support over 19,000 jobs (direct, indirect, induced) (Von Nessen 2019).
Port of Savannah	Savannah, GA	41,273,947	Tonnage Containers	In fiscal year 2017, this port generated an economic output of $4.3 million and supported over 33,000 jobs (direct, indirect, induced) (Humphreys 2018).
NW-ATL-Florida and the Caribbean Proposed Action Area				
Port of Jacksonville	Jacksonville, FL	17,999,036	Containers	In 2018, cargo activity at the port created $27 billion of total economic output, and port activities supported over 26,000 jobs (direct, indirect, induced) (Martin Associates 2019).
Port of Palm Beach	Riviera Beach, FL	2,094,734	Containers	In 2018, the cruise and cargo sectors of the port, combined, generated over $250 million in revenue and supported over 2,900 jobs (Port of Palm Beach 2019).
Port Everglades	Fort Lauderdale, FL	25,022,351	Containers	In fiscal year 2019, the port's total value of economic activity was over $32 million, and that activity supported over 219,000 jobs (direct, indirect, induced, related) (Broward County Port Everglades Department 2019).
Port of Miami	Miami Beach, FL	8,371,129	Containers	In fiscal year 2018, the port supported over $43 billion in economic activity for the state and impacted over 334,000 jobs (direct, indirect, induced, related) (PortMiami 2018).
Port of San Juan	San Juan, Puerto Rico	11,737,059	Containers	Puerto Rico imports approximately 85 percent of its foodstuffs, and the vast majority of imports arrive via the ports. In 2012, marine transportation services (including cargo handling and port operations) throughout Puerto Rico employed over 1,800 people. In fiscal year 2015, estimated combined cruise passenger and crew

Port	***Location***	***2018 Total Tonnage Throughput (short tons)[1]***	***2018 Top 25 Ranked Port for Tonnage, Containers, or Dry Bulk?***	***Notes on Port Economics***
				spending in Puerto Rico was over $100 million (Clements et al. 2016a).
GoMEX Proposed Action Area				
Port of Corpus Christi	Corpus Christi, TX	93,751,006	Tonnage	In 2018, the port had $45.6 million in net income, supporting $150 billion in total U.S. economic activity (Port Corpus Christi 2019).
Port Houston	Houston, TX	269,003,164	Tonnage Containers Dry Bulk	In 2018, the port supported over 3.2 million jobs, $801.9 billion in economic value, and $38.1 billion in tax revenue nationally (Port Houston 2020).
Port of Texas City	Texas City, TX	42,727,582	Tonnage	The Port of Texas City is the third largest port in Texas (World Port Source 2020). The top 12 Texas port districts, combined, generated over 5 million jobs and over $1.1 million in economic impact in 2015 (Martin Associates 2016a). Specific data on the Port of Texas City economic impact is not available.
Port of Port Arthur	Port Arthur, TX	39,851,706	Tonnage	One of the top 12 port districts in the state, which combined generated over 5 million jobs and over $1.1 million in economic impact in 2015 (Martin Associates 2016a). Specific data on Port Arthur's economic impact is not available.
Port of Beaumont	Beaumont, TX	100,468,257	Tonnage	This port boasts $24.5 billion in economic impact annually and supports 67,000 jobs (direct, indirect, induced) (Port of Beaumont 2020).
Port of Lake Charles	Lake Charles, LA	57,064,647	Tonnage	In 2018, the port's net revenue was $4.7 million (Lake Charles Harbor and Terminal District 2019).
Port of Plaquemines	Belle Chasse, LA	56,850,137	Tonnage Dry Bulk	In 2014, the port had an annual revenue of over $5.4 million and employed 40 people (Port Plaquemines 2020).
Port of New Orleans	New Orleans, LA	93,332,543	Tonnage Containers Dry Bulk	Total operating revenue for fiscal year 2018 was $78.3 million (Wendel 2019).
Port of South Louisiana	Laplace, LA	275,557,702	Tonnage Dry Bulk	In 2013, the port supported over 83,000 jobs throughout the region and generated over $310 million in tax revenue (Loren C. Scott & Associates 2015).
Port of Greater Baton Rouge	Baton Rouge, LA	82,234,811	Tonnage Dry Bulk	In 2018, port operating revenues were over $15 million (Hardman et al. 2019).
Port of Gulfport	Gulfport, MS	2,052,691	Containers	Total operating revenue for fiscal year 2019 was $28.2 million (Alexander 2019).
Port of Pascagoula	Pascagoula, MS	27,358,043	Tonnage	According to a 2004 study, the port is responsible for 19,370 direct jobs, $902 million

Port	*Location*	*2018 Total Tonnage Throughput (short tons)*[1]	*2018 Top 25 Ranked Port for Tonnage, Containers, or Dry Bulk?*	*Notes on Port Economics*
				in personal income, and $50 million in state tax revenue (Jackson County Port Authority 2020).
Port of Mobile	Mobile, AL	58,726,003	Tonnage Containers Dry Bulk	The port has a total economic value of $22.4 billion and supports over 134,000 jobs (direct, indirect) (Alabama State Port Authority 2020).
Port Tampa Bay	Tampa, FL	31,006,487	Tonnage Dry Bulk	In fiscal year 2015, the port's total economic activity was valued at $15.6 million, and the port supported over 85,000 jobs (direct, indirect, induced, related) (Martin Associates 2016b).
NEPAC-North Proposed Action Area				
Port of Seattle	Seattle, WA	26,046,093	Containers Dry Bulk	In 2017, the cargo facilities of the ports of Seattle and Tacoma, combined, directly supported $5.9 billion in business output and over 20,000 jobs (Community Attributes Inc. 2019).
Port of Tacoma	Tacoma, WA	22,874,791	Containers	
Port of Longview	Longview, WA	13,738,906	Dry Bulk	In 2018, the port had $2.8 billion in total economic activity ($678 million towards the local business economy), and port-related activity employed 11 percent of workers in Cowlitz County (Port of Longview 2020).
Port of Kalama	Kalama, WA	15,796,458	Dry Bulk	In 2017, total operating revenue was $14.6 million, and businesses on the port employed 1,024 people (Port of Kalama 2020).
Port of Portland	Portland, OR	23,267,941	Dry Bulk	This port generates $6.4 billion a year in economic value to the Portland area, including 27,000 local jobs (Port of Portland 2020).
Port of Richmond	Richmond, CA	27,255,061	Tonnage	Combined, the California ports generate an estimated $9 billion in state and local tax revenue annually and contribute to more than 3 billion jobs nationally (California Association of Port Authorities 2020). Specific data on the Port of Richmond's economic impact is not available.
Port of Oakland	Oakland, CA	19,373,876	Containers	In 2017, the port generated $9.9 billion in business revenue and supported over 84,000 jobs (direct, indirect, induced) (Martin Associates 2018b).
NEPAC-South Proposed Action Area				
Port of Los Angeles	Los Angeles, CA	67,806,137	Tonnage Containers	The port's fiscal year 2019 operating revenue was $506 million, and the port supports 150,000 jobs within Los Angeles and 1.6 million jobs within the United States (The Port of Los Angeles 2019). This port had the 17th highest container throughput in the world in 2018 (United Nations Conference on Trade and Development 2019).
Port of Long Beach	Long Beach, CA	86,536,154	Tonnage Containers	The port generates $374 billion in direct and indirect business sales annually and supports

Port	*Location*	*2018 Total Tonnage Throughput (short tons)*[1]	*2018 Top 25 Ranked Port for Tonnage, Containers, or Dry Bulk?*	*Notes on Port Economics*
			Dry Bulk	approximately 51,000 jobs in Long Beach and 576,000 jobs within the five-county Southern California region (Port of Long Beach 2020). This port had the 20th highest container throughput in the world in 2018 (United Nations Conference on Trade and Development 2019).
AK Proposed Action Area				
Port of Alaska	Anchorage, AK	3,252,349	Containers	In 2018, the port's total operating revenue was $12.3 million (BDO USA 2019).
HI-PAC Proposed Action Area				
Port of Honolulu	Honolulu, HI	15,181,890	Containers	Approximately 80 percent of products used in Hawaii are imported, and 98.6 percent of imports arrive by sea. Nearly all imports arrive through the Port of Honolulu. In 1992, $10.3 billion in imports passed through Hawaii's commercial harbors (Hawaii State Department of Transportation 1997).

[1] As reported by the U.S. Department of Transportation (2020).

[2] Direct jobs are those generated by cargo and vessel activity at a port (e.g., cargo handling or truckers). Indirect jobs are those supported by the business purchases of the employers who create the direct jobs (e.g., utilities, office suppliers, or repair services). Induced jobs are those supported by the local purchases of goods and services by direct employees (e.g., sales clerks, restauranteurs, or teachers) (Martin Associates 2018a).

In addition to the physical ports where cargo is loaded and unloaded, commercial vessels also transit throughout the oceans. Close to ports, commercial vessels typically follow designated lanes via traffic separation schemes (National Oceanic and Atmospheric Administration 2017, 2020). Farther from coasts, cargo ships are more dispersed. Although there are frequently traveled shipping lanes where more commercial ship traffic would be expected to occur, vessel traffic throughout the proposed action areas is widespread (National Oceanic and Atmospheric Administration 2020; Rodrigue et al. 2017; United Nations Conference on Trade and Development 2019).

Table 3-53 provides information on the marine transportation (e.g., ferries, cruise ships) sector within each proposed action area. While some ferries are used by tourists and residents to reach recreational destinations, others are used solely for transportation. The number one cruise destination in the world is the Caribbean, accounting for roughly 32 percent of all ocean-going cruises (Cruise Lines International Association 2020). Within the proposed action areas, Alaska is another popular cruise destination (5 percent of all ocean-going cruises) (Cruise Lines International Association 2020). Most other cruise destinations are outside of the proposed action areas (e.g., the Mediterranean, Europe, and China) (Cruise Lines International Association 2020). See Section 3.5.5.1.3 for more information on cruise travel economics.

Table 3-53. Economic Impact of Marine Transportation by Ports within the Proposed Action Areas

Proposed Action Area	*Number of Registered U.S. Coastal Ferry Ports[1]*	*Number of Marine Transportation[2] Jobs*	*GDP Attributed to Marine Transportation[2] (in Millions USD)*	*Major Cruise Ship Departure Ports*
NW-ATL	189	187,956	$21,546	Boston, MA New York, NY Cape Liberty, NJ Baltimore, MD Norfolk, VA Charleston, SC
NW-ATL-Florida and the Caribbean	24	29,291	$3,370	Jacksonville, FL Port Canaveral, FL Riviera Beach, FL Fort Lauderdale, FL Miami, FL San Juan, PR
GoMEX[3]	19	66,601	$7,638	Galveston, TX New Orleans, LA Mobile, AL Tampa, FL
NEPAC-South [4]	24	65,649	$11,528	Los Angeles, CA Long Beach, CA San Diego, CA
NEPAC-North	69	51,534	$5,119	Seattle, WA San Francisco, CA
AK	44	2,143	$165	Anchorage, AK Seward, AK
HI-PAC	8	3,822	$599	Honolulu, HI

[1] As compiled by the U.S. Department of Transportation (2018).

[2] Economics: National Ocean Watch's annual time-series data. Job statistics account for the number of people employed by business establishments, including part-time and seasonal workers. GDP is based on the value of goods and services that were produced in 2017 (NOAA Office for Coastal Management 2020).

[3] Monroe County, Florida data was included within the GoMEX proposed action area although the county borders expand into the NW-ATL-Florida and the Caribbean proposed action area as well.

[4] Santa Barbara County, California data was included in the NEPAC-South proposed action area although the county borders expand into the NEPAC-North proposed action area as well

Maritime shipping and transportation likewise play an important role in countries outside the United States, including those countries whose EEZs are encompassed within the proposed action areas. Greater than four-fifths of world merchandise trade (by volume) is transported by marine vessels (United Nations Conference on Trade and Development 2019), making the global economy heavily dependent on transportation and shipping. In 2018, global maritime trade volume totaled 11 billion tons, although the rate of growth from previous years has slowed due to global economic and political hardships (United Nations Conference on Trade and Development 2019). Despite the slowed growth in 2018, the United Nations Conference on Trade and Development (2019) estimated an average 3.4 percent annual growth in global maritime trade during the period from 2019 to 2024.

Globally, the regions most engaged in international trade are Asia (accounting for nearly two-thirds of all container port-handling activity in 2018), the Americas, and Europe (United Nations Conference on Trade and Development 2019). Latin America (including the Caribbean), combined, had higher than average growth rates in imports in 2018 (5.9 percent compared to the global average of 3.1 percent), and the annual percentage growth in exports matched the global average (2.5 percent) (United Nations Conference on Trade and Development 2019). However, mainland Latin American countries, specifically, experienced a decline in global trade in 2018 (United Nations Conference on Trade and Development 2019). Shipping between Mexico and the United States may increase in the future due to a response to recent trade pressures where over 10 percent of manufacturers relocated from China to Mexico (United Nations Conference on Trade and Development 2019). According to the United Nations Conference on Trade and Development (2019), Canada and Japan are also expected to attract substantial new trade business in the future. The Pacific Island economies, including Guam and American Samoa, have some of the lowest container shipping activity in the world (United Nations Conference on Trade and Development 2019). Although the Port of Guam is not a major commercial port for local trade, it does play a key role in international shipping, serving as a transportation hub linking the Commonwealth of the Northern Mariana Islands, the Micronesian islands, the Asian markets, and the United States (Port Authority of Guam 2020).

3.5.8.2 Environmental Consequences to Transportation and Shipping

The predominant socioeconomic impact of the OPC program would potentially result from an increase in Coast Guard presence in the proposed action areas. Replacement of the aging MEC fleet would facilitate the Coast Guard's ability to support their missions offshore. Coast Guard missions that would benefit transportation and shipping include ports, waterways, and coastal security; marine safety; and SAR. OPC assets would tow or escort crippled vessels to safety and escort vessels of high national security importance (e.g., newly commissioned submarines); conduct homeland security missions aimed at preventing catastrophic events, such as port security patrols; intercept vessels suspected of housing illegal cargo (e.g., a "go-fast" drug smuggling boat), conduct security boardings; and survey port approaches. Maritime security operations would be conducted by OPC assets before, during, and after a threat (i.e., terrorist incident) occurs against the U.S. Maritime Domain. Coast Guard would also support workers on vessels or oil and gas platforms, should an emergency arise; however, an emergency response is not covered under the Proposed Action. Additionally, outreach and educational programs conducted by the Coast Guard within the proposed action areas would facilitate communication between Coast Guard and the communities that they serve. Coast Guard would follow SOPs (Appendix C) to mitigate potential impacts to transportation and shipping activities that may occur near OPC trainings and operations. As a result, there would be no significant impact or harm to transportation and shipping as a result of the Proposed Action.

3.5.8.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to transportation and shipping as a result of Alternative 1.

3.5.8.2.2 Impacts Under Alternatives 2–3

Similar to Alternative 1, under Alternatives 2–3, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to transportation and shipping as a result of Alternatives 2–3.

3.5.8.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, with the exception of OPCs 1–5, Coast Guard offshore presence could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the offshore environment could decrease. However, there would be no significant impact or harm to transportation and shipping with implementation of the No Action Alternative.

3.5.9 Subsistence Fishing and Hunting

3.5.9.1 Affected Environment

In this document, the term subsistence refers to the take of animals locally for non-commercial purposes, in order to feed one's self, family, or community (Berkes 1990). It is difficult to monitor subsistence activities, as compared to commercial and recreational activities, because they tend to be diffuse, sporadic, and less dependent on established infrastructures associated with fishing and hunting practices (e.g., licenses, catch limits) (Schumann and Macinko 2007).

The adaptability of fishermen to switch gears and target species makes it difficult to differentiate between subsistence, traditional (artisanal) and advanced artisanal (semi-industrial) fishing (Salas et al. 2011). There are no particular criteria or thresholds, such as income level or frequency of fishing that define subsistence fishing. Depending on the country and regional jurisdiction, governmental bodies may manage subsistence practices (Salas et al. 2011). Survey-based studies indicate that in the United States, Native Americans, lower income urban populations, and Asian-Americans are more likely to be subsistence fishermen (Schumann and Macinko 2007). While much of the research supporting the limited policy and regulation of subsistence fishing in the United States is based on the practices of Native Alaskans, this research is not necessarily applicable to other communities (Schumann and Macinko 2007).

Fish and wildlife play a central role in the spiritual and cultural framework of Native American life. As such, treaties signed between tribes and the federal government explicitly guarantee hunting and fishing rights on land and in waters within and outside of the jurisdiction of reservations. Fishing areas that are located off-reservation are referred to as usual and accustomed fishing grounds. As discussed in Sections 3.5.1 and 3.5.5.1.4, the difference in the quality and type of available fisheries data makes it difficult to make standardized comparisons between countries. Small-scale, non-commercial fisheries, especially nearshore subsistence fisheries, have been recognized as fundamental for social, cultural, and food security reasons, both in the Unites States and in developing countries (Allison and Ellis 2001). A variety of fish are caught, mainly by hook and line from beaches, piers, and small boats that have been designed for use in nearshore waters (Pitchon and Norman 2012; Stevenson et al. 2012). It is assumed that the majority of subsistence fishing would occur in waters close to the coastline because these fishermen have limited means and opportunities to travel offshore (i.e., in waters beyond 3 nm) (Pitchon and Norman 2012; Stevenson et al. 2012). Subsistence fishing and hunting are likely to occur "often" from the coastline to 3 nm (Table 3-28), in the area where the OPC would be transiting to and from its respective homeport. There is not strong evidence to suggest that subsistence activities regularly occur beyond 3 nm of the coast in the NW-ATL, GoMEX, and NEPAC-South proposed action areas; therefore, these proposed action areas are not included in the following discussion. Tribal usual and accustomed fishing grounds located in inshore waters (e.g., rivers and estuaries) which would not overlap with the Proposed Action and are therefore not analyzed. Only tribal subsistence areas that occur outside of 3 nm are addressed in this PEIS/POEIS.

Subsistence fishing and harvest activities may occur "rarely" (Table 3-28) in the transiting area (from 3–12 nm) as well as the OPC operational area (i.e., beyond 12 nm (22 km) from shore). Therefore, only subsistence activities that occur beyond 3 nm will be addressed in this document for the following proposed action areas: NW-ATL-Florida and the Caribbean; NEPAC-North, AK, and HI-PAC (Table 3-54). Although the Proposed Action may occur in foreign EEZs in these proposed action areas, the discussion of subsistence activities is qualitatively described by region, rather than by individual country. Additionally, detailed information on sea turtle and marine mammal subsistence harvest is provided under the species descriptions in Sections 3.4.6.1.2 and 3.4.7.

Table 3-54. Marine Subsistence Fishing and Hunting Resources by Proposed Action Area

Resource	***Proposed Action Areas***			
	NW-ATL-Florida and the Caribbean	***NEPAC-North***	***AK***	***HI-PAC***
Marine Mammals				
Beluga whale			x	
Bowhead whale			x	
Gray whale		x		
Bearded seal			x	
Ringed seal			x	
Spotted seal			x	
Northern fur seal		x		
Walrus			x	
Polar bear			x	
Sea otter		x		
Sea Turtles				
All species	x			x
Fish				
Arctic cisco			x	
Arctic grayling			x	
Black rockfish		x		
Dolly Varden			x	
Groundfish		x		
Halibut		x	x	
Herring			x	
Pacific whiting		x		
Sablefish		x		
Saffron cod			x	
Salmon		x	x	
Sheefish			x	
Whitefish			x	
Caribbean reef fish	x			
Pacific reef fish				x
Marine Invertebrates				
Shellfish (multiple species)	x	x	x	x
Urchin	x	x		x
Octopus	x			x
Squid	x			x

3.5.9.1.1 NW-ATL-Florida and the Caribbean Proposed Action Area

Subsistence fishermen in Latin America (which include the island nations in the Caribbean) are particularly vulnerable to the impacts of fisheries declines, given their livelihood and income dependence on local resources (Salas et al. 2011). Additionally, limited technical and financial support for fisheries assessment and management in the Caribbean has led to a lack of consistency in the way fishery catches are recorded and, thus, analyzed (Salas et al. 2011). Latin America, despite small landings measurements, receive important foreign exchange from their catches. These foreign markets can determine which species are consumed locally and which species are sold in local and in foreign markets (Agüero et al. 2007; Salas et al. 2011).

In the Caribbean, subsistence take of nesting and foraging sea turtles has been a part of longstanding traditional fisheries, primarily for local consumption. The wider Caribbean region accounts for 34.6 percent of worldwide estimated takes (mostly legal), from 16 countries. The majority of legal take is legislated through closed seasons, size restrictions by species, permits, and gear restrictions (Richardson et al. 2006). By comparison, sea turtle take in the Pacific Islands region is characterized by high cultural significance with associated customs (Humber et al. 2014).

3.5.9.1.2 NEPAC-North Proposed Action Area

In the NEPAC-North proposed action area, there are 18 federally recognized tribes that currently or have historically or traditionally used resources that depend on offshore waters (i.e., beyond 3 nm) in Washington, Oregon, and Northern California. Of these tribes, 14 Washington, Oregon, and California federally recognized tribes that harvest traditional resources that use offshore waters (e.g., salmon that migrate upstream into inland waters) and 15 tribes with traditional use areas inland of the Oregon and California Coast that may have traditional resource habitat in offshore waters (e.g., salmon, steelhead, lamprey eel, and sturgeon) (Department of the Navy 2015). These resources are addressed in Section 3.4.4.2. Only Tribes with usual and accustomed fishing grounds in offshore waters are addressed in this PEIS/POEIS.

There are four federally recognized Washington tribes that have usual and accustomed fishing grounds in offshore waters: the Hoh Indian Tribe, Makah Indian Tribe of the Makah Indian Reservation, Quileute Indian Tribe of the Quileute Indian Reservation, and Quinault Indian Nation. The Hoh Indians use fishing grounds from the coastline to beyond 12 nm, between the Quilayute River and the Quinault River (Freedman et al. 2004). The Makah Indian Tribe of the Makah Indian Reservation (located on the northwestern tip of the Olympic Peninsula), use fishing grounds from the coastline to beyond 12 nm, north of Norwegian Memorial in Clallam County, Washington (Freedman et al. 2004). The Quileute Indian Tribe of the Quileute Indian Reservation use fishing grounds from the coastline to beyond 12 nm, between Sand Point and the Queets River (Freedman et al. 2004). The Quileute Indian Tribe's usual and accustomed fishing grounds were recognized to extend to 40 nm in 2015 (United States v. State of Washington 2015). The Quinault Indian Nation use fishing grounds from the coastline to beyond 12 nm, between Destruction Island and Point Chehalis in Washington (Freedman et al. 2004). In 2015, their usual and accustomed fishing grounds boundary was extended to 30 nm from shore (United States v. State of Washington 2015).

All four Washington tribal allocations are divided into a commercial component and a year-round ceremonial and subsistence component (U.S. Department of the Navy 2006). Since 1983, tribal regulations allow fishing for all salmon species with the exception of coho salmon in May and June. Fishing for all species of salmon has varied from a season lasting from 12 to 92 days, with the average season lasting between 20 and 42 days. Since 1986, all four tribes also possess and exercise treaty fishing rights for Pacific halibut (U.S. Department of the Navy 2006). In 1994, the U.S. government formally granted all four tribes treaty rights to fish for groundfish (60 CFR 660.324). The Washington tribes have formal allocations for sablefish, black rockfish, and Pacific whiting. All Tribes participating in groundfish fisheries use longline vessels in their fleet, but only the Makah Indian Tribe has trawlers. Groundfish fishing occurs primarily with hook and line and pots (U.S. Department of the Navy 2006). Only the Makah Indian Tribe has fished for the tribal Pacific whiting allocation, which takes place from May through September (U.S. Department of the Navy 2006).

In 2005, the Makah Indian Tribe requested authorization from NOAA/NMFS, under the MMPA and the Whaling Convention Act, to resume limited hunting of gray whales for ceremonial and subsistence purposes in the coastal portion of their usual and accustomed fishing grounds off Washington State (73 FR 26375). The spatial overlap of the Makah usual and accustomed grounds and the summer distribution of gray whales, specifically Pacific Coast Feeding Group whales, has management implications. Given conservation concerns for the WNP population, the Scientific Committee of the IWC emphasized the need to estimate the probability of a WNP gray whale being struck during aboriginal gray whale hunts (IWC 2012a). Although, observations of gray whales moving between the WNP and ENP highlight the need to estimate the probability of a gray whale observed in the WNP being taken during a hunt, this is likely only to occur during hunts conducted by the Makah Tribe (Moore and Weller 2013). The Makah Tribe hunting area is within the NEPAC-North proposed action area but would only potentially overlap with transit to and from a homeport.

3.5.9.1.3 AK Proposed Action Area

Alaskans generally place a high value on being able to hunt, fish, and live off the land. The Alaska Constitution guarantees equal access to fish, wildlife, and waters for all residents of the state. Traditionally, Alaska Natives hunted, fished, and lived off the land out of necessity. They, like other native communities, view subsistence hunting and gathering as a core value of their traditional cultures. Most subsistence activities are group activities that further core values of community, kinship, cooperation, and reciprocity. In Alaska, state and federal definitions of subsistence (and who is permitted to participate in the subsistence harvest) differ. The Alaska Department of Fish and Game defines subsistence fishing as “the taking of, fishing for, or possession of fish, shellfish or other fisheries resources by a resident of the State for subsistence uses [customary and traditional uses of fish]” (Alaska Department of Fish and Game 2011). Current federal regulations define subsistence use as “the customary and traditional use by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools of transportation; for making and selling handicraft articles out of inedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade” (Federal Subsistence Management Program 2017). While the state definition makes subsistence harvesting available to all Alaska residents, federal land managers restrict the harvest to those whose primary residence is rural, and may restrict a particular harvest area to a specified community or group of communities. It should be noted that much of the state is defined as rural except for designated non-rural areas (Federal Subsistence Management Program 2017). Priority for subsistence harvesting in land management is expressed in the Alaska National Interest Lands Conservation Act, passed by Congress in 1980. However, since similar state legislation was struck down as violating the State Constitution, the Alaska National Interest Lands Conservation Act now only applies to federal lands. Some marine resources are subject to federal regulation. Subsistence hunting of marine mammals is governed by the MMPA, and is restricted to Alaska Natives who reside on the coast of the North Pacific Ocean or the Arctic Ocean. In addition, halibut may be harvested by residents of rural communities through the federal subsistence halibut program (Alaska Department of Fish and Game 2011).

Native communities along the Bering, Chukchi, and Beaufort Seas subsist largely on fish, land mammals, and marine mammals. The top species that are harvested as subsistence foods include marine mammals such as ringed seals, bearded seals, walruses, beluga, polar bear, and bowhead whales; fish such as Dolly Varden, Arctic char, sheefish, cod, whitefish, salmon, herring, and halibut. Statewide, most of the subsistence food is fish (about 53 percent by weight). Marine mammals comprise 14.2 percent and shellfish comprise 3.2 percent of subsistence food. In total, subsistence harvest represents 0.9 percent of the fish and game harvested annually in the state of Alaska (while 98.5 percent is taken as part of commercial fishing) (Fall 2016). As many of these species migrate, the hunting or fishing season depends on the species presence near the Native community. For example, in Kotzebue, a seasonally varied list of marine mammals and fish are caught year-round, while terrestrial animals are typically hunted in the fall and winter.

In Barrow/Utqiagvik, use of the offshore environment occurs year-round, but primarily during the open lead and open water season, which is April through October (Stephen R. Braund Associates 2012). The community begins the spring season, typically in April, by hunting bowhead whales (and seals as available) in open leads along the Chukchi Sea. The summer and fall months are spent by hunting marine mammals (bearded and ringed seals, and walruses) in the open ocean, concluding with the fall bowhead whale hunt in October. During the late fall and winter months, residents target ringed seals on the ice as well as polar bears closer to shore. While the Barrow/Utqiagvik offshore use areas extend nearly 78 nm offshore to the north and up to approximately 52 nm offshore from the Chukchi and Beaufort Sea coasts, the majority of reported use areas do not extend beyond 52 nm from shore (Stephen R. Braund Associates 2012).

3.5.9.1.4 HI-PAC Proposed Action Area

There have been no comprehensive surveys of subsistence fishing activities in Hawaii; however, the contribution to local economies and communities is considered substantial (Zeller et al. 2015a) and has been an integral way of life for Native Hawaiians for centuries (McClenachan and Kittinger 2013). The cultural and economic value of subsistence fishing to Native Hawaiians is considered an important component of many communities, particularly rural communities (Pooley 1993) that strive to preserve a long-standing way of life (McClenachan and Kittinger 2013; Steutermann-Rogers 2015). Recent efforts aimed at sustaining subsistence fishing practices have resulted in the establishment of community-based subsistence fishing areas in the state (Levine and Richmond 2014; Steutermann-Rogers 2015). These areas were established through coordination between communities practicing subsistence or traditional fishing, and state and local governments—an approach that recent studies have shown to be effective at achieving the regulatory goals of sustaining the fishery (Ayers and Kittinger 2014; Steutermann-Rogers 2015). To aid in the preservation of this practice, Hawaii's Governor signed the first Community-Based Subsistence Fishing Area rules for Hāena on the island of Kauai into law. The new rules set bag limits for lobster, octopus, and urchins; prohibit the taking of some imperiled marine snails for two years; provide restrictions on the types of fishing gear and methods that may be used; and prohibit commercial fishing in the subsistence fishing area. The state is responsible for enforcement, but the community assumes a neighborhood-watch function, engaging visitors in the practices and importance of preserving subsistence fishing. It is difficult to separate data on subsistence fishing from other types of non-commercial fishing (e.g., recreational), because both types are often conducted on the same trip. Data reconstruction efforts estimate that non-commercial fishing in Hawaii, including subsistence fishing, has traditionally far exceeded commercial landings, particularly prior to European contact (McClenachan and Kittinger 2013). This trend has continued into modern times, non-commercial catch exceeding commercial landings by as much as 15 times by weight according to estimates in 2000 (McClenachan and Kittinger 2013).

Subsistence fisheries for self-consumption play an important role in Samoan culture (Zeller et al. 2015a). In American Samoa, fishing occurring along the shoreline is largely subsistence, while artisanal boat-based fishing predominantly supports the commercial fishing industry (Zeller et al. 2015a). In the CNMI, non-commercial fishing catches, which typically includes reef rather than pelagic fish, are not reported. Smith (Smith 1947) reported that subsistence fishing was an important daily activity in the Northern Marianas after World War II, as documented by the high daily consumption rate of fish. "Semi-subsistence," a practice where fishermen sell a portion of their catch to generate additional income, is prevalent in the CNMI. These operations are usually land-based (i.e., no boat used) and typically operate at night. Estimates predict that the subsistence catch could be up to 4–5 times the commercial volume, with over 16 percent of households actively fishing (Rhodes et al. 2011).

Sea turtle take in the Pacific Islands region (Melanesia, Polynesia, and Micronesia) is characterized by high cultural significance with associated customs. While the Indo-Pacific region accounts for 63 percent of the global permitted sea turtle take in 17 countries (Humber et al. 2014), all countries listed are outside of the HI-PAC proposed action area. However, due to the large and culturally diverse environment of this propose action area, subsistence harvest of sea turtles may overlap with the Proposed Action.

3.5.9.2 Environmental Consequences to Subsistence Fishing and Hunting

The predominant socioeconomic impact of the OPC program would potentially result from an increase in Coast Guard presence in the proposed action areas. Replacement of the aging MEC fleet would facilitate the Coast Guard's ability to support their missions offshore. Coast Guard missions that would benefit subsistence fishing and hunting include law enforcement, living marine resources, marine safety, and SAR. OPC assets would work to prevent over-fishing, reduce mortality of protected species, and protect marine habitats by enforcing domestic fishing laws and regulations (LMR); enforce foreign fishing vessel laws (OLE); enforce the Marine Mammal Protection Act and Endangered Species Act (LMR); patrol the U.S. EEZ boundary areas to reduce the threat of foreign poaching of U.S. fish stocks (OLE); monitor compliance with international living marine resource regimes and international agreements OLE); and deter and enforce efforts to eliminate fishing using large drift-nets (OLE, LMR). Coast Guard would also support subsistence fishermen and hunters on vessels should an emergency arise; however, an emergency response is not covered under the Proposed Action. Additionally, outreach and educational programs conducted by the Coast Guard within the proposed action areas would facilitate communication between Coast Guard and the communities that they serve.

In the AK proposed action area, interruption to subsistence hunting activities is a concern for some tribal communities. However, as stated in the Coast Guard SOPs (Appendix C), properly trained lookouts would be aboard all Coast Guard vessels. Training for vessel and aircraft crews would include identification of areas to avoid, such as active or anticipated subsistence hunting activities as determined through community engagement and information. The Coast Guard would coordinate with tribal representatives about planned hunts. Federally recognized tribes in the geographic region of the Proposed Action would be invited to consult on proposed undertakings to address issues concerning Indian Tribal self-government, trust resources, and Indian Tribal treaty and other rights.

Conversely, potential negative impacts to subsistence fishing would be indirect impacts to fish from fathometer and Doppler speed log noise, vessel noise, vessel movement, and MEM associated with the Proposed Action. As discussed in Section 3.4.4.2, these impacts would not be significant. Potential negative impacts to subsistence hunting would be indirect impacts to marine mammals from fathometer and Doppler speed log noise, vessel noise, vessel movement, and MEM associated with the Proposed

Action. As discussed in Section 3.4.7.2, these impacts would not be significant. As a result, there would be no significant impact or harm to subsistence fishing and hunting as a result of the Proposed Action.

3.5.9.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to subsistence fishing and hunting as a result of Alternative 1.

3.5.9.2.2 Impacts Under Alternatives 2–3

Similar to Alternative 1, under Alternatives 2–3, an increase in the Coast Guard's offshore presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations and training would be mitigated by the implementation of SOPs (Appendix C). Therefore, there would be no significant impact or harm to subsistence fishing and research as a result of Alternatives 2–3.

3.5.9.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate OPCs 1–5 and associated assets. As MECs are decommissioned and not replaced, with the exception of OPCs 1–5, Coast Guard offshore presence could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the offshore environment could decrease. However, there would be no significant impacts to subsistence hunting and fishing with implementation of the No Action Alternative.

3.5.10 Summary of Impacts to the Socioeconomic Environment

Impacts to the socioeconomic environment were analyzed for activities associated with the Proposed Action, primarily from an increase in Coast Guard presence in the proposed action areas. The analysis for socioeconomic resources under Alternative 1 and Alternatives 2–3 are detailed in Table 3-55. No significant impact or harm to the socioeconomic environment would occur with implementation of the No Action Alternative.

Table 3-55. Summary of Impacts to Socioeconomic Resources Under Alternative 1 and Alternatives 2–3

Socioeconomic Resource	*Impacts as a Result of Alternative 1*	*Impacts as a Result of Alternatives 2-3*	*Detailed Section*
Commercial Fishing	No significant impact or harm	No significant impact or harm	Section 3.5.1.2
Marine Construction	No significant impact or harm	No significant impact or harm	Section 3.5.2.2
Mineral Extraction	No significant impact or harm	No significant impact or harm	Section 3.5.3.2
Oil and Gas Extraction	No significant impact or harm	No significant impact or harm	Section 3.5.4.2
Recreation and Tourism	No significant impact or harm	No significant impact or harm	Section 3.5.5.2
Renewable Energy	No significant impact or harm	No significant impact or harm	Section 3.5.6.2
Research	No significant impact or harm	No significant impact or harm	Section 3.5.7.2
Transportation and Shipping	No significant impact or harm	No significant impact or harm	Section 3.5.8.2
Subsistence Fishing and Hunting	No significant impact or harm	No significant impact or harm	Section 3.5.9.2

CHAPTER 4 Consultation and Coordination Process

This section documents how the Coast Guard consulted with government, public, and individual interests during preparation of the PEIS/POEIS. The principal emphasis of this section is a summary of the public comments that were received on the Draft PEIS/POEIS and our responses to those comments. Other types of information included in this section are:

- results of any consultation with the appropriate Federal Agencies about the possible impacts of the proposal on endangered or threatened plant or animal species
- descriptions of the public participation process, including the details of scoping meetings and public hearings
- listings of the persons or groups that were provided copies of the PEIS/POEIS

4.1.1 Consultation Process

To comply with section 7 of the ESA, the Coast Guard initiated consultation with the USFWS and NMFS in December 2021 regarding the presence of federally listed and federally proposed species and their habitats that are protected under the ESA, as amended; species that are currently candidates for federal listing under the ESA; state-listed threatened or endangered species; and species otherwise granted special status at the state or federal level. During the consultation process, the USFWS and NMFS requested further clarification to which the Coast Guard responded. Programmatic consultation pursuant to section 7(a)(2) of the ESA has not yet been initiated, however, the Coast Guard anticipates that both NMFS and the USFWS will issue their programmatic biological opinions on the Proposed Action in 2022.

On April 13, 2022, the Coast Guard sent a letter to the USFWS and NMFS under Section 7(d) of the ESA. In those letters, the Coast Guard determined that the design and construction of the OPCs would not constitute an irreversible or irretrievable commitment of resources which would foreclose the formulation or implementation of reasonable and prudent alternative measures that may be included in future biological opinions issued by the Services. The Coast Guard anticipates that any reasonable and prudent alternatives would focus on the future operations of the OPCs and not the design and construction of the vessels. The Coast Guard also requested consultation under the Magnuson-Stevens Fishery Conservation and Management Act on designated EFH and anticipates completion before the first OPC is constructed. The determinations presented herein may be modified as a result of the ESA and EFH consultations. Additionally, the design and build of the OPCs would have no effect on ESA-listed species or designated critical habitat. Pursuant to Section 7(d) of the ESA, the Coast Guard proceeded with the contract award and vessel construction.

In a biological evaluation provided to the USFWS and NMFS, the Coast Guard provided the preliminary determination that the Proposed Action would not result in the destruction or adverse modification of federally-designated critical habitat of black abalone, elkhorn coral, staghorn coral, piping plover, spectacled eider, Steller’s eider, western snowy plover, bocaccio, eulachon, green sturgeon, Gulf sturgeon, smalltooth sawfish, steelhead trout, yelloweye rockfish, green sea turtle, hawksbill sea turtle, leatherback sea turtle, loggerhead sea turtle, humpback whale, North Atlantic right whale, North Pacific right whale, false killer whale, southern resident killer whale, proposed bearded seal, Hawaiian monk seal, Steller sea lion, northern sea otter, polar bear, West Indian manatee, and the proposed ring seal. No other critical habitat overlaps the proposed action areas; therefore, there will be no effect to critical habitat outside of the proposed action areas. Potential impacts to critical habitat should be considered preliminary, since the consultation process with NMFS and the USFWS has not been completed (see above).

Although the Coast Guard provides the following determinations, pursuant to section 7 of the ESA and its implementing regulations at 50 CFR Part 402, they should be considered preliminary; however, the Coast Guard has determined that the Proposed Action may affect, but is not likely to adversely affect, the ESA-listed black abalone, white abalone, chambered nautilus, giant clam, queen conch, staghorn coral, elkhorn coral, *Acropora globiceps, Acropora jacquelineae, Acropora retusa, Acropora speciose, Euphyllia paradivisa, Isopora crateriformis, Orbicella annularis* complex, rough cactus coral, pillar coral, *Seriatorpora aculeata, Siderastea glynni*, Miami blue butterfly, island marble butterfly, Oregon silverspot butterfly, Schaus swallowtail butterfly, Taylor's checkerspot butterfly, band-rumped storm petrel, California least tern, marbled murrelet, Newell's townsend's shearwater, piping plover, red knot, roseate tern, short-tailed albatross, spectacled eider, Steller's eider, western snowy plover, Pacific sheath-tailed bat, Hawaiian hoary bat, Mariana fruit bat, Atlantic sturgeon, bocaccio, chinook salmon, chum salmon, coho salmon, eulachon, giant manta ray, green sturgeon, Gulf sturgeon, largetooth sawfish, Nassau grouper, oceanic whitetip shark, scalloped hammerhead shark, shortnose sturgeon, smalltooth sawfish, sockeye salmon, steelhead trout, yelloweye rockfish, green sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, loggerhead sea turtle, olive ridley sea turtle, blue whale, bowhead whale, Bryde's whale, fin whale, gray whale, humpback whale, right whale (North Pacific and North Atlantic), sei whale, false killer whale, Southern resident killer whale, sperm whale, bearded seal, Guadalupe fur seal, Hawaiian monk seal, ringed seal, Steller sea lion, sea otter, polar bear, and West Indian manatee. Potential impacts to ESA-listed species should be considered preliminary, since the consultation process under the ESA with NMFS and the USFWS has not been completed (see above).

4.1.2 Coordination

4.1.2.1 Cooperating Agency

The Coast Guard solicited certain Federal agencies to enter into formal agreement to participate in this PEIS/POEIS process as a cooperating agency. None of those agencies entered into a formal cooperating agency agreement, but rather participated informally through other regulatory processes.

4.1.2.2 Public Participation Process

The public scoping period began with issuance of the Notice of Intent (NOI) in the Federal Register (85 FR 73492; November 18, 2020). The scoping period lasted 45 days, concluding on January 4, 2021. The public was provided a variety of methods to comment on the scope of the PEIS/POEIS during the scoping period. A project website was established to facilitate public input (https://www.dcms.uscg.mil/Our-Organization/Assistant-Commandant-for-Engineering-Logistics-CG-4-/Program-Offices/Environmental-Management/Environmental-Planning-and-Historic-Preservation). A Notice of Availability and request for comments was published in the Federal Register Notice (86 FR 52162; September 20, 2021) to notify the public of the 45 day public review period of the Draft PEIS/POEIS.

CHAPTER 5 Conclusions

In accordance with 40 CFR § 1052.12, this chapter summarizes the major conclusions of this document. The Proposed Action supports the Coast Guard's acquisition and operation of up to 25 OPCs with design service lives of 30 years each. This would provide the Coast Guard with a reliable and operationally available presence to accomplish assigned missions in offshore waters. Typical OPC operations would occur between 12 nautical miles (nm; 22 kilometers (km) from shore and inside 200 nm (370 km), but they can be deployed anywhere around the globe where national interests require.

This PEIS/POEIS is consistent with the requirements of NEPA (42 U.S.C. 4321), CEQ regulations for implementing NEPA (40 CFR Part 1500); DHS Directive Number 023-01, Rev 01 and DHS Instruction Manual 023-01-001-01, Rev 01; and Coast Guard Commandant Instruction 5090.1. The Coast Guard will issue a Record of Decision once the Final PEIS/POEIS has been made publicly available for at least 30 days. Scoping for preparation of the Draft PEIS/POEIS and public commenting on the Draft PEIS/POEIS were used to obtain input from stakeholders, including individuals, public interest organizations, governmental agencies, and tribes. This input was used to develop the alternatives and issues analyzed in this PEIS/POEIS. On the basis of the analyses in this PEIS/POEIS, the types of impacts that could occur during routine operations and training activities would be similar among the action alternatives. The alternatives principally differ on the basis of vessel acquisition.

CHAPTER 6 List of Preparers

Name	***Qualifications***
U.S. Navy	
Monica DeAngelis	M.S. in Biology. 27 years marine mammal research; 21 years environmental planning experience.
Erica Felins	M.S. in Environmental Science and Management. 4 years biological research; 3 years environmental planning experience.
Erin Oliveira	B.S. in Marine Biology. 4 years environmental research experience; 10 years environmental planning experience.
McLaughlin Research Corporation	
Jessica Greene	B.S. in Environmental Science and Management. 6 years experience in Geographic Information System data and maps.
David Loiselle	M.S. in Environmental Science and Management. 2 years environmental planning experience.

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APPENDIX A APPLICABLE LAWS AND POLICIES

This appendix is a summary of the federal, tribal, state, and local statutes and regulations that are potentially applicable to the Proposed Action and Alternatives presented in this PEIS/POEIS. This list includes statutes and regulations that have been followed and require no further action, as well as those for which permits or authorizations have been, or may be at a future date, requested. Given the period between document preparation and when the OPC fleet would be operational, the Coast Guard acknowledges that updates to the information provided in this PEIS/POEIS may be necessary and would therefore follow appropriate processes to ensure compliance. With the exception of NEPA and EO 12114, which are presented first and second, respectively, the other applicable laws are presented in alphabetical order.

A.1. National Environmental Policy Act

NEPA (42 U.S.C. §§ 4321 *et seq.*) was enacted to provide for the consideration of environmental factors in federal agency planning and decision-making. Federal agencies implement NEPA through CEQ regulations as well as agency-specific regulations and guidance. A Notice of Intent was prepared and published on November 18, 2020 to engage the public and initiate the scoping process. Scoping is an early and open NEPA process to determine how the lead federal agency will analyze the potential impacts of a Proposed Action to the human environment, which includes the physical, biological, and socioeconomic resources. This process assisted in identifying and defining issues pertaining to a set of reasonable alternatives regarding the Proposed Action.

A.2. Executive Order 12114

EO 12114, Environmental Effects Abroad of Major Federal Actions (44 Federal Register [FR] 1957), directs federal agencies to be informed of and take account of environmental considerations when making decisions regarding major federal actions outside of the United States, its territories, and possessions. Actions with the potential to significantly harm the global commons must be considered. The global commons is defined as the geographic areas outside the jurisdiction of any nation, including the oceans beyond their territorial limits. The U.S. territorial sea extends 12 nm (22 km) from the baseline[21] .In Chapter 1 of the U.S. Coast Guard Environmental Planning Implementing Procedures (IP) manual (U.S. Coast Guard 2019), this analysis is referred to as an EIS and OEIS hybrid document. The Coast Guard analyzes environmental effects and actions within 12 nm under NEPA (an EIS) and those effects occurring beyond 12 nm under the provisions of EO 12114 (an OEIS). The purpose of EO 12114 is to ensure that environmental factors are weighted equally when compared to other factors in the decision-making process. The analysis detailed in Chapter 4 of the Environmental Planning IP manual has been used to determine whether OPC operations occurring within the U.S. EEZ and territorial seas will have transboundary effects on the environment. The PEIS and POEIS have been combined into one document, as permitted under NEPA and EO 12114, to reduce duplication. This PEIS/POEIS evaluates the potential for significant harm from the Proposed Action.

21 Maritime limits and boundaries for the United States are measured from the official U.S. baseline, recognized as the low-water line along the coast in accordance with the articles of the Law of the Sea.

A.3. Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C §§ 668-668d) was enacted in 1940 and prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts, nests, or eggs and provides criminal penalties for such acts. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." "Disturb" means: "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, 1) injury to an eagle, 2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior." In accordance with the Bald and Golden Eagle Act, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS/POEIS evaluates the likelihood that the Proposed Action would cause take of bald or golden eagles.

A.4. Clean Air Act and the General Conformity Rule

The purpose of the CAA (42 U.S.C. §§ 7401–7671q) is to protect public health and welfare by the control of air pollution at its source and set forth primary and secondary NAAQS to establish criteria for states to attain, or maintain, these minimum standards (Appendix E). Non-criteria air pollutants that can affect human health are categorized as hazardous air pollutants under section 112 of the CAA. The U.S. EPA identified 189 hazardous air pollutants such as benzene, perchloroethylene, and methylene chloride. Section 176(c)(1) of the CAA, commonly known as the General Conformity Rule, requires federal agencies to ensure that their actions conform to applicable SIP for achieving and maintaining the NAAQS for criteria pollutants and their precursors. In accordance with the CAA, applicable regulations, and the DHS and Coast Guard instructions and directives, this PEIS/POEIS evaluates the potential for significant impact from the Proposed Action to air quality.

The criteria pollutants, which are the principal pollutants defining the air quality, include CO, SO_2, NO_2, O_3, suspended PM less than or equal to 10 microns in diameter, fine PM less than or equal to 2.5 microns in diameter, and Pb. CO, SO_2, Pb, and some particulates are emitted directly into the atmosphere from emissions sources. O_3, NO_2, and some particulates are formed through atmospheric chemical reactions that are influenced by weather, ultraviolet light, and other atmospheric processes. NAAQS are classified as primary or secondary. Primary standards protect against adverse health effects; secondary standards protect against welfare effects (e.g., damage to farm crops and vegetation and damage to buildings). Some pollutants have long- and short-term standards. Long-term standards were established to protect against chronic health effects while short-term standards are designed to protect against short-term health effects. Areas that are and have historically been in compliance with the NAAQS are designated as attainment areas. Areas that violate federal air quality standards are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment. The CAA requires states to develop a general plan to attain and maintain the NAAQS in all areas of the country and a specific plan (i.e., a SIP) to attain the standards for each area designated as nonattainment for NAAQS. These SIPs are developed by state and local air quality management agencies and submitted to the EPA for approval. If a state fails to submit a SIP or the SIP does not fully comply with the NAAQS, the state must adhere to the EPA's Federal Implementation Plan.

In 1993, the EPA developed the General Conformity Rule, which specifies how federal agencies must determine CAA conformity for sources of nonattainment pollutants in designated nonattainment and maintenance areas. The EPA General Conformity Rule is used to determine if federal actions meet the requirements of the SIP, by ensuring that air emissions related to the action do not (1) cause or contribute to violations of the NAAQS, (2) increase the frequency or severity of an existing violation of the NAAQS, or (3) delay the attainment of the NAAQS. The General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emissions thresholds that trigger requirements for a conformity analysis are called de minimis levels, which, in tons per year, vary by pollutant and also depend on the severity of the nonattainment status for the air quality management area in question. In other words, areas with a more severe nonattainment status will have lower thresholds for additional pollutants than areas with a less severe nonattainment status.

Through the Conformity Determination process specified in the final rule, any federal agency must analyze increases in pollutant emissions directly or indirectly attributable to a proposed action. There are two main components to the overall process: an applicability analysis to determine whether a conformity determination is required and, if it is, a conformity determination to demonstrate that the action conforms to the SIP. A conformity applicability analysis quantifies applicable direct and indirect emissions that are projected to result due to implementation of the federal action. Indirect emissions are those emissions caused by the federal action and originating in the region of interest, but which can occur later or in a different location from the action itself and are reasonably foreseeable. The federal agency can control and will maintain control over the indirect action due to a continuing program responsibility of the federal agency. Reasonably foreseeable emissions are projected future direct and indirect emissions that are identified at the time the conformity evaluation is performed. The location of such emissions is known and the emissions are quantifiable, as described and documented by the federal agency based on its own information and after reviewing any information presented to the federal agency.

The results of the applicability analysis may find that (1) the action is not subject to the General Conformity Rule, (2) the action is subject to the rule, but a conformity determination is not required, or (3) a conformity determination is required. If the results of the applicability analysis indicate that the total emissions would not exceed the de minimis emissions thresholds, then a conformity determination is not required and a Record of Non-Applicability must be prepared.

A.5. Clean Water Act

The Clean Water Act (CWA; 33 U.S.C §§ 1251 *et seq.*) regulates the discharge of pollutants into the surface waters of the United States, including lakes, rivers, streams, wetlands, and coastal areas. The CWA uses a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the physical, chemical, and biological integrity of the nation's waters so that they can support "the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water." See MARPOL Section A.12.

The Oil Pollution Act (OPA) of 1990 (33 U.S.C. §§ 2701-2761) amended the CWA and addressed the wide range of problems associated with preventing, responding to, and paying for oil pollution incidents in navigable waters of the U.S. It created a comprehensive prevention, response, liability, and compensation regime to deal with vessel and facility oil spills. OPA greatly increased federal oversight of maritime oil transportation, while providing greater environmental safeguards. The Oil Spill Liability Trust Fund administration was delegated to the Coast Guard by Executive Order. In accordance with the CWA, applicable regulations, and the DHS and Coast Guard instructions and directives, this PEIS/POEIS evaluates the potential for significant impact or harm from the Proposed Action to surface waters.

A.6. Coastal Zone Management Act

The Coastal Zone Management Act (CZMA; 16 U.S.C §§ 1451 *et seq.*) was enacted to protect the coastal environment from demands associated with residential, recreational, and commercial uses. The CZMA provisions encourage states to develop coastal management programs for managing and balancing competing uses of the coastal zone. Each state, in order to receive federal approval, is required to define the boundaries of the coastal zone and to identify uses of the area to be regulated by the state, the mechanism for controlling such uses, and broad guidelines for priorities of uses within the coastal zone. In accordance with the CZMA, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS/POEIS evaluates the potential for significant impact from the Proposed Action. A federal agency must determine the impact of the Proposed Action and provide a Coastal Consistency Determination or Negative Determination to the appropriate state agency for anticipated concurrence once the homeports are selected for the OPCs.

A.7. The Convention on International Trade in Endangered Species of Wild Fauna and Flora

CITES is an international agreement between governments. It aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival. CITES is a voluntary international agreement. Participating countries agree to implement CITES; however, it does not take the place of national laws. Rather, it provides a framework to be respected by each country, which has to adopt its own domestic legislation to ensure implementation at the national level. In accordance with CITES, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS/POEIS evaluates the potential for significant impact or harm from the Proposed Action.

A.8. Endangered Species Act

The ESA of 1973 (16 U.S.C §§ 1531 *et seq*.) provides for the conservation of endangered and threatened species and the ecosystems on which they depend. The ESA defines an endangered species as a species in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered within the near future throughout all or in a significant portion of its range. The USFWS and NMFS jointly administer the ESA and are responsible for listing species as threatened or endangered. The ESA also allows the Services to designate geographic areas as critical habitat for threatened or endangered species. Section 7(a)(2) requires each federal agency to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species (16 U.S.C. § 1536(a)(2)).

When a federal agency's action "may affect" a listed species, that agency is required to consult with the service (NMFS or the USFWS) that has jurisdiction over the species (50 CFR part 402.14(a)). If an agency's proposed action would "take" a listed species, then the agency must obtain an incidental take authorization from the responsible Service. The ESA defines the term "take" to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt any such conduct" (16 U.S.C. § 1532(19)). The regulatory definitions of "harm" and "harass" are relevant to the Coast Guard's determination as to whether the Proposed Action would result in adverse effects to listed species.

Harm is defined by regulation as "an act which actually kills or injures" fish or wildlife (50 CFR §§ 17.3, 222.102; 64 FR 60727, November 8, 1999). Harass is defined by the USFWS regulations to mean an "intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering" (50 CFR § 17.3). NMFS has not defined the term in its regulations. Consultation will conclude with preparation of a biological opinion that determines whether the federal agency action will jeopardize listed species or adversely modify or destroy critical habitat. An incidental take statement is also included in every biological opinion where take is anticipated. This incidental take statement allows the Proposed Action to occur without being subject to penalties under the ESA.

A.9. Executive Order 13089 (U.S. Coral Reef Ecosystem)

EO 13089 (63 FR 32701; June 16, 1998) is aimed at preserving and protection the biodiversity, health, heritage, and social and economic value of U.S. coral reef ecosystems. These coral reef ecosystems include all "species, habitats, and other natural resources associated with coral reefs in all maritime areas and zones subject to the jurisdiction or control of the U.S. (e.g., federal, state, territorial, or commonwealth waters)." Federal agencies whose actions affect U.S. coral reef ecosystems (i.e., pollution and sedimentation) are required to implement measures that would reduce negative impacts. In accordance with EO 13089, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS/POEIS evaluates the potential for significant impact or harm from the Proposed Action.

A.10. Executive Order 13158 (Marine Protected Areas)

EO 13158 (65 FR 34909; May 26, 2000) was authorized in May 2000 to protect special natural and cultural resources by strengthening and expanding the nation's system of marine protected areas. The purpose of the order is to (1) strengthen the management, protection, and conservation of existing marine protected areas and establish new or expanded marine protected areas; (2) develop a scientifically-based, comprehensive national system of marine protected areas representing diverse U.S. marine ecosystems and the nation's natural and cultural resources; and (3) avoid causing harm to marine protected areas through federally conducted, approved, or funded activities. In accordance with EO 13158, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS/POEIS evaluates the potential for significant impact or harm from the Proposed Action.

A.11. Executive Order 13840 (Ocean Policy to Advance the Economic, Security, and Environmental Interests of the United States)

On June 19, 2018, President Trump signed EO 13840. The EO is intended to advance the economic, security, and environmental interests of the U.S. through improved public access to marine data and information, efficient federal agency coordination on ocean-related matters, and engagement with marine industries, the science and technology community, and other ocean stakeholders. The EO continues to require federal agencies to coordinate activities regarding ocean-related matters for effective management of the ocean as well as promote lawful use of the ocean by agencies, including the Armed forces. The Coast Guard continues to engage with regional and state ocean planning entities. This EO revokes and replaces EO 13547, Stewardship of the Ocean, Our Coasts, and the Great Lakes.

A.12. International Convention for the Prevention of Pollution from Ships

The International Convention for the Prevention of Pollution from Ships is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. The Convention, known as MARPOL 73/78, includes regulations aimed at preventing and minimizing pollution from ships—both accidental pollution and that from routine operations. MARPOL specifies standards for stowing, handling, shipping, and transferring pollutant cargoes, as well as standards for discharge of ship-generated operational wastes. Although the U.S. has not ratified all components of the Convention, equivalent regulations for the treatment and discharge standards of shipboard sewage exist in amendments of the CWA (Section A.5; the Federal Water Pollution Control Act implemented by 33 U.S.C. 1251 and 33 CFR 159). In accordance with MARPOL, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS/POEIS evaluates the potential for significant impact or harm from the Proposed Action.

A.13. International Maritime Organization

The International Maritime Organization (IMO) is a specialized agency of the United Nations responsible for improving the safety and security of international shipping and preventing pollution from ships. It is also involved in legal matters, including liability and compensation issues and the facilitation of international maritime traffic. The IMO concentrates on keeping legislation up to date and ensuring that it is ratified by as many countries as possible and ensuring that these conventions and other treaties are properly implemented by the countries that have accepted them. In accordance with the IMO, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS/POEIS evaluates the potential for significant impact or harm from the Proposed Action.

A.14. Magnuson-Stevens Fishery Conservation and Management Act

The MSA (16 U.S.C. Sections 1801–1882) enacted in 1976 and amended by the Sustainable Fisheries Act in 1996, mandates identification and conservation of EFH. EFH is defined as those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity (i.e., full life cycle). These waters include aquatic areas and their associated physical, chemical, and biological properties used by fish, and may include areas historically used by fish. Substrate types include sediment, hard bottom, and associated biological communities. Federal agencies are required to consult with NMFS and to prepare an essential fish habitat assessment (EFHA) if potential adverse effects on EFH are anticipated from their activities. Any federal agency action that is authorized, funded, undertaken, or proposed to be undertaken that may affect fisheries is subject to the MSA. In addition, federal agencies shall consult with the Secretary of Commerce with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any EFH identified under the MSA. In accordance with the MSA, applicable regulations, and the DHS and Coast Guard instructions and directives, this PEIS/POEIS evaluates the potential for significant impact or harm from the Proposed Action.

A.15. Mandatory Reporting of Greenhouse Gases Rule

GHGs are gas emissions that trap heat in the atmosphere. The EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule on September 22, 2009. GHGs covered under the Final Mandatory Reporting of Greenhouse Gases Rule are CO_2, methane, nitrogen oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers. Each GHG is assigned a global warming potential, which is the ability of a gas or aerosol to trap heat in the atmosphere. The global warming potential rating system is standardized to CO_2, which has a value of one. The equivalent CO_2 (CO_2e) rate is calculated by multiplying the emissions of each GHG by its global warming potential and adding the results together to produce a single, combined emissions rate representing all GHGs. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of mobile sources and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions as CO_2e in metric tons are required to submit annual reports to U.S. EPA. In general, only large industrial facilities trigger the U.S. EPA reporting requirements under the GHG Rule.

A.16. Marine Mammal Protection Act

The MMPA (16 U.S.C §§ 1361 *et seq.*) established, with limited exceptions, a moratorium on the "taking" of marine mammals in waters or on lands under U.S. jurisdiction, and on the High Seas by vessels or persons under U.S. jurisdiction. The MMPA further regulates "takes" of marine mammals in U.S. waters and by U.S. citizens on the High Seas. The term "take," as defined in Section 3 (16 U.S.C. § 1362) of the MMPA, means "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal". "Harassment" was further defined in the 1994 amendments to the MMPA as any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (i.e., Level A Harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (i.e., Level B Harassment).

The MMPA directs the Secretary of Commerce, as delegated to NMFS, and the Secretary of the Interior, as delegated to the USFWS, to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens or agencies who engage in a specified activity (other than commercial fishing) within a specified geographical region if NMFS or the USFWS finds that the taking will have a negligible impact on the species or stock(s), and will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant). The regulation must set forth the permissible methods of taking, other means of effecting the least practicable adverse impact on the species or stock and its habitat and on the availability of the species or stock for subsistence uses (where relevant), and requirements pertaining to monitoring and reporting of such taking.

A.17. Migratory Bird Treaty Act and Executive Order 13186

The MBTA of 1918 (16 U.S.C §§ 703-712 *et seq.*) was enacted to ensure the protection of shared migratory bird resources. The MBTA makes it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations.

EO 13186, titled "Responsibilities of Federal Agencies to Protect Migratory Birds" (66 FR 3853; January 17, 2001), requires all federal agencies with activities that have (or may have) negative effects on migratory birds to develop, implement, and publish a Memorandum of Understanding with the USFWS that promotes conservation of migratory birds. The DHS and Coast Guard have entered into agreements consistent with the MBTA. December 2017, a Department of Interior legal opinion (Opinion M-37050) stated that the MBTA does not prohibit incidental take. However, the Coast Guard would continue to analyze potential impacts to migratory birds and consult with the USFWS when a proposed action may result in an incidental take. In accordance with the MBTA, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS/POEIS evaluates the potential for significant impact or harm from the Proposed Action.

A.18. Mobile Source Air Toxics Rule and Engine Emission Certification Standards

HAPs emitted from mobile sources are called Mobile Source Air Toxics (MSATs), which are compounds emitted from highway vehicles and non-road equipment that are known or suspected to cause cancer or other serious health and environmental effects. In 2001, EPA issued its first MSAT Rule, which identified 201 compounds as being HAPs that require regulation. A subset of six of the 201 MSAT compounds were identified as having the greatest influence on health and included: benzene, butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter. In February 2007, the EPA issued a second MSAT Rule, which generally supported the findings in the 2001 rule and provided additional recommendations of compounds having the greatest impact on health. The 2007 rule also identified several engine emission certification standards that must be implemented (40 CFR parts 80, 85, 86, and 96; 72 FR 8427; February 26, 2007). The primary method to control for these pollutants in mobile sources (e.g., vessels) involves reducing their content in the fuel and altering engine operating characteristics to reduce the volume of these pollutants generated during combustion.

A.19. National Historic Preservation Act

The National Historic Preservation Act of 1966 (NHPA; 54 U.S.C. §§ 300101 *et seq.*) establishes preservation as a national policy and directs the federal government to provide leadership in preserving, restoring, and maintaining the historic and cultural environment. Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. The NHPA created the National Register of Historic Places, the list of National Historic Landmarks, and the State Historic Preservation Offices to help protect each state's historical and archaeological resources. Section 110 of the NHPA requires federal agencies to assume responsibility for the preservation of historic properties owned or controlled by them and to locate, inventory, and nominate all properties that qualify for the National Register. Agencies shall exercise caution to assure that significant properties are not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate. The NHPA applies to cultural resources evaluated in this PEIS/POEIS.

A.20. National Marine Sanctuaries Act

The National Marine Sanctuaries Act (NMSA; also known as Title III of the Marine Protection, Research and Sanctuaries Act of 1972, 33 U.S.C §§ 1401 *et seq*.) authorizes the Secretary of Commerce to designate and manage areas of the marine environment with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archeological, educational, or aesthetic qualities as National Marine Sanctuaries. The primary objective of the NMSA is to protect marine resources and areas of special national significance, such as coral reefs, sunken historical vessels, or unique habitats. The NMSA also directs the Secretary to facilitate all public and private uses of those resources that are compatible with the primary objective of resource protection. Sanctuaries are managed according to site-specific Management Plans prepared by the National Oceanic and Atmospheric Administration's (NOAA) National Marine Sanctuary Program. Any Federal agency internal or external to a national marine sanctuary, including private activities authorized by licenses, leases, or permits, that are likely to destroy, cause the loss of, or injure any sanctuary resource are subject to consultation with the Secretary. In accordance with the NMSA, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS/POEIS evaluates the potential for significant impact or harm from the Proposed Action.

A.21. The Rights of Federally Recognized Tribes (Native American and Alaskan Native)

Over the course of American history, the U.S. federal government's relationship with Indian tribes has been defined and modified by treaties, executive orders, court decisions, Congressional legislation, and regulations. The U.S. federal government recognizes tribal nations as "domestic dependent nations" and has established laws attempting to clarify the relationship between the federal government, state, and tribal governments. Important rights were guaranteed to tribes by treaty. Case law has established the status of Indian tribes and their relationship to the federal government. Historically, legislation passed by Congress reflects the national Indian policy at the time of enactment. Current federal Indian policy recognizes that Indian tribes are an integral part of the fabric of the United States, and the policy seeks to strengthen tribal governments through self-determination and self-governance.

The U.S. Supreme Court first recognized the existence of a Federal-Indian trust relationship in cases in the mid-1900s interpreting Indian treaties. Between 1787 and 1871, the United States entered into nearly 400 treaties with Indian tribes. In these treaties, the United States obtained land from the tribes, and in return, the United States set aside other reservation lands for those tribes, and guaranteed that the federal government would respect the sovereignty of the tribes, protect the tribes, and provide for the well-being of the tribes. The Supreme Court, in its role as the United States' highest arbiter of justice, upholds tribal rights and obligates the federal government to abide by their agreement with tribes made in the treaties. This principle, that the government has a duty to keep its word and fulfill its treaty commitments, is known as the "doctrine of trust" responsibility. The purpose behind the doctrine of trust is, and always has been, to ensure the survival and welfare of Indian tribes and people, including an obligation to provide services required to protect and enhance tribal lands, resources, and self-government. The doctrine of trust responsibility also includes economic and social programs, which are necessary to raise the standard of living and social well-being of the Indian people to a level comparable to the non-Indian society.

The federal trust responsibility extends to all federal agencies and actions, and treaty rights are not diminished by the passage of time. "Express treaty rights" include hunting, fishing, gathering, and grazing rights. "Implied rights" include rights such as the right to access the areas holding a resource of interest, such as fish or medicinal plants, which would be required to make express treaty rights meaningful. The Fifth Amendment of the U.S. Constitution provides that Congress may not deprive anyone of "private property…without just compensation." The Supreme Court has upheld that Indian treaty rights are a form of private property protected by the Just Compensation Clause. Therefore, although Congress may repeal an Indian treaty, it must adequately compensate a tribe for the value of any rights or property that are lost.

The right of hunting, fishing, gathering, and grazing at usual and accustomed grounds is secured to federally recognized tribes. A federally recognized tribe is an American Indian or Alaska Native tribal entity that is recognized as having a government-to-government relationship with the United States, with the responsibilities, powers, limitations, and obligations attached to that designation. Furthermore, federally recognized tribes are recognized as possessing certain inherent rights of self-government (i.e., tribal sovereignty) and are entitled to receive certain federal benefits, services, and protections due to their special relationship with the United States.

EO 13175 (65 FR 67249; November 6, 2000) was released in November of 2000 to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, strengthen the U.S. government-to-government relationships with Indian tribes, and reduce the imposition of unfunded mandates upon Indian tribes. The NHPA, ESA, MMPA, EO 13007 (Indian Sacred Sites; 61 FR 26771; May 29, 1996), EO 12898 (Environmental Justice; 59 FR 7629; February 16, 1994), Native American Graves Protection and Repatriation Act, American Indian Religious Freedom Act, and the Religious Freedom Restoration Act also apply to tribes and are considered under NEPA. In accordance with NEPA and DHS and Coast Guard instructions and directives, this PEIS/POEIS evaluates the potential for significant impact or harm from the Proposed Action. As part of the MMPA process (Section A.16), the Coast Guard intends to prepare a Plan of Cooperation.

APPENDIX B FOREIGN EEZS IN THE PROPOSED ACTION AREAS

As discussed in Section 2.1, some of the proposed action areas include foreign EEZs. The NW-ATL and NEPAC-North proposed action areas contain operational areas within the EEZ of Canada, while the GoMEX and NEPAC-South proposed action areas contain operational areas within the EEZ of Mexico. The AK proposed action area contains operational areas within the EEZ of Russia. Table B- 1 details the foreign EEZs within the NW-ATL-Florida and the Caribbean proposed action area.

Table B- 1. Foreign EEZs within the NW-ATL-Florida and the Caribbean Proposed Action Area

Islands of the Caribbean		*Mainland Central America*
Antigua and Barbuda	Guadalupe (France)	Belize
Anguilla (U.K.)	Haiti	Columbia
Aruba (Netherlands)	Jamaica	Costa Rica
Barbados	Martinique (France)	Guatemala
Bahamas	Montserrat (U.K.)	Honduras
Bermuda	Saba (Netherlands)	Mexico (East Coast)
Bonaire (Netherlands)	St. Eustatius (Netherlands)	Nicaragua
British Virgin Islands	St. Kitts and Nevis	Panama
Cayman Islands	St. Martin/St. Maarten (France and the Netherlands)	Venezuela
Cuba	St. Barthelemy (France)	
Curacao (Netherlands)	St. Lucia	
Dominica	St. Vincent and the Grenadines	
Dominican Republic	Trinidad and Tobago	
Grenada	Turks and Caicos	

Table B- 2 lists the countries and territories with EEZs within the HI-PAC proposed action area.

Table B- 2. EEZs within the HI-PAC Proposed Action Area

Foreign EEZs	*U.S. Territories*
Federated States of Micronesia	American Samoa
Kiribati	CNMI
Marshall Islands	Guam
Nauru	Hawaii
Palau	Johnson Atoll
	Northwestern Hawaiian Islands (NWHI)
	Palmyra Atoll

APPENDIX C STANDARD OPERATING PROCEDURES

Coast Guard currently uses a variety of guidance and proactive operational measures to help minimize the environmental impacts of Coast Guard vessels and aircraft. Although SOPs are established on a vessel-by-vessel basis, SOPs for OPCs are not currently developed, since OPCs are not yet operational; however, those used on MECs are provided below. While these are subject to change (given the timeframe until all OPC vessels are fully operational), the SOPs in use by current MECs are as follows:

C.1. General SOPs applicable to all activities addressed in this document

1. In accordance with Chapter 11 of the Vessel Environmental Manual, all Commanding Officers and Officers in Charge should plan and act to protect ESA-listed species and designated critical habitat during operations and planning, including selection of navigation and flight routes that avoid designated critical habitat and areas where ESA-listed species are known to concentrate.

2. Marine mammal and sea turtle avoidance measures are prescribed (see Vessel Operations (C.2) below), including requiring that vessel crew be especially alert for activity, and proceed with caution, in areas of known migration routes or high animal density, including areas with concentrations of floating vegetation where animals may be feeding, and that vessels do not approach marine mammals or sea turtles head-on during non-emergency maneuvering, when navigationally safe to do so.

C.2. Vessel Operations

1. Vessel operators would use caution, be alert, maintain a vigilant lookout and reduce speeds, as appropriate, to avoid collisions with marine mammals and sea turtles and to avoid collisions with benthic habitats during the course of normal operations.

2. During non-emergency vessel operations, including law enforcement activities, when marine mammals or sea turtles are sighted or known to be in the immediate vicinity at the time of operations (such as if helicopters sight animals along the vessel's intended course), operators would employ all possible precautions to avoid interactions or collisions with animals when navigationally safe to do so and, in the case of law enforcement activities, when practical to do so. These precautions should include one or more of the following:

a. Reducing speed (see Vessel Operations (C.3) below).

b. Posting additional dedicated lookouts to assist in monitoring the location of sea turtles and/or marine mammals.

c. Avoiding sudden changes in speed and direction, or if a swimming marine mammal or sea turtle is spotted, attempting to parallel the course and speed of the animal so as to avoid crossing its path.

d. Avoiding approach of sighted animals head-on or from directly behind.

e. When whales are sighted, maintain a distance of 200 yards (yd; 183 m) or greater between the whale and the vessel and a distance of 500 yd (457 m) or greater for right whales, provided it is safe to do so. In the Bering Sea, Gulf of Alaska, and along the east coast of the continental U.S., a whale should be treated as a right whale unless the whale is positively identified as another whale species.

f. When sea turtles or dolphins are sighted, attempt to maintain a distance of 50 yd (46 m) or greater between the animal and the vessel wherever possible.

g. When polar bears are sighted, maintain a distance of 1,000 yd (914 m) or greater between the polar bear and the vessel per COMDTINST M16455.1 (series).

3. Coast Guard would consider a reduction in vessel speed to 10 knots or less when a whale is sighted within 5 nm of the intended vessel track. Vessels would use navigationally prudent courses to avoid striking the whale and, if necessary, reduce speed to bare steerageway or come to a stop.

4. Unless a vessel or aircraft's mission involves specifically investigating an ESA-listed species, or there is an aviation or navigation safety issue during transit or flight, the vessel or aircraft would plan its passage to avoid any known sanctuaries, feeding grounds, or other biologically important areas.

C.3. Aircraft Operations

1. In accordance with the instruction in the Coast Guard Air Operations Manual, Commanding Officers would implement SOPs to prevent unnecessary overflight of sensitive environmental habitat areas to include, but not be limited to, designated critical habitat, migratory bird sanctuaries, and marine mammal haul-outs and rookeries. Environmentally sensitive areas would be properly annotated on pilot's chart, as required.

2. When it is necessary to fly over sensitive habitat areas (e.g., designated critical habitat, known haul outs and rookeries, pinniped aggregations), an altitude of 2,000 ft (610 m) above ground level would be maintained (unless a higher altitude is required by regulations promulgated in 50 CFR), except in a situation defined by 50 CFR 402.05 as an emergency (i.e., situations involving acts of God, disasters, casualties, national defense or security emergencies) and for reconnaissance. The amount of time spent at low altitudes should be limited to what is necessary to respond to the particular emergency or conduct reconnaissance overflights.

3. Aircraft would not operate at an altitude lower than 2,000 ft (610 m) within 0.5 miles (0.805 km) of marine mammals observed on ice or land. Helicopters may not hover or circle above such areas or within 0.5 mi (0.0805 km) of such areas. When weather conditions do not allow a 2,000 ft (610 m) flying altitude, such as during severe storms or when cloud cover is low, aircraft may be operated below the 2,000 ft (610 m) altitude. However, when aircraft are operated at an altitude below 2,000 ft (610 m) because of weather conditions, the operator would attempt to avoid areas of known marine mammal concentrations and would take precautions to avoid flying directly over or within 0.5 mi (0.805 km) of these areas.

4. UAS would be flown in accordance with Coast Guard Air Operations Manual COMDTINST 3710.1 (series) and either the Federal Aviation Administration, when within 12 nm (14 mi) of the U.S., or the International Civil Aviation Organization, when beyond 12 nm (14 mi) from U.S.

5. UAS would not operate within 1,000 ft (305 m) of marine mammals observed on ice or land. When UAS must be operated within 1,000 ft (305 m) of marine mammals due to weather conditions, the operator would take precautions to avoid flying directly over animals.

6. For passenger transfer, aircraft would operate at an altitude of at least 2,000 ft (610 m) between the OPC and a land-based point of departure, with the exception of during take-off and landing.

7. During vertical replenishments, aircraft routes would avoid operation over areas known to be used by or contain concentrations of marine mammals to the maximum extent practicable to minimize disturbance to these animals.

C.4. Vessel Observers

1. Crewmembers would be trained in marine mammal and sea turtle identification and would alert the Command of the presence of these animals and initiate the adaptive mitigation responses identified in Vessel Operations (2) and (3) above.

2. At least one trained crewmember would look for marine mammals and sea turtles during all vessel operations and associated with the activities described in this PEIS/POEIS, including aircraft operations. If a marine mammal or sea turtle is spotted, the vessel would avoid them by changing course and/or taking the measures identified in Vessel Operations (2) above unless there is a threat to vessel safety.

3. Small vessels would also have a trained crew member to look for marine mammals during vessel operations associated with the activities described in this PEIS/POEIS. If a marine mammal or sea turtle is spotted, the vessel would avoid them by changing course and/or taking the measures identified in Vessel Operations (2) above.

C.5. ESA-listed Documentation, Reporting, and Planning

1. The Coast Guard would document sightings of ESA-listed marine mammals and sea turtles during vessel transit whenever course changes or other measures are taken to avoid or minimize interactions with the animals in the daily Operational Summary (OPSUM). Information would include, at a minimum: date and time of the sighting that required action be taken to avoid or minimize vessel interaction with an animal, the species observed (if animals can be determined to species; if not, the type of animal [i.e., whale, sea turtle, pinniped]), number of animals sighted, approximate geographic coordinates, and action taken to avoid or minimize interactions between the vessel and the animal(s). Additional information, including photographs, would be collected as needed. Sightings listed in the OPSUMs and any supplemental information, such as photographs, would be consolidated and submitted to NMFS Office of Protected Resources Interagency Cooperation Division and the appropriate regional Fish and Wildlife Conservation Office as part of any annual reporting requirements.

2. The Coast Guard would document sightings of ESA-listed marine mammals within 200 yd (183 m) and sea turtles within 50 yd (46 m) of a vessel during vessel operations in all proposed action areas including towing and escort, fueling underway, gunnery training, and SAR training in the daily OPSUM. Information would include, at a minimum: date and time for each sighting event; species observed, number of animals per sighting, number of animals that are adults/juveniles/calves/pups, behavior of the animals in sighting event, and geographic coordinates for the observed animals; information regarding sea state, weather conditions, visibility, and lighting conditions; and activity in which vessel(s) is (are) engaged and any actions taken to avoid or minimize interactions with the animals. Additional information, including photographs, would be collected as needed. Sightings listed in the OPSUMs and any supplemental information, such as photographs, would be consolidated and submitted to NMFS Office of Protected Resources Interagency Cooperation Division and the appropriate regional Fish and Wildlife Conservation Office as part of any annual reporting requirements.

3. Any collision with and/or injury to a marine mammal or sea turtle would be reported immediately to the appropriate NMFS or USFWS office, depending on jurisdiction, and local authorized stranding/rescue response organizations based on where the incident occurred (see https://www.fisheries.noaa.gov/report for regional contact information for reporting).

4. Coast Guard personnel would annually report all observed bird strikes between OPCs and ESA-listed birds.

5. Coast Guard would coordinate with the Service's to develop and implement a Polar Bear Interaction Plan to avoid and minimize impacts to polar bears encountered while underway near sea ice.

C.6. Ballasting and Deballasting

1. In accordance with Chapter 10 of the Vessel Environmental Manual, ballasting and deballasting would be conducted in a manner to minimize the introduction of non-native species and reduce their potential impact on natural resources in areas where waters are discharged. Vessels would control all ballasting and de-ballasting evolutions as indicated below:

a. Each transfer of ballast water would be recorded in the Machinery Log noting ship's location, water depth, tanks involved, and amount of ballast taken aboard or discharged.

b. To the maximum extent practicable, taking on ballast water under the following conditions would be avoided:

i. In areas known to have infestations or populations of harmful organisms or pathogens (e.g., harmful algal blooms),

ii. In areas near sewage outfalls,

iii. In areas where tidal flushing is known to be poor at times or at times when tidal flow is known to cause more turbidity in water,

iv. In darkness where bottom-dwelling organisms may rise up in the water column,

v. In areas where propellers may stir up the sediment.

2. Ballasting and/or de-ballasting within 12 nm (14 mi) from land would be avoided. Ballast water taken on board from a location more than 200 nm (230 mi) from any shore and in water of a depth greater than 656 ft (200 m) may be discharged without restriction.

3. Ballast water taken on board within 200 nm (230 mi) from any shore or in water less than 656 ft (200 m) deep, must be managed in accordance with the applicable Damage Control Book and the stepwise protocol below:

a. Exchange ballast water in an area greater than 200 nm (230 mi) from any shore and in water more than 656 ft (200 m) deep with an efficiency of 95% or more of the original volume. Do not exchange ballast in ballasted fuel tanks.

b. If unable to meet requirements in (a), then exchange ballast water in area greater than 200 nm (230 mi) from any shore and in water more than 656 ft (200 m) deep, passing two complete tank volumes through. Do not exchange ballast in ballasted fuel tanks.

c. If unable to meet requirements in (b), then exchange ballast water in area greater than 200 nm (230 mi) from any shore passing two complete tank volumes through. Do not exchange ballast in ballasted fuel tanks.

d. If unable to meet requirements in (c), then retain ballast water as long as safely practicable or conduct flushing as far from shore as possible.

4. If unable to meet requirements in (c), then retain ballast water as long as safely practicable or conduct flushing as far from shore as possible.

5. In all cases, the minimum distance for de-ballasting would be 12 nm (14 mi) from land.

6. In the proposed action areas, any ballast water taken on board would likely be released (ballast tanks cycled) prior to entering any port or navigable shallow waters. If it is suspected that invasive species are in this ballast water, efforts must be made to release these species in the open ocean.

C.7. Discharging Waste

1. OPCs would not discharge any plastic waste overboard, plastic waste would either be retained onboard until return to homeport, or incinerated while at sea in accordance with MARPOL regulations and the M16455.1 (series) Vessel Environmental Manual.

2. The Coast Guard would coordinate with NMFS, USFWS, and local sources in the proposed action areas to learn of confirmed haul out locations and communicate them to all field units in the proposed action areas operating environment as part of the requirement not to discharge sewage black water within 3 nm (2.5 mi) of known or reported marine mammals to the extent operating constraints permit.

C.8. Mooring, Anchoring, and Area Avoidance

1. When planning transit routes from one operation area to another and/or from the vessel homeport to another operation area, ports in which docking facilities are available to support the mooring of the OPC are preferred. If ports that do not have docking facilities for the OPC are used, then anchorage areas that do not contain ESA-listed species such as corals or benthic habitats that support ESA-listed species' feeding, refuge, and reproduction are preferred.

2. Impacts to ESA-listed corals associated with vessel operation, including anchoring, are prohibited unless a step-down consultation has been completed to address these effects or an emergency consultation is initiated under the ESA section 7 emergency consultation procedures, depending on the specific circumstances.

3. OPCs and associated support assets would avoid entering:

a. Eastern Norton Sound (Unit 3) and Ledyard Bay Critical Habitat (Unit 4) from early July through late October to minimize impacts to concentrations of molting spectacled eiders (66 FR 9145).

b. Avoid open water activity in the Bering Sea between St. Lawrence and St. Matthew islands (Unit 5) from late October through April to minimize impacts to concentrations of wintering spectacled eiders (66 FR 9145).

c. Avoid entering Kuskokwim Shoals (Unit 2), Seal Islands (Unit 3), and Nelson and Izembek lagoons (Units 4 and 5) from early August through April, to minimize impacts to molting, wintering, and staging Steller's eiders (66 FR 8850).

d. If entering areas of designated critical habitat for listed eiders cannot be avoided, all vessels would maintain a speed ≤ 10 knots unless it is otherwise unsafe to do so, and/or during law enforcement or emergent activities.

C.9. Towing

1. All tow lines and cables used for towing a vessel would be kept taut to the greatest extent possible and would be monitored for fraying or other signs of potential failure that could result in entanglement.

2. A trained crew member would search for marine mammals along the transit route used for towing to minimize potential collisions with animals and the OPC and/or the vessel being towed. The lookout would inform the captain immediately upon sighting a marine mammal in order for the captain to determine whether changes to vessel speed are required.

3. For vessels being towed to a pier or other mooring, the OPC would bring the vessel as close as is safe such that lines can be passed to crew where the vessel would moor from the OPC and/or vessel being towed; or using smaller vessels to ferry the lines from the vessel to the mooring point to minimize the potential for slack in the lines that could result in entanglement.

4. Tow lines would be collected as soon as is safely possible to minimize dragging of lines in the water that may damage habitat or present an entanglement hazard.

C.10. Fueling Underway

1. The new OPCs and any tankers or other vessels providing fuel would be equipped with spill response equipment and would end fueling operations immediately upon detection of leaks or spills and clean up any fuel as quickly as possible to minimize any potential transfer of fuel to marine waters.

2. Should a spill occur during fueling underway, the Coast Guard would engage in ESA section 7 emergency consultation, if appropriate, for the response activities associated with spill cleanup with NMFS and USFWS.

3. Fueling underway would be conducted when vessels are stationary or moving at very slow speeds.

4. No fueling underway would take place during inclement weather or in areas with rough seas to minimize the potential for accidental spills.

C.11. Gunnery Training

1. A mitigation zone with a radius of 200 yd (183 m) would be established for small-caliber gunnery exercises using non-explosive practice munitions with a surface target. Vessel personnel would observe the mitigation zone from the firing position.

2. The exercise would not commence if concentrations of floating vegetation (kelp patties) are observed within the mitigation zone.

3. Firing would cease if a marine mammal or sea turtle is sighted within or approaching the mitigation zone. Firing (aimed away from the animal) would recommence if the animal is observed exiting the mitigation zone, the mitigation zone has been clear from any additional sightings for a period of 30 minutes for a firing ship, or the intended target location has been repositioned more than 400 yd (370 m) away from the location of the last sighting and in a direction opposite the animal’s path or direction in which it was moving.

4. Plastic “killer tomato” and other targets used during training would be retrieved from the water to the extent possible to minimize the potential for these to become marine debris and entangle marine mammals and other species or be ingested by animals, potentially leading to health consequences. Targets with a floating line would be preferentially used to allow for easier recovery. If targets are left in the water, over the course of training exercises in the operation area observers would look for signs of entanglement and would follow appropriate reporting procedures, as necessary, to assist entangled animals (see https://www.fisheries.noaa.gov/insight/entanglement-marine-life-risks-and-response#what-should-i-do-if-i-see-an-entangled-animal?).

C.12. Vessel Lighting

1. OPCs would set "Darken Ship" each evening at sunset to minimize emission of white light from the ship and to protect the night vision of watch-standing personnel:

a. All portlights would be covered;

b. Red/blue lights would be used on weather decks (and only when required);

c. Only navigational lighting would be consistently visible per the Navigation Rules and Regulations Handbook and maritime regulations regarding nighttime lighting.

APPENDIX D THE PROPAGATION OF SOUND

D.1. In-Air Noise

In-air noise decreases with distance, with a decrease in sound level from any single noise source following the "inverse-square law." Thus, the SPL changes in inverse proportion to the square of the distance from the sound source. Therefore, aircraft sound levels at the air-water interface (i.e., sea surface) is a function of how high above the surface the aircraft is flying or hovering. Thus, the higher the aircraft, the less sound reaches the sea surface (Eller and Cavanagh 2000; Richardson et al. 1995). Any sound produced by the UAS is expected to be less than that produced by the helicopter.

Given in-air transmission loss with distance (via the previous discussion of the inverse-square law), it would be estimated that a 136 dB re 20 µPa helicopter source level at 100 ft (30.5 m) would measure an SPL of approximately 106 dB re 20 µPa at the air-water interface (i.e., sea surface), while the same source level at 10 ft (3 m) would measure an SPL of approximately 126 dB re 20 µPa at the air-water interface. Aircraft associated with the Proposed Action would not operate at altitudes under 2,000 ft (610 m). Therefore, the received level estimated above would be significantly less than 106 dB re 20 µPa when measured at the surface if the helicopter were at an altitude of 2,000 ft (610 m). The sound values in-air and in-water are not directly comparable due to the reference units used, and must be converted. The result is that sound waves with the same intensities in water and air have relative intensities that differ by 26 dB. This amount (26 dB) must be added to sound levels in air referenced to 20 µPa to obtain the in-water sound level referenced to 1 µPa. In consideration of the air-water interface, another 6 dB would have to be added (doubling of pressure across interface), such that 26 dB + 6dB or 32 dB would have to be added to any in air value to estimate its corresponding in water transition value (ex. 100 dB re 20 µPa in air + 26 dB +6 dB= 132 dB re 1 µPa in water). Therefore, for a helicopter at 100 ft (30.5 m), the in water sound just beneath the surface would be approximately 138 dB re 1 µPa. For a helicopter at 10 ft (3 m), the in water sound just beneath the surface would be approximately 168 dB re 1 µPa.

D.2. Sea Surface (Air-Water Interface) Noise

As stated above, aircraft sound levels present at the air-water interface (i.e., sea surface) is a function of how high above the surface the aircraft is flying or hovering. Thus, the higher the aircraft, the less sound reaches the sea surface (Figure D- 1).

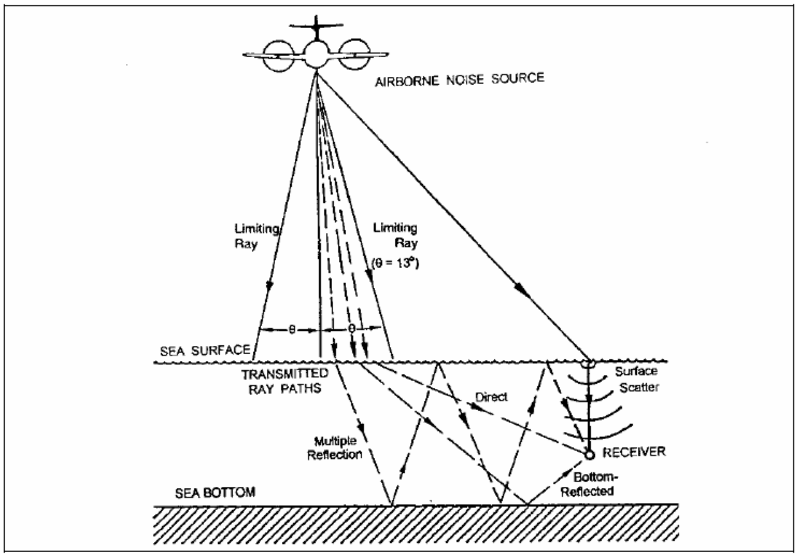


Figure D- 1. Characteristics of Sound Transmission through the Air-Water Interface

Source: (Richardson et al. 1995)

Given in air transmission loss with distance via the previous discussion of the inverse-square law, it would be estimated that a 136 dB re 20 µPa helicopter source level at 100 ft (30.5 m) would measure an SPL of approximately 106 dB re 20 µPa at the air-water interface (i.e., sea surface), while the same source level at 10 ft (3 m) would measure an SPL of approximately 126 dB re 20 µPa at the air-water interface. Aircraft associated with the Proposed Action would not operate at altitudes under 1,500 ft (457 m). Therefore, the received level estimated above would be significantly less than 106 dB re 20 µPa when measured at the surface if the helicopter were at an altitude of 2,000 ft (610 m). Any sound produced by the UAS is expected to be less than that produced by the helicopter.

The sound values in air and in water are not directly comparable due to the reference units used, and must be converted[22]. The result is that sound waves with the same intensities in water and air have relative intensities that differ by 26 dB. This amount (26 dB) must be added to sound levels in air referenced to 20 µPa to obtain the sound level in water referenced to 1 µPa. In consideration of the air-water interface, another 6 dB would have to be added (doubling of pressure across interface), such that 26 dB + 6dB or 32 dB would have to be added to any in air value to estimate its corresponding in water transition value (ex. 100 dB re 20 µPa in air + 26 dB +6 dB= 132 dB re 1 µPa in water). Therefore, for a helicopter at 100 ft (30.5 m), the in water sound just beneath the surface would be approximately 138

[22] Sound in water and sound in air are both waves that move similarly and can be characterized the same way. However, even though sound waves in water and sound waves in air are basically similar, the way that sound levels in water and sound levels in air are reported is very different, and comparing sound levels in water and air must be done carefully. Confusion arises because sound levels given in dB in water are not the same as sound levels given in dB in air. There are two reasons for this:

1) Reference intensities. The reference intensities used to compute sound levels in dB are different in water and air. Scientists have arbitrarily agreed to use as the reference intensity for underwater sound the intensity of a sound wave with a pressure of 1 microPascal (µPa). Scientists have agreed to use as the reference intensity for sound in air the intensity of a sound wave with a pressure of 20 µPa. This value in air is because it is consistent with the minimum threshold of young human adults in their range of best hearing (1,000–3,000 Hz). 2) Densities and sound speeds. Intensity of a sound wave depends not only on the pressure of the wave, but also on the density and sound speed of the medium through which the sound is traveling. Sounds in water and sounds in air that have the same pressures have very different intensities because the density of water is much greater than the density of air and because the speed of sound in water is much greater than the speed of sound in air. For the same pressure, higher density and higher sound speed both give a lower intensity.

dB re 1 µPa. For a helicopter at 10 ft (3 m), the in water sound just beneath the surface would be approximately 168 dB re 1 µPa.

D.3. In-Water Noise

Helicopter overflights produce airborne noise and some of this energy is transmitted into the water. Most of the acoustic energy transmitted into the water from an aircraft arrives through a relatively narrow cone extending vertically downward from the aircraft (Eller and Cavanagh 2000; Richardson et al. 1995) The intersection of this cone with the surface traces a "footprint" directly beneath the flight path, with the width of the footprint being a function of aircraft altitude. Transmission of sound from a moving airborne source to a receptor underwater is influenced by numerous factors and has been addressed by Urick (1983), Young (1973), Richardson et al. (1995), and Eller and Cavanagh (2000). Any sound that does enter the water from a passing aircraft or hovering helicopter is refracted due to the difference in sound velocity between air and water. Sound is transmitted from an airborne source to a receptor underwater by four principal means: (1) a direct path, refracted upon passing through the air-water interface; (2) direct-refracted paths reflected from the bottom in shallow water; (3) evanescent transmission in which sound travels laterally close to the water surface; and (4) scattering from interface roughness due to wave motion.

Aircraft sound is refracted upon transmission into water because sound waves move faster through water than through air (a ratio of about 0.23:1). Based on this difference, the direct sound path is reflected if the sound reaches the surface at an angle more than 13 degrees from vertical. As a result, most of the acoustic energy transmitted into the water from an aircraft arrives through a relatively narrow cone extending vertically downward from the aircraft.

Traveling beyond the sea surface, the sound values in air and in water are not directly comparable due to the reference units used, and must be converted. The result is that sound waves with the same intensities in water and air have relative intensities that differ by 26 dB. This amount (26 dB) would be added to sound levels in air referenced to 20 µPa to obtain the sound level in water referenced to 1 µPa. However, this calculation may be appropriate for something at the water surface, but the difference in the relative sound pressures between air and water is not as simple as adding or subtracting 26 dB from a measured sound in air or water to convert to the other medium. Because water is much denser than air, water has higher impedance. The impedance of water is about 3600 times (10 log 3600 = 36) times that of air because sound travels faster in water than in air. Thus, sounds of equal measured pressure will be measured at 36 dB higher in water than in air. So, unlike the reference pressure correction (the 26 dB), the difference is not only between the air and water pressures, but also the impedance of water. This means it is actually 26 + 36 dB = 62 dB, which is a difference of 62 dB higher in water than in air. Therefore, sound measuring 100 dB in air would correspond to a sound measuring 162 dB in water. In consideration of the air-water interface, another 6 dB would have to be added (doubling of pressure across interface), such that 62 dB + 6 dB or 68 dB would have to be added to any in air value to estimate its corresponding in water transition value (e.g., 100 dB re: 20 µPa in air + 62 dB +6 dB = 168 dB re: 1 µPa in water).

Any sound that does enter the water from a passing aircraft or hovering helicopter is refracted due to the difference in sound velocity between air and water as mentioned previously. Sound is transmitted from an airborne source to a receptor underwater, such as a marine mammal by: (1) direct path, refracted upon passing through the air-water interface; and, (2) direct-refracted paths reflected from the bottom in shallow water.

Therefore, for a helicopter at an altitude of 100 ft (30.5 m), the in water sound just beneath the surface would be approximately 168 dB re 1 µPa. For a helicopter at 10 ft (30.5 m), the in water sound just beneath the sea surface would be approximately 198 dB re 1 µPa. Helicopter sounds that do enter the water would be subject to further transmission loss with distance. The underwater noise produced is generally brief when compared with the duration of audibility in the air. Due to the relatively small area over which aircraft noise would radiate outward, the noise in water would be transient. Any sound produced by the UAS is expected to be less than that produced by the helicopter and, similar to helicopters, would also be transient.

APPENDIX E THE NATIONAL AMBIENT AIR QUALITY STANDARDS

The criteria pollutants, which are the principal pollutants defining the air quality, include CO, SO_2, NO_2, O_3, suspended PM less than or equal to 10 microns in diameter, fine PM less than or equal to 2.5 microns in diameter, and lead. CO, SO_2, lead, and some particulates are emitted directly into the atmosphere from emissions sources. O_3, NO_2, and some particulates are formed through atmospheric chemical reactions that are influenced by weather, ultraviolet light, and other atmospheric processes. The NAAQS are classified as primary or secondary and provide details about these pollutants. Primary standards protect against adverse health effects; secondary standards protect against welfare effects (e.g., damage to farm crops and vegetation and damage to buildings). Some pollutants have long- and short-term standards. Long-term standards were established to protect against chronic health effects while short-term standards are designed to protect against acute, or short-term, health effects. Areas that are and have historically been in compliance with the NAAQS are designated as attainment areas. Areas that violate a federal air quality standard are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment.

Table E- 1. National Ambient Air Quality Standards

Pollutant		*Primary or Secondary*	*Averaging Time*	*Level*	*Form*
Carbon Monoxide (CO)		Primary	8 Hours	9 ppm (10 mg/m3)	Not to be exceeded more than once per year
			1 Hour	35 ppm (40 mg/m3)	
Lead		Primary and Secondary	Rolling 3-month period	0.15 µg/m3 (1)	Not to be exceeded
Nitrogen Dioxide (NO2)		Primary	1 Hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Primary and Secondary	1 Year	53 ppb (2)	Annual mean
Ozone (O3)		Primary and Secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (particulate matter)	PM2.5	Primary	1 year	12.0 µg/m3	Annual mean, averaged over 3 years
		Secondary	1 year	15.0 µg/m3	Annual mean, averaged over 3 years
		Primary and Secondary	24 hours	35 µg/m3	98th percentile, averaged over 3 years
	PM10	Primary and Secondary	24 hours	150 µg/m3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO2)		Primary	1 Hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3 Hours	0.5 ppm	Not to be exceeded more than once per year

In areas designated nonattainment for the lead standards prior to the promulgation of the current (2008) standards, and for which plans to attain or maintain these standards have not been submitted and approved, the previous standard (1.5 µg/m^3 as a calendar quarter average) also remain in effect.
The level of the annual nitrogen dioxide standard is 0.053 ppm. It is in ppb here for the purposes of clearer comparison to the 1-hour standard level.
Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.
(4)The previous sulfur dioxide standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous sulfur dioxide standards or is not meeting the requirements of a State Implementation Plan call under the previous sulfur dioxide standards (40 CFR 50.4(3)).
Source: U.S. Environmental Protection Agency 2016. Last updated December 20, 2016. Notes: µg/m^3= micrograms per cubic meter; ppb= parts per billion; ppm=parts per million; $PM_{2.5}$= fine particulate matter less than or equal to 2.5 microns in diameter; PM_{10}= fine particulate matter less than or equal to 10 microns in diameter.

APPENDIX F SPECIES-SPECIFIC HEARING CAPABILITIES

The acoustic stressors associated with the Proposed Action are fathometer and Doppler speed log noise, vessel noise, aircraft noise, and gunnery noise. Species within range of these acoustic stressors may be able to detect these acoustic stressors associated with the Proposed Action either in the air or in the water, depending on the species morphology, their preferred habitat, and the medium in which the noise is created. It is assumed that the sound would need to be within the animal's hearing range, the range of frequencies that can be heard by an animal, to be detected. If an animal is unable to detect a sound or hears a faint sound because of its hearing range, it is unlikely the animal would have a behavioral response or hearing loss from the sound. The range of best hearing for each all species group, with the exception of marine mammals, is detailed in the sections below and summarized in Table F- 1. Marine mammals are in Section F.7.

Table F- 1. The Range of Best Hearing for Species Groups Within Range of Acoustic Stressors Associated with the Proposed Action

Group	*Range of Best Hearing*	
	In-Air	*In-Water*
Marine Invertebrates (decapods and cephalopods only)	n/a	below 200 Hz, potentially up to 3 kHz
Flying Insects	> 100 kHz over distances greater than 100 ft (30m)	n/a
Birds	1–3 kHz	0.5–4 kHz
Bats	from 0.7 to greater than 40 kHz	n/a
Marine Fish	n/a	most species: 50 Hz – 1 kHz with best sensitivity from 100– 400 Hz specialists: over 4 kHz
Sea Snakes	below 400 Hz	80–160 Hz
Sea Turtles	50–800 Hz, with maximum sensitivity from 300–400 Hz	50 Hz – 1.6 kHz, with maximum sensitivity from 100–400 Hz

F.1. Marine Invertebrate Hearing

Hearing capabilities of invertebrates are poorly understood (Lovell et al. 2005; Popper and Schilt 2008). Although marine invertebrates do not hear in the same way vertebrates do, it is thought they are able to sense vibrations and movements associated with sound production. While data are limited, research suggests that some of the major decapods and cephalopods may have limited hearing capabilities (Edmonds et al. 2016; Hanlon 1987; Offutt 1970), particularly of low frequency sound. In a review of crustacean sensitivity of high amplitude underwater noise by Edmonds et al. (2016), it was found that crustaceans may be able to hear the frequencies at which they produce sound, but it remains unclear which noises are incidentally produced and if there are any negative effects from masking them. Acoustic signals produced by crustaceans range from low frequency rumbles (20–60 Hz) to high frequency signals (20–55 kHz) (Henninger and Watson 2005; Patek and Caldwell 2006; Staaterman 2016). Decapod crustaceans respond primarily to sounds well below 1 kHz (Celi et al. 2014; Edmonds et al. 2016). Both behavioral and auditory brainstem response studies suggest that crustaceans may sense frequencies up to 3 kHz, but best sensitivity is likely below 200 Hz (Goodall et al. 1990; Lovell et al. 2005; Lovell et al. 2006). Most cephalopods likely sense low-frequency sound below 1,000 Hz, with best sensitivities at lower frequencies (Budelmann 2010; Mooney et al. 2010; Offutt 1970). A few cephalopods may sense frequencies up to 1,500 Hz (Hu et al. 2009).

Aquatic invertebrates that can sense local water movements with ciliated cells include cnidarians, flatworms, segmented worms, urochordates (tunicates), mollusks, and arthropods (Budelmann 1992a, 1992b; Popper et al. 2001). Some aquatic invertebrates have specialized organs called statocysts for determination of equilibrium and, in some cases, linear or angular acceleration. Statocysts allow an animal to sense movement and may enable some species, such as cephalopods and crustaceans, to be sensitive to water particle movements associated with sound (Hu et al. 2009; Kaifu et al. 2008; Montgomery et al. 2006; Popper et al. 2001). Because the sensory capabilities associated with statocysts are limited to detecting water motion, and water particle motion near a sound source falls off rapidly with distance, aquatic invertebrates are most likely limited to detecting nearby sound sources rather than sound caused by pressure waves from distant sources.

Studies of sound energy effects on invertebrates are few and identify only behavioral responses and some sub-lethal non-auditory responses (Celi et al. 2014; Edmonds et al. 2016; Roberts and Breithaupt 2016). PTS, TTS, and masking studies have not been conducted for invertebrates.

F.2. Flying Insect Hearing

Generally, flying insects are sensitive to high frequency sounds (a few kHz to over 100 kHz), depending on the species. Some butterflies and moths use hearing for communication within their species, while some use it to target prey. Additionally, many flying insects use their hearing to detect and evade predators, specifically echolocating bats (Yager 2012). While the ability to sense sound vibrations is common in the Phylum Arthropoda, the reception of sound pressure waves through a tympanal "ear" is unique to insects (Stumpner and Von Helversen 2001). Pressure-sensitive tympanal ears detect high frequency sounds (> 100 kHz) over long distances (>100 ft [30m]), whereas antennal ears can detect lower frequency sounds (<1 kHz) over shorter distances (inches [centimeters]) (Albert and Kozlov 2016).

F.3. Bird Hearing

Dooling and Okanoya (1995) provided a complete summary of what is known about basic in-air hearing capabilities of a variety of bird species. Broadly, birds hear best in air at frequencies between 1 and 5 kHz, with absolute sensitivity often approaching 0 to 10 dB re 20 µPa at the most sensitive frequency, which usually is in the region of 2 to 3 kHz. A study of diving birds (ducks, gannets, and loons) showed best in-air hearing between 1 and 3 kHz (Crowell et al. 2015b). On average, the spectral limit of "auditory space" available for a bird to vocally communicate in air extends from approximately 0.5 to 6 kHz (Dooling 2002; Witherington and Hirama 2006). Dooling (2009) and Beason (2004) also noted that birds do not hear well at either high or low frequencies when compared to most mammals, and do not hear at frequencies greater than 15 kHz. While there are no studies that have directly analyzed hearing of the ESA-listed bird species located within the proposed action area, data included in this section is thought to be representative of the hearing for these species.

Diving birds may not hear well under water because of adaptations to protect their ears from pressure changes during diving (Dooling and Therrien 2012). Currently, there are few studies on underwater bird hearing or auditory threshold data (Hansen et al. 2017a; Melvin et al. 1999; Therrien 2014). The long-tailed duck (*Clangula hyemalis*) was recorded responding to underwater sound stimuli with frequencies between 0.5 and 2.86 kHz at underwater stimuli greater than 117 dB re 1 µPa at 1 m (Therrien 2014). The most recent study on the underwater hearing range of a diving bird was on great cormorants (*Phalacrocorax carbo*). Hansen et al. (2017b) found that great cormorants can hear between 1 and 4 kHz underwater. Common murres (*Uria aalge*) avoided gill nets with acoustic deterrent devices emitting a

1.5 kHz tone at 120 dB re 1µPa at 1 m (Melvin et al. 1999). For the purposes of analysis, the assumed range of underwater hearing in birds is 0.5–4 kHz, which encompasses all of these studies. Water birds spend a limited amount of time underwater, and Dooling and Therrien (2012) speculate that birds may not depend on underwater hearing to locate prey or avoid predators while diving underwater (although research in this area is lacking). Water birds spend a limited amount of time underwater, and Dooling and Therrien (2012) speculate that birds may not depend on underwater hearing to locate prey or avoid predators while diving (although research in this area is lacking).

F.4. Bat Hearing

Although hearing ranges for bats are not well documented, bats generally have poor hearing at low frequencies, and this is supported by examination of call frequencies. Bat call frequencies are typically categorized as low- (less than 25 kHz), mid- (from 25–35 kHz), or high-frequency (greater than 40 kHz). Bats are able to adjust their frequencies used in echolocation to be either higher or lower than the range of best hearing for their prey (Faure et al. 1993). Bat calls can range from 9 to 200 kHz (Maryland Department of Natural Resources 2019). Additionally, some bats have the capacity to hear lower frequencies, particularly insectivorous bats that orient towards low frequency sounds produced by their prey. *Eptesiscus fuscus* has the ability to hear low frequency sounds from 0.7–1.3 kHz (Poussin and Simmons 1982).

F.5. Marine Fish Hearing

All fish have two sensory systems to detect sound in the water: the inner ear, which functions very much like the inner ear in other vertebrates, and the lateral line, which consists of a series of receptors along the fish's body (Popper 2008). Although hearing capability data only exist for fewer than 100 of the 32,000 fish species, current data suggest that most species of fish detect sounds from 50 Hz to 1 kHz. It is believed that most fish have their best hearing sensitivity from 100 to 400 Hz (Popper 2003), including the ESA-listed salmon, sturgeon, and rockfish species. While all fish are sensitive to the particle motion component of sound, some fish species possess anatomical specializations in the form of connections between swim bladders and the inner ear that may enhance their sensitivity to the pressure component of sound (Popper 2014). These adaptations allow some fish species such as clupeiformes (herrings, shads, sardines, anchovies) the ability to sense higher frequencies and lower intensities, hearing sounds above 4 kHz (Popper 2008; Popper and Fay 2010).

Unlike other fish, sharks do not have a swim bladder. As such, sharks are incapable of detecting sound pressure and are limited to detection of particle motion only (Casper and Popper 2010). The data on hearing in species tested in the elasmobranch group (e.g., nurse shark, little skate, and Atlantic sharpnose shark) show that they do not hear particularly well, and that their best hearing is at low frequencies (below 100 Hz) (Casper et al. 2003; Casper and Mann 2006, 2009). The hearing range of tested elasmobranchs is from roughly 20 Hz up to 1 kHz, with similar thresholds in all species above 100 Hz (Casper and Mann 2009). Some research suggests that larger piscivorous (fish-eating) sharks, like the scalloped hammerhead shark, may be responsive to frequencies below 40 Hz, but the hearing range of smaller sharks is approximately 40 Hz to 1.5 kHz (Casper and Mann 2006; Myrberg 2001), with reduced sensitivity above 100 Hz and very little sensitivity above 800 Hz (Casper and Mann 2006; Myrberg 2001).

F.6. Reptile Hearing

F.6.1. Sea Snakes

Currently, no studies have been conducted on sea snake hearing. However, hearing has been researched in land-borne snakes, and it is suspected that sea snakes have similar hearing anatomy. All land-borne snakes lack external and middle ear structures but retain a single ear bone, the columella auris (Hartline 1971), which interacts with the inner ear. In snakes, the columella auris is connected to the lower jaw bone (Christensen et al. 2012; Hartline 1971). Therefore, since the lower jaw bone directly conducts substrate vibrations, snakes have an acute sensitivity to substrate vibrations (Hartline 1971). Based on hearing abilities in land-borne snakes (Christensen et al. 2012; Hartline 1971), it is suspected that sea snakes have a very limited hearing range and may use other senses for interacting with their environment.

Land-borne snakes have been shown to have highest in-air hearing sensitivity below 400 Hz (Christensen et al. 2012; Hartline 1971). Given that land-borne snakes hear sound-induced vibrations conducted by their bodies (Christensen et al. 2012), their in-water hearing sensitivity is likely similar to in-air sensitivities. Since sea snakes are suspected to have hearing anatomy similar to land-borne snakes, their highest in-water hearing sensitivity is believed to range from 80 to 160 Hz (Christensen et al. 2012).

F.6.2. Sea Turtle Hearing

Sea turtle ears are adapted for hearing underwater and in-air, with auditory structures that receive sound via bone conduction (Lenhardt et al. 1985), via resonance of the middle ear cavity (Willis et al., 2013), or via standard tympanic middle ear path (Hetherington 2008). Studies of hearing ability show that sea turtles' ranges of in-water hearing detection generally lie between 50 and 1,600 Hz, with maximum sensitivity between 100 and 400 Hz, and that hearing sensitivity drops off rapidly at higher frequencies. Sea turtles are also limited to low-frequency hearing in-air, with hearing detection in juveniles possible between 50 and 800 Hz, with a maximum hearing sensitivity around 300 to 400 Hz (Bartol and Ketten 2006a; Piniak et al. 2016). Hearing abilities have primarily been studied with subadult, juvenile, and hatchling subjects in four sea turtle species, including green (Bartol and Ketten 2006a; Ketten and Bartol 2005; Piniak et al. 2016; Ridgway et al. 1969), Kemp's ridley (Ketten and Bartol 2005), loggerhead (Bartol and Ketten 2006a; Lavender et al. 2014; Martin et al. 2012), and leatherback (Eckert 2012; Harms et al. 2014). Only one study examined the auditory capabilities of an adult sea turtle, which was a loggerhead (Martin et al. 2012); the hearing range of the adult loggerhead turtle was similar to other measurements of juvenile and hatchling sea turtle hearing ranges.

The role of underwater hearing in sea turtles is unclear. Sea turtles may use acoustic signals from their environment as guideposts during migration and as cues to identify their natal beaches (Lenhardt et al. 1985). However, they may rely more on other senses, such as vision and magnetic orientation, to interact with their environment (Avens and Lohmann 2003; Narazaki et al. 2013).

F.7. Marine Mammal Hearing

Marine mammals use sound for communication, feeding, and navigation. Measurements of marine mammal sound production and hearing capabilities provide some basis for assessment of whether exposure to a particular sound source may affect a marine mammal behaviorally or physiologically. Hearing has been directly measured in some odontocete and pinniped species [in air and underwater] (Erbe et al. 2016; Finneran 2016; Southall et al. 2007). To better reflect marine mammal hearing, Southall et al. (2007) recommended that marine mammals be divided into hearing groups and in 2016 and revised in 2018, NMFS made modifications as part of their technical guidance (NMFS 2018a).

Table F- 2. Marine Mammal Hearing Groups and Associated Generalized Underwater Hearing Range

Hearing Group	***Generalized Hearing Range***
LF cetaceans (baleen whales)	7 Hz to 35 kHz
MF cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
HF cetaceans (true porpoises, *Kogia*, river dolphins, cephalorhynchid, *Lagenorhynchus cruciger*, *L. australis*)	275 Hz to 160 kHz
SI: manatees and dugongs	*
PW underwater (true seals)	50 Hz to 86 kHz
OW underwater (sea lions, fur seals, sea otter, and polar bears)**	60 Hz to 39 kHz

HF: high-frequency marine mammal hearing group; LF: low-frequency marine mammal hearing group MF: mid-frequency marine mammal hearing group; OW: otariid and non-phocid marine carnivore hearing group; PW: phocid marine mammal hearing group; *SI: manatees and dugongs; NMFS (2018a) included all available datasets from in-water groups, including sirenian datasets (Gerstein et al. 1999; Mann et al. 2009a); Behavioral and Auditory Evoked Potential threshold measurements for manatees have revealed lower upper cutoff frequencies and sensitivities compared to the mid-frequency cetaceans (National Marine Fisheries Service 2016; NMFS 2018a); see Section (F.7.4); **Audiogram data from a single Pacific walrus (Kastelein et al. 2002) and a single sea otter (Ghoul and Reichmuth 2014) were included in the derivation of the composite audiogram for OW pinnipeds.

F.7.1. Mysticetes

Direct measurements of mysticete hearing are lacking. Thus, hearing predictions for mysticetes are based on other methods including: anatomical studies and modeling (Cranford and Krysl 2015; Houser et al. 2001b; Parks et al. 2007; Tubelli et al. 2012); vocalizations (see reviews in (Au and Hastings 2008; Richardson et al. 1995; Wartzok and Ketten 1999)); taxonomy; and behavioral responses to sound ((Dahlheim and Ljungblad 1990); see review in (Reichmuth et al. 2007)). It is generally assumed that most animals hear well in the frequency ranges similar to those used for their vocalizations (songs or calls), which are mainly below 1 kHz in baleen whales (Richardson et al. 1995). Although auditory frequency range and vocalization frequencies do not always perfectly align, caution should be taken when considering vocalization frequencies along in predicting hearing capabilities of species for which no data exists, like mysticetes. Estimation of hearing ability based on inner ear morphology was completed for two baleen whale species: humpback whales (700 Hz to 10 kHz; (Houser et al. 2001a) and North Atlantic right whales (10 Hz to 22 kHz; (Parks et al. 2007)). Further, preliminary anatomical data indicate minke whales may be able to hear slightly above 22 kHz (Ketten and Mountain 2009). The anatomy of the baleen whale inner ear seems to be well adapted for detection of low-frequency sounds (Ketten 1992a, 1992b, 1994). Thus, the auditory system of baleen whales is almost certainly more sensitive to low-frequency sounds than that of the small- or moderate-sized toothed whales. However, auditory sensitivity in at least some large whale species extends up to higher frequencies than the maximum frequency of the calls, and relative auditory sensitivity at different low-moderate frequencies is unknown.

F.7.2. Odontocetes

Odontocetes use high-frequency biosonar signals to sense their environment. They have a broad hearing range extending to 200 kHz, but the frequency of best hearing range from 150 Hz to 160 kHz (Mooney et al. 2012; Tougaard et al. 2014). Auditory response curves for odontocetes show maximum auditory sensitivity near the frequencies where toothed whale signals have peak power (Mooney et al. 2012; Tougaard et al. 2014) at about 1,000 to 20,000 Hz for social sounds and 10,000 to 100,000 Hz or higher for echolocation. Like mysticetes, it is assumed that most animals hear well in the frequency ranges similar to those used for their vocalizations (songs or calls); although auditory frequency range and vocalization frequencies do not always perfectly align. Odontocetes use underwater communicative signals that, while not as low in frequency as those of many mysticetes, likely serve similar functions. These include tonal whistles, clicks, and pulsed calls in some odontocetes. Odontocetes generate short-duration (500–200 microseconds), specialized clicks used in biosonar with peak frequencies between 10 and 200 kHz to detect, localize, and characterize underwater objects such as prey (Au 1993; Wartzok and Ketten 1999). These clicks are often more intense than other communicative signals, with reported source levels as high as 229 dB re 1 µPa peak-to-peak (Au et al. 1974). The echolocation clicks of high-frequency cetaceans (e.g., porpoises) are narrower in bandwidth (i.e., the difference between the upper and lower frequencies in a sound) and higher in frequency than those of mid-frequency cetaceans.

F.7.3. Pinnipeds and Carnivores

Unlike cetaceans who spend their entire lives in the water, pinnipeds and carnivores are adapted to live part of their lives in water and part on land and therefore would be expected to adapt to hearing in water and in air. Underwater hearing in otariid seals is adapted to low frequency sound and less auditory bandwidth than phocid seals. Hearing in otariid seals has been tested in California sea lion (Kastak and Schusterman 1998) and northern fur seal (Babushina et al. 1991; Moore and Schusterman 1987), whose ranges overlap with the proposed action areas. Kastelein et al. (2005) provided underwater audiograms of a male and female Steller sea lion, whose range also overlaps with the proposed action area. The audiogram of the male had a maximum hearing sensitivity at 77 dB at 1 kHz, with a best hearing range, between 1 and 16 kHz. The female Steller sea lion had a maximum sensitivity at 73 dB at 25 kHz. Kastelein et al. (2005) concluded that low frequency sounds are audible to Steller sea lions. Based on these studies, otariid seals would be expected to hear sounds within the ranges of 50 Hz to 75 kHz in air and 50 Hz to 50 kHz in water.

Phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemila et al. 2006; Kastelein 2009; Reichmuth et al. 2013). Phocid ears are anatomically distinct from otariid ears in that phocids have larger, more dense middle ear ossicles, inflated auditory bulla, and larger sections of the inner ear (i.e., tympanic membrane, oval window, and round window), which make them more adapted for underwater hearing (Hemila et al. 2006; Kastak and Schusterman 1998; Mulsow et al. 2011; Reichmuth et al. 2013; Schusterman and Moore 1978; Terhune and Ronald 1975).

Hearing in odobenids (walrus) and polar bears are both very similar to that of otariids. The walrus is the only extant odobenid pinniped and may be found within the Alaska proposed action area. The walrus is adapted to low-frequency sound with a range of best hearing in water from 1 to 12 kHz and maximum hearing sensitivity around 12 kHz; its hearing ability falls off sharply at frequencies above 14 kHz (Kastelein et al. 2002; Kastelein et al. 1996). The walrus hearing sensitivity is most similar to otariids, and therefore the walrus is assigned the same functional hearing range as for otariids for this analysis. Functional hearing limits are conservatively estimated to be 50 Hz–35 kHz in air and 50 Hz–50 kHz in water (Southall et al. 2007).

Traditional behavioral audiometry is difficult to perform for polar bears. Therefore, obtaining data on the hearing capabilities of polar bears presents a challenge. There have been a number of recent measurements of large mammal hearing using auditory evoked potential audiometry (Nachtigall et al. 2005; Supin et al. 2001; Yuen et al. 2005). Using this technique, the in-air range of best sensitivity for polar bears has been measured from 11.2–22.5 kHz by Nachtigall et al. (2007). Southall et al. (2007)

determined that the polar bear has a range of best hearing from 50 Hz–50 kHz in water and 50 Hz–35 kHz in air.

Ghoul and Reichmuth (2014) studied a male sea otter and determined that the aerial audiogram of the sea otter resembled that of sea lions and showed a reduction in low-frequency sensitivity relative to terrestrial mustelids. Best sensitivity was 1 dB re 20 µPa at 8 kHz. Under water, hearing sensitivity was significantly reduced when compared to sea lions and other pinniped species, demonstrating that sea otter hearing is primarily adapted to receive airborne sounds. Critical ratios were more than 10 dB higher than those measured for pinnipeds, suggesting that sea otters are less efficient than other marine carnivores at extracting acoustic signals from background noise, especially at frequencies below 2 kHz.

F.7.4. Sirenians

Behavioral data on manatees indicate they have an underwater hearing range of approximately 400 Hz to 76 kHz (Gerstein et al. 2008; Gerstein et al. 1999; Mann et al. 2009b). Gerstein et al. (1999) obtained behavioral audiograms for two West Indian manatees and found an underwater hearing range of approximately 400 Hz to 76 kHz, with best sensitivity around 16 to 18 kHz. Mann et al. (2009b) obtained masked behavioral audiograms from two manatees; sensitivity was shown to range from 250 Hz to 90 kHz, although the detection level at 90 kHz was 80 dB above the manatee's frequency of lowest sensitivity (16 kHz). Behavioral and audio evoked potential threshold measurements for manatees have revealed lower and upper cutoff frequencies and sensitivities compared to the mid-frequency cetaceans (National Marine Fisheries Service 2016; NMFS 2018a). Sirenians communicate by sound and this communication is best developed between a mother and calf. Cows and calves use vocalizations to keep track of one another—it is believed that these animals can identify and distinguish one another based on their chirps and barks.

APPENDIX G ADDITIONAL INFORMATION BY SPECIES GROUP

This Appendix presents an analysis of the potential impacts to flying insects, bats, certain marine fish, and EFH that are known to occur in the proposed action areas, but are not expected to overlap with the Proposed Action (or overlap would be expected to be exceptionally low), due to their habitat and distribution within the proposed action areas. The information presented here provides an analysis for each species group, including those that are ESA-listed.

G.1. Flying Insects

G.1.1. Affected Environment

In general, insect populations are large and, in any given area, there is a great variety of insects present. The lifespan of some insects can be up to 50 years and others live only for a few hours. While some insects feed only in the immature or larval stage and go without food during an extremely short adult life, other insects feed during all life stages. Insects have adapted to every land and freshwater habitat where food is available. Flying insects range from those that are strong fliers, those that are poor fliers, and those that rarely take flight (Lytle 2015; Resh and Carde 2003; Yee and Kehl 2015). However, only species of the orders Diptera and Lepidoptera may be found in the proposed action areas. Flying insects inhabit ecosystems throughout the world, with fewer species found in the coldest Polar Regions (Resh and Carde 2003). Those that are associated with aquatic ecosystems typically live within freshwater waterbodies during early life stages and in more upland terrestrial habitats as adults (Resh and Carde 2003). Therefore, the Proposed Action only has the potential to impact flying insect species that inhabit, reproduce, and forage in coastal habitats, and have the potential to fly over marine waters in the vicinity of the proposed action areas. As such, the following discussions focus on flying insect orders and ESA-listed species known to occur in the proposed action areas.

G.1.1.1. Major Groups of Flying Insects

Two orders of flying insects that are potentially located within the proposed action areas are described in Table G- 1.

Table G- 1. Major Groups of Flying Insects Present in the Proposed Action Areas

Taxonomic Group	*Description*	*Distribution Within Proposed Action Areas*
Lepidoptera	Butterflies and moths	Occur worldwide with some species occurring in coastal areas. May occur in all proposed action areas.
Diptera	Flies and mosquitos	Abundant worldwide and live in freshwater aquatic, semi-aquatic, or moist terrestrial environments. May occur in all proposed action areas.

G.1.1.1.1. Lepidoptera

The second largest order of insects, Lepidoptera are widely dispersed across the globe and are found on every continent except Antarctica. Many species have adapted for life in relatively small ecological niches and are rarely abundant in more than one type of habitat. These environments include deserts, mountains, rainforests, and marshes (Culin 2018). Larvae of this order are commonly known as caterpillars and are primarily herbivores, feeding on leaves, roots, bark, fruits, and other plant structures. Adults feed on nectar, sap, and honeydew using their tube-like mouth structure called a proboscis (Whitfield and Purcell 2013). Eggs are typically laid singly or in large masses on or near the larval food source, such as leaves (Culin 2018; Whitfield and Purcell 2013). Species from this order may occur in all proposed action areas, but impacts would be assessed separately in a case by case basis by each homeport analysis.

G.1.1.1.2. Diptera

Diptera are considered one of the most dominant orders of insects due to their extreme abundance worldwide (Whitfield and Purcell 2013). While adult Diptera are terrestrial, larvae are often aquatic, semi-aquatic, or terrestrial, but prefer moist environments (Meyer 2020; Whitfield and Purcell 2013). Most adults feed primarily on nectar, plant and animal fluids, and blood, as their mouthparts generally limit them to liquid forms of food. Larvae feed primarily on dead organic matter and may also parasitize vertebrates, mollusks, and other arthropods (Meyer 2020). Eggs are laid either singly or in groups of about 250 and are usually deposited directly into decaying material in or near water (Oldroyd 2018). Species from this order may occur in all proposed action areas, but impacts would be assessed separately in a case by case basis by each homeport analysis.

G.1.1.2. ESA-Listed Flying Insects

Only ESA-listed flying insect species that inhabit coastal areas during their adult flying life stage are addressed in this document. There are five flying insects listed as threatened or endangered under the ESA that may occur within the proposed action areas (Table G-2). These species, their ESA status, and distribution are outlined in and discussed in the subsections below. There is no critical habitat designated for ESA-listed flying insect species within any of the proposed action areas.

Table G-2. ESA-Listed Flying Insects within the Proposed Action Areas

Common Name (Scientific Name)	*Listing Status*	*Distribution*	*Proposed Action Area(s)*	*Critical Habitat within Proposed Action Area(s)*
Miami blue Butterfly (*Cyclargus thomasi bethunebakeri*)	Endangered	Coast of southern Florida	NW-ATL-Florida and the Caribbean; GoMEX	None
Island marble butterfly (*Cyclargus thomasi bethunebakeri*)	Endangered	Upland coastal habitats of islands off of Washington and coastal Washington	NEPAC-North	None
Oregon silverspot butterfly (*Speyeria zerene hippolyta*)	Threatened	Meadows and beaches along the Oregon Coast	NEPAC-North	None
Schaus swallowtail butterfly (*Heraclides aristodemus ponceanus*)	Endangered	Coast of Florida and the Florida Keys	NW-ATL-Florida and the Caribbean; GoMEX	None
Taylor's checkerspot butterfly (*Euphydryas editha taylori*)	Endangered	Coastal and inland prairies in Washington and Oregon	NEPAC-North	None

G.1.1.2.1. Miami Blue Butterfly

The Miami blue butterfly (*Cyclargus thomasi bethunebakeri*) is listed as endangered under the ESA (77 FR 20948; April 6, 2012). There is no critical habitat designated for this species. Winged adult Miami blue butterflies may occur within geographically-limited areas of the NW-ATL-Florida and the Caribbean and GoMEX proposed action areas.

The Miami blue butterfly is endemic to the southern tip of the Florida peninsula, Florida Keys, and Dry Tortugas National Park. Once common across southern Florida and its barrier islands and preferring the edges of hardwood hammocks, coastal berms, dunes, and scrub, this species is now distributed mainly on the Florida Keys at the Key West National Wildlife Refuge (Minno 1993; Saarinen 2014). Population size is currently unknown, but is estimated to be in the hundreds (USFWS 2012).

The Miami blue butterfly produces multiple generations per year, typically from February to November. Eggs are laid on the stalks of grey nickerbean (*Caesalpina bonduc*), seed pods of balloon vine (*Cardiospermum spp.*), and Pithecellobium (Carroll 2006; Daniels and Emmel 2004). Adult butterflies feed on a variety of nectar sources, which must be in the vicinity of potential host plants. These plants include species in the Boraginaceae, Asteraceae, Fabaceae, Polygonaceae, and Verbenaceae families (Daniels and Emmel 2004).

G.1.1.2.2. Island Marble Butterfly

The island marble butterfly (*Euchloe ausonides insulanus*) is listed as endangered under the ESA (85 FR 26786; May 5, 2020). Critical habitat is designated for the species; however, it is located outside of the proposed action areas. Winged adult island marbled butterflies may occur within geographically-limited regions of the NEPAC-North proposed action area.

Island marble butterflies do not migrate and are known to inhabit six northern counties and sixteen islands in Washington, with all of their populations residing from San Juan and Lopez Islands. They live their entire lifecycle in upland prairie-like habitat, sand dunes, or coastal lagoons (USFWS 2018b).

Island marble butterflies only live for approximately one year, emerging from eggs as larvae then entering a chrysalis stage for most of their year-long existence. They undergo metamorphosis and emerge from their chrysalis as winged adults in the spring. Adults immediately mate and lay eggs, living for only a few days before dying. Typically, eggs are laid on plants of the mustard family, the larva's preferred food source (USFWS 2018b).

G.1.1.2.3. Oregon Silverspot Butterfly

The Oregon silverspot butterfly (*Speyeria zerene hippolyta*) is listed as threatened under the ESA (45 FR 44935; July 2, 1980). Critical habitat is designated for the species; however, it is located outside of the proposed action areas. Winged adult Oregon silverspot butterflies may occur within geographically-limited regions of the NEPAC-North proposed action area.

Oregon silverspot butterflies inhabit three types of grassland along the Oregon Coast. These include marine terrace and coastal headland salt-spray meadows and stabilized dunes along marine beaches, which are strongly influenced by their proximity to the ocean, mild temperatures, high rainfall, and persistent fog. The third habitat consists of montane grasslands found on mountainsides, which are influenced by colder temperatures, snow accumulation, less coastal fog, and no salt spray. The most important feature of their preferred habitat is the early blue violet (*Viola adunca*), which is one of the only flowers that these butterflies can successfully feed on and develop as larva (USFWS 2018d).

Salt-spray meadows act as important nursery habitats for eggs and larva, but not for adults. Once the Oregon silverspot butterflies become flying adults, they migrate out of the meadows into the fringe of conifers or brush forests. In these areas, adults feed on various nectar sources and seem to favor yarrow (*Achillea millefolium*) and Indian thistle (*Cirsium edule*) (USFWS 2018d).

G.1.1.2.4. Schaus Swallowtail Butterfly

The Schaus swallowtail butterfly (*Heraclides aristodemus ponceanus*) was listed as endangered under the ESA in 1976 (41 FR 17736; April 28, 1976). There is currently no critical habitat designated for this species. Winged adult Schaus swallowtail butterflies may occur within geographically-limited regions of the NW-ATL-Florida and the Caribbean proposed action area.

The range of the Schaus swallowtail butterfly extends from southern Miami-Dade County to the Upper and Middle Florida Keys. They occur exclusively in hardwood hammocks in areas that were once farmed and have now regrown. Although their preferred habitat is mainly inland and away from tidal waters, adults may travel over the ocean for short periods of time (USFWS 1999). Population abundance of the Schaus swallowtail butterfly has been studied yearly since 2011. In 2018 within Biscayne National Park and Key Largo, 438 individuals were identified (USFWS 2019b).

Adults are primarily active between April and July, producing only one generation per year. A single female can lay several hundred eggs, depositing them on the leaves of torchwood (*Amyris elemifera*) and wild lime (*Zanthoxylum fagara*), and hatching in three to five days (USFWS 1999). Larval caterpillars can remain in the chrysalis stage for up to two years before emerging as adults. In contrast, adults are short-lived, averaging about three days in the wild (USFWS 1999).

Larval caterpillars feed primarily on torchwood, while adults feed on nectar from a variety of blossoms from guava (*Psidium guajava*), cheese shrub (*Morinda royoc*), wild coffee (*Psychotria nervosa*), blue porterweed (*Stachytarpheta jamaicensis*), sea grape (*Coccoloba uvifera*), dog's tail (*Heliotropium angiospermum*), lantana (*Lantana involucrata*), and salt-and-pepper (*Melanthera nivea*). Although little is known about predation of the Schaus swallowtail butterfly, their main predators are spiders, lizards, and birds (USFWS 1999).

G.1.1.2.5. Taylor's Checkerspot Butterfly

The Taylor's checkerspot butterfly (*Euphydryas editha taylori*) is listed as endangered under the ESA (78 FR 61451; October 3, 2013). Critical habitat is designated for this species; however, it is located outside of the proposed action areas. Winged adult Taylor's checkerspot butterflies may occur in geographically-limited regions of the NEPAC-North proposed action area.

Taylor's checkerspot butterflies inhabit open grasslands and grass/oak woodland sites within coastal and inland prairies of the Pacific Northwest (USFWS 2018e). They inhabit the same habitat year-round (Potter 2016). Each year the checkerspot butterfly completes one life cycle from egg to larva, pupa, and adult. Taylor's checkerspot butterflies emerge from chrysalis in the spring from April through June, depending upon local site and weather conditions. Male butterflies seek mates and defend territories, and females search for suitable host plants and micro-sites for egg-laying. Male and female butterflies rely on floral nectar for nutrition and feed from a variety of plants often specializing on a few species (Potter 2016).

G.2. Bats

G.2.1. Affected Environment

Some bats may reside in areas that are more coastal while others may be only present inland, especially in caves or other enclosed spaces. Some bat species may forage on insects over water, while others may feed on flowers, fruit, or terrestrial species. Only those bat species that may be present within the proposed action area that are distributed coastally for part of the year and may forage over water are evaluated below.

G.2.1.1. Major Groups of Bats

All bats belong the order Chiroptera, which is comprised of two suborders Microchiroptera (true bats) and Megachiroptera (flying foxes). These are potentially located within the proposed action areas and are described in Table G-3.

Table G-3. Major Groups of Bats Present in the Proposed Action Areas

Taxonomic Group	*Description*	*Distribution*	*Distribution Within the Proposed Action Area(s)*
Microchiroptera	True bats that have the ability to echolocate. Small in size. Feed on small terrestrial vertebrates and insects, or, less commonly, fruit or flowers. Nocturnal.	Reside in caves during wintering or maternity, hibernating from October to March. Reside in roots during summer.	May occur in all proposed action areas. More common coastally. May rarely be present offshore, but would become very sparse with increased distance.
Megachiroptera	Flying foxes that do not echolocate but have excellent night vision. Large in size. Feed on fruit and flowers.	Live in tropical regions of Asia, Australia, and Africa and throughout the islands of the western Pacific.	May occur in coastal areas of the HI-PAC proposed action area.

G.2.1.1.1. Microchiroptera

Microchiroptera are distributed worldwide and have the largest number of species. In the United States and Canada, there are 45 species of “true bats.” The greatest number of species are found in the southwestern United States, in states that share a border with Mexico. By contrast, states that border water (e.g., the Gulf of Mexico) are home to significantly fewer species (Pierson 1998).

All members have a highly developed echolocation system (the ability to locate objects by using reflected sound). Most bats in this suborder are small, weighing 0.35–0.71 ounces (oz; 5–20 grams [g]). However, some species can weigh up to 3.52 oz (100 g) (Neuweiler 2000); these species include some tropical species that are obligate fruit and flower feeders or species that are carnivorous ground-feeders that prey on small vertebrates such as frogs, lizards, birds, and mice, and blood feeders (vampire bats).

In North America, caves provide some of the most important maternity and winter hibernating sites for bats (Pierson 1998). In the summer, bats roost in trees, rock crevices, and manmade structures like buildings, bridges, and mines. North American bats occupy summer habitats from approximately March through August. Females form maternity colonies that can be as large as a few hundred to several thousand individuals. Maternity colonies are located near foraging habitat. In late summer, bats begin to swarm near winter hibernation habitat (e.g., caves and mines). Hibernation generally begins during October and ends mid-March to early April (Caire et al. 1979; Harvey 1992; Martin 2007; Tuttle and Kennedy 2005). Although bats are terrestrial mammals, offshore monitoring studies in the Gulf of Maine, Mid-Atlantic, and Great Lakes noted that bats fly over marine waters (Peterson et al. 2016), albeit rarely. Peterson et al. (2016) observed that the abundance of bats flying over offshore waters (some as far from shore as 20 nm) was highest near heavily forested coastal areas and decreased as the distance from land increased. There was also an increase in the abundance of bats observed over offshore waters during periods of warm air temperatures and low wind speeds (Peterson et al. 2016).

Most North American bats are nocturnal and insectivorous, foraging at night over fields and bodies of freshwater, often around lights that attract warms of insects (Barbour and Davis 1969), which are their preferred prey. Larger bats in this order may feed on fruit, flowers, or small invertebrates.

On many geographically-isolated islands in the Pacific, bats are the only endemic mammal (Fujita and Tuttle 1991). For example, the Hawaiian hoary bat (*Lasiurus cinereus semotus*), a Microchiroptera species, is the only extant land mammal native to the Hawaiian archipelago (USFWS 1998). However, Pacific sheath-tailed bats (*Emballonura* spp., also a Microchiroptera), co-exists in the Mariana archipelago with several other species of flying foxes (Neuweiler 2000).

G.2.1.1.2. Megachiroptera

The suborder Megachiroptera includes 175 species in a single family—Pteropodidae. These bats are commonly known as flying foxes and occur only in the tropical regions of Asia, Australia, and Africa (Neuweiler 2000). In fact, the majority of flying foxes are restricted to islands in the Pacific (Brooke et al. 2000).

Unlike most Microchiroptera that roost in enclosed spaces such as caves, hollow trees, or buildings, members of Pteropodidae roost in the open or on branches within forest canopy. Most species are highly social and form large colonies (Brooke et al. 2000). They are also relatively large (3.52–35.23 oz [100–1000 g]). At night, flying foxes depend on their large eyes for visual orientation while flying and foraging. Only one genus of cave-dwelling flying foxes have the ability to echolocate (Neuweiler 2000), all others do not have this ability. Evidence suggests that bats in this order are capable of long-distance movement, on both a diurnal and longer seasonal basis (Parsons et al. 2008). Parsons et al. (2008) found that some larger species in this order can travel up to 25 mi (40 km) in a single night.

Pteropodidae is a diverse family frugivorous and nectarivorous bats. Although a few are highly specialized to feed only on flower nectar, most feed on both fruit and flowers. Frugivorous bats play an important role in island ecology through pollination and seed dispersal. Because they defecate in flight, they can move seeds wide distances (Fujita and Tuttle 1991).

On many geographically isolated islands in the Pacific, bats are the only endemic mammal (Fujita and Tuttle 1991). For example, the Hawaiian hoary bat (*Lasiurus cinereus semotus*), a Microchiroptera species, is the only extant land mammal native to the Hawaiian archipelago (USFWS 1998). However, the Pacific sheath-tailed bats (genus *Emballonura*, also a Microchiroptera), co-exists in the Mariana archipelago with several other species of flying foxes (Neuweiler 2000).

G.2.1.2. ESA-Listed Bats

Three bat species are listed under the ESA. All may occur within the HI-PAC proposed action area and have the potential to overlap with the Proposed Action due to the potential for inter-island (coastal) movement by the species. Table G- 4 summarizes the presence of these species and their critical habitat in each proposed action area.

Table G- 4. ESA-Listed Bats within the Proposed Action Areas

Common Name (Scientific Name)	*ESA Status*	*Proposed Action Area*	*Critical Habitat within Proposed Action Area*
Pacific sheath-tailed bat (*Emballonura semicaudata rotensis* & *E. s. semicaudata*)	Endangered	HI-PAC	None
Hawaiian hoary bat (*Lasiurus cinereus semotus*)	Endangered	HI-PAC	None
Mariana fruit bat (*Pteropus mariannus mariannus*)	Threatened	HI-PAC	None

G.2.1.2.1. Pacific Sheath-tailed Bat

There are four sub-species of the Pacific sheath-tailed bat (*Emballonura semicaudata*), two of which are listed as endangered under the ESA. The CNMI sub-species, *Emballonura semicaudata rotensis*, is listed as endangered (80 FR 59423; October 1, 2015). The South Pacific sub-species, *Emballonura semicaudata,* from American Samoa is also listed as endangered (81 FR 65466; September, 22, 2016). Currently, no critical habitat has been designated for either sub-species. These species may occur within the Mariana Islands region of the HI-PAC proposed action area.

Bats are the only mammal to have naturally colonized the islands of the remote Pacific (east of Vanuatu in the south, and the Philippines in the north). The Pacific sheath-tailed bats have the widest natural range of any terrestrial mammal in this region (Helgen and Flannery 2002). Because bats are often the only native terrestrial mammals in geographically-isolated island systems, they are critical to the biodiversity of mammalian fauna (Fraser et al. 2009). The sub-species *E. s. rotensis* is endemic to the CNMI. While it once occurred on the five southernmost Mariana Islands of Sipan, Tinian, Aguiguan, Rota, and Guam, the only remaining population is currently on Aguiguan. Because Pacific sheath-tailed bats are known to occur on Aguiguan in the CNMI, based on available habitat, they could also conceivably occur in remote areas of other islands such as Tinian in the CNMI, western Samoa, and Tutuila in American Samoa. However, the few surveys conducted have not confirmed the presence outside of Aguiguan, CNMI (Fraser et al. 2009).

Little is known about the ecology or natural history of Pacific sheath-tailed bats, but foraging and roosting occurs in caves and forests. This subspecies roosts exclusively in caves (Wiles et al. 2011). On Aguiguan, these bats appear to occupy the same caves for many years, both during the day and night (Wiles et al. 2011).

Pacific sheath-tailed bats are insectivorous. *E.s. rotensis* on Aguiguan forage mainly on hymenopterans (e.g., wasps, bees, and ants), lepidopterans (e.g., butterflies and moths), and coleopterans (e.g., beetles). Pacific sheath-tailed bats migrate distances exceeding 3 mi (5 km) to reach foraging sites (Wiles et al. 2011). They mainly congregate in forest understories to forage; however, they also forage at treetop level, below the forest canopy, and possibly in non-forested areas (Valdez et al. 2011).

Members of the genus *Emballonura* are highly maneuverable fliers, which is demonstrated by their ability to forage inside cluttered forest understories. Aguiguan's native forests are of relatively short stature (23 to 49 ft [7 to 15 m] tall), so most of the bat's foraging flights occur 16 to 20 ft (5 to 6 m) above the ground (Valdez et al. 2011).

G.2.1.2.2. Hawaiian Hoary Bat

The Hawaiian Hoary bat (*Lasiurus cinereus semotus*) was listed as endangered under the ESA in 1970 (35 FR 16047; October 13, 1970). Critical habitat has not been designated for this species. The Hawaiian hoary bat may occur near the Hawaiian archipelago in the HI-PAC proposed action area.

The Hawaiian hoary bat is the only extant land mammal native to the Hawaiian archipelago and occurs on all the MHI (i.e., Kauai, Oahu, Maui, Molokai, and the Island of Hawaii). Mating appears to occur between September and December with the birth of young (typically twins) during May or June. Mother bats likely stay with their pups until they are 6–7 weeks old. Breeding populations occur on all of the MHI except for Niihau and Kahoolawe (USFWS 1998). The largest populations of hoary bats are believed to occur on Kauai and the Island of Hawaii, with populations roosting primarily in woody vegetation exceeding 15 ft (5 m) in height (Bonaccorso et al. 2015).

Observations of the Hawaiian hoary bat have been reported on the eastern side of Oahu in the Koʻolau mountain range and, to a lesser extent, the Waiʻanae mountain range. Although Hawaiian hoary bats have been documented on Oahu (USFWS 1998), little research on the species has been conducted on the island. Gorressen et al. (2016) noted that bats on Oahu were acoustically cryptic and were less frequently detected in windward northern areas than in leeward southern parts of their study area. Seasonal peaks in acoustic detection on Oahu were observed from March through September, coinciding with the birthing and raising of young for the species.

Like most bats, this species is nocturnal. It roosts during the day in native and non-native tree foliage and may travel as far as 6–8 mi (11–13 km) one-way to forage on a given night (Bonaccorso et al. 2015). They have been documented foraging from 3 to over 483 ft (1 to 147 m) above the ground or water. Their diet is diverse and includes a variety of native and non-native flying insects such as moths, beetles, crickets, mosquitoes, and termites. Hawaiian hoary bats have been observed foraging either just before or after sunset depending on the time of year, and activity patterns may also be affected by altitude (Bonaccorso et al. 2015; USFWS 1998).

Based on the North American hoary bat's ability to migrate long distances, it is assumed long distance movement, such as inter-island migration is possible, but largely unknown (USFWS 1998). Seasonal elevation migration has been documented, where areas at low elevations are occupied during the breeding season (May through October) and areas of high elevation are occupied during the non-breeding season (November through April) (Gorressen et al. 2016; Menard 2001; USFWS 1998).

G.2.1.2.3. Mariana Fruit Bat

The Mariana fruit bat (*Pteropus mariannus mariannus*) is listed as threated under the ESA throughout its range (70 FR 1190; January 6, 2005). Approximately 376 acres (152 hectares) on Guam are designated as critical habitat (68 FR 62944; October 28, 2004). While Guam is within the HI-PAC proposed action area, the designated critical habitat for the Mariana fruit bat is located on land and would not overlap with the Proposed Action. The Mariana fruit bat may occur in the Mariana Islands region of the HI-PAC proposed action area.

This subspecies is endemic to the Mariana archipelago, where it is known to reside on 14 of the 15 major islands. Rota is the only island within the southern Mariana archipelago that has maintained a sizeable population (600–2,600) of Mariana fruit bats. Populations on the other southern islands (Guam, Aguiguan, Tinian, and Saipan) counted under 200 individuals during the same timeframe. On Guam, the southernmost Mariana Island (which is not part of the CNMI), the only colony of Mariana fruit bats resides on Andersen Air Force Base (Esselstyn et al. 2006). Although this population receives greater protection as a result of this location, predation of juveniles by the brown tree snake (*Boiga irregularis*) have caused a decline in this population (Esselstyn et al. 2006; Wiles 1987; Wiles and Glass 1990).

Several surveys (conducted in 1983, 2000, and 2001) have indicated that the relatively isolated northern islands of the CNMI support the majority of the bat population in the archipelago, despite the relatively small land mass of these islands in comparison to the southern islands. The presence of the Mariana fruit bat on an island depends on the availability of enough suitable forest (e.g., limestone forests, ironwood or coconut groves) for roosting and foraging to sustain resident and transient bats (U.S Fish and Wildlife Service 2009). Mariana fruit bats are highly colonial, and can form large, dense roosts in multiple adjacent trees. They forage and roost primarily in forests, particularly in primary and secondary limestone forests and volcanic (or ravine) forest. They also forage in coconut plantations and ironwood groves. On islands uninhabited by humans, Mariana fruit bat colonies usually occur in remote sites, especially near or along cliffs (U.S Fish and Wildlife Service 2009).The Mariana fruit bat is highly reliant on forest habitat containing diverse food resources that are available throughout the year. Their diet consists of fruits, nectar, pollen, and leaves of 39 different plant species, including 11 introduced species (U.S Fish and Wildlife Service 2009).

The Mariana fruit bat is known for its strong flight and high mobility. Although the pattern and frequency of inter-island movements is mostly unknown, these bats have been observed flying over the ocean between islands (U.S Fish and Wildlife Service 2009). Evidence of inter-island movement of Mariana fruit bats has shown that individual fruit bats were able to fly from Guguan to Sarigan—a distance of 39 mi (63 km) (Wiles et al. 1989). There would be no effect to federally-designated critical habitat for ESA-listed Mariana fruit bat as a result of the Proposed Action.

G.3. Marine Fish

G.3.1. Affected Environment

G.3.1.1. Major Groups of Marine Fish

There are major groups of marine fish that are in the proposed action areas, but are not expected to overlap with the Proposed Action, due to their occurrence in the water column and/or habitat (e.g., bathypelagic and bathydemersal fish orders, as well as freshwater fish orders which are restricted to caves and headwaters too shallow for vessels to operate). Although it is theoretically possible for an extralimital occurrence of a fish from the groups in Table G- 5 to overlap with the Proposed Action, the probability of encountering an individual from these groups during the activities described in Section 2.3 is exceptionally low, and thus, these fish groups are not discussed in the PEIS/POEIS, but are included here.

Table G- 5. Major Groups of Fish Not Impacted by the Proposed Action

Taxonomic Order	*Representative Species or Groups*	*Water Column Location*
Chimaeriformes	Rabbitfish, ratfish, chimeras	Demersal, bathydemersal
Lampriformes	Opahs, oarfish	Mesopelagic and bathypelagic
Myctophiformes	Lanternfishes	Mesopelagic and bathypelagic
Notacanthiformes	Gilbert's halosaurid fish, snubnosed spiny eel	Bathypelagic, bathydemersal
Osmeriformes	Argentines, deep sea smelts	Mesopelagic and bathypelagic
Stomiiformes	Dana viperfish, ribbon sawtail fish	Mesopelagic and bathypelagic
Zeiformes	Dories, boarfishes	Mesopelagic and bathypelagic

G.4. Essential Fish Habitat

G.4.1. Affected Environment

There are habitats that are in the proposed action areas, but are not expected to overlap with the Proposed Action, due to their occurrence in the water column and/or nearshore areas. Potential overlap with the Proposed Action would be exceptionally low, and thus, these EFH types are not discussed in the PEIS/POEIS, but are included here.

G.4.1.1.Shoreline Vegetation

Most of the 4 million acres (16,187 km^2) of salt marshes in the United States occur on the Atlantic Coast from Maine to Florida, and along the Gulf of Mexico from Louisiana to Texas (Mitsch et al. 2009). The New England states have primarily fringing marshes, with the greatest extent of salt marsh habitat is on the coast of South Carolina (Roman et al. 2000). Hundreds of thousands of acres of salt marsh line the northern Gulf of Mexico from Texas to as far south as Tampa Bay in Florida (Stevens et al. 2006; University of Florida 2016). On the U.S. Pacific Coast, coastal salt marshes occur in discontinuous patches on the inland margins of bays, lagoons, and estuaries from northern Alaska to the Tijuana Estuary. The San Francisco Bay-Estuary supports large tracts of salt marsh. In southern California, the greatest expanse of salt marsh is in the Mugu Lagoon Estuary north of Los Angeles (Mitsch et al. 2009; Ornduff et al. 2003). Salt marshes are not a significant habitat in Hawaii, Puerto Rico, the U.S. Virgin Islands, or Guam.

Mangrove forests add nutrients to the surrounding ecosystem, making them among the richest nursery grounds for marine life (Feller et al. 2010; Nagelkerken et al. 2008). Mangrove occurrence is limited by freezing weather, so half of the world's mangroves occur between latitudes of 0° and 10° in both hemispheres, commonly near seagrass beds and salt marshes (Mitsch et al. 2009). Mangrove forests are essential habitat for many fishes and animals, including mangrove crabs (*Scylla* spp.), clams, shrimp, fish, and reptiles. Mangrove forests are the tropical equivalent of salt marshes, lining the shores of coastal embayments and the banks of rivers to the upper tidal limits (Nagelkerken et al. 2008).

Mangrove occurrence in the continental United States is concentrated in Florida, where mangroves cover about 1,954 mi^2 (5,061 km^2) on both coasts of Florida, from Cape Canaveral on the Atlantic to Cedar Key on the Gulf of Mexico, and throughout the Caribbean (Mitsch et al. 2009; Nagelkerken et al. 2008). Mangroves also occur in scattered populations in the northern Gulf of Mexico, the northernmost extent of their range, where they tend to occur interspersed with salt marsh vegetation. Southern Florida, Puerto Rico, and the U.S. Virgin Islands support at least four species of mangroves, though human disturbance has reduced the natural extent of mangrove forests throughout their range (Feller et al. 2010; Martinuzzi et al. 2009; Polidoro et al. 2010).

Mangroves are not native to Hawaii (Polidoro et al. 2010). Guam has the greatest species diversity of mangroves in the Mariana Archipelago, with more than 10 species. Mangroves grow in estuarine habitats at the mouths of rivers on Guam, where the tides may vary by almost 3 ft (1 m) each day. Mangrove forests are located in the intertidal zone on the eastern shores of Outer and Inner Apra Harbors. The archipelago of American Samoa represents the easternmost natural extension of mangroves in the Indo-Pacific (Waddell and Clarke 2008; Western Pacific Regional Fishery Management Council 2009, 2016).

G.4.1.1.1. Submerged Aquatic Vegetation

Submerged aquatic vegetation, including seagrasses, kelp, and other macroalgae, are found throughout the proposed action areas. Submerged aquatic vegetation is most prolific in estuarine and nearshore areas, particularly those areas with clear water. The various FMCs refer to submerged aquatic vegetation using different terms, but all focus on seagrasses, kelp, and macroalgae as EFH. Habitat features that support algae and seagrass distribution are the availability of light, salinity level, seafloor type, currents, tidal regime, temperature, and availability of a firm surface for attachment (Green et al. 2003; Mitsch et al. 2009). As discussed in Section 3.4.1, green, brown, and red algae occur throughout each proposed action area. Macroalgal distribution is shaped by the differences in water temperature that are directed by oceanic currents (Hine et al. 2003; Spalding et al. 2001; Spalding et al. 2007).

Seagrasses grow in a range of salinities, from fresh water to salinities of up to 42 ppt, but thrive in intermediate salinities (Green et al. 2003; University of Florida 2016). Seagrasses occur as one element of a complex patchwork of coastal habitats, including estuaries, rocky reefs, coral reefs, mangroves, and bare sediments. Seagrasses are unique among the flowering plants in their ability to grow submerged in shallow marine environments. Seagrass beds provide complex, three-dimensional structures that other organisms use to feed, spawn, and hide (Fonseca 1998; Nelson et al. 2016). Seagrass beds are known as nursery habitat for commercially-important crustaceans, finfish, and shellfish, and they provide food sources for fish, sea turtles, and manatees, as well as others (Russell and Balazs 2009; Spalding et al. 2001).

Seagrasses occur in all coastal U.S. waters, except Georgia and South Carolina (Fonseca 1998). Within the proposed action areas, seagrass coverage is greatest in the Gulf of Mexico (7,470 mi^2 [19,350 km^2]), followed by the Atlantic Coast of Florida (1,080 mi^2 [2,800 km^2]), the north Atlantic Coast of the United States (145 mi^2 [375 km^2]), and the Mid-Atlantic Coast of the United States (110 mi^2 [290 km^2]) (Green et al. 2003; Spalding et al. 2007). The Florida Keys National Marine Sanctuary seagrass bed is the world's largest documented, contiguous seagrass bed (Lewis III et al. 2000; Orth et al. 2006). Eelgrass and surfgrass (*Phyllospadix* spp.) form extensive underwater meadows or beds in shallow water in the Pacific Northwest, providing important epibenthic food sources for Pacific salmonids (Blackmon et al. 2006). Twelve species of seagrasses occur in the Pacific Islands, with all but one widely distributed. Extensive seagrass meadows surround the coastlines of both Saipan, in the CNMI, and Guam (Ellison 2009).

Kelp forests (Section 3.4.1) occur primarily in coastal habitats in the temperate to arctic latitudes of the northern hemisphere, and are the principal biological structure along rocky shores in cold marine waters (Steneck et al. 2002). Kelp forests influence the distribution and abundance of a wide variety of other marine organisms including bryozoans, snails, fish, and lobsters (Stephens et al. 2006; Williams et al. 2010).

Kelp occurs from Maine to Long Island Sound in the Gulf of Maine/Bay of Fundy and Virginian ecoregions (Steneck et al. 2002), where they provide important habitat for Management Unit species such as scup (*Stenotomus chrysops*) and black seabass (*Centropristis striata*). Canopy-forming kelp also dominate in the California Current and Gulf of Alaska ecosystems and throughout the northeastern Pacific Ocean (Graham et al. 2007; Steneck et al. 2002), where they are designated as a Habitat Area of Particular Concern (HAPC). Kelp beds occur in close association with rocky reefs because, with few exceptions, kelp must attach to rocky structures to maintain their position in the ever-moving ocean (Stephens et al. 2006). Kelp forms dominant structural habitat in both Kachemak Bay and Prince William Sound near the Port of Valdez in Alaska (Dean et al. 2000). Kelp does not occur in the Gulf of Mexico, Caribbean Sea, Hawaiian Islands, or Guam (Graham et al. 2007).

G.5. Marine Mammals

Table G- 6. Mysticete Species Presence in the Proposed Action Areas

Common Name	*Scientific Name*	*Stock(s) within the Proposed Action Areas*	*ESA-Listing Status*	*Critical Habitat*
Blue whale	*Balaenoptera musculus*	Western North Atlantic, Central North Pacific, Eastern North Pacific	Global: Endangered	
Bryde's whale	*Balaenoptera edeni*	Northern Gulf of Mexico, Eastern Tropical Pacific	Endangered: Gulf of Mexico DPS	
Fin whale	*Balaenoptera physalus*	Western North Atlantic; Northeast Pacific, CA/OR/WA	Global: Endangered	
Gray whale	*Eschrichtius robustus*	Western North Pacific Eastern North Pacific	Endangered: Western North Pacific	
Humpback whale	*Megaptera novaeangliae*	Gulf of Maine, Western North Pacific, Central North Pacific, CA/OR/WA	Endangered: Western North Pacific DPS, Central North Pacific DPS Threatened: Mexico DPS	86 FR 21082; May 21, 2021
Minke whale (common)	*Balaenoptera acutorostrata*	Canadian East Coast, Alaska, CA/OR/WA		
North Atlantic right whale	*Eubalaena glacialis*	Western North Atlantic	Global: Endangered	81 FR 4837; February 26, 2016

Common Name	*Scientific Name*	*Stock(s) within the Proposed Action Areas*	*ESA-Listing Status*	*Critical Habitat*
North Pacific right whale	*Eubalaena japonica*	Eastern North Pacific	Global: Endangered	73 FR 19000; April 8, 2008
Sei whale	*Balaenoptera borealis*	Nova Scotia, Western North Atlantic, Eastern North Pacific	Global: Endangered	

Table G- 7. Odontocete Presence in the Proposed Action Areas

Common Name	*Scientific Name*	*Stock(s) within the Proposed Action Areas*	*ESA-Listing Status*	*Critical Habitat*
Atlantic spotted dolphin	*Stenella frontalis*	Western North Atlantic, Northern Gulf of Mexico [Puerto Rico and USVI]		
Atlantic white-sided dolphin	*Lagenorhynchus albirostris*	Western North Atlantic		
Baird’s beaked whale	*Berardius bairdii*	Alaska, CA/OR/WA		
Beluga whale	*Delphinapterus leucas*	Beaufort Sea, Eastern Chukchi Sea, Bristol Bay	Cook Inlet DPS	
Blainville’s beaked whale	*Mesoplodon densirostris*	Western North Atlantic, Northern Gulf of Mexico, Hawaii		
Clymene dolphin	*Stenella clymene*	Western North Atlantic, Northern Gulf of Mexico		
Common bottlenose dolphin	*Tursiops truncatus*	Atlantic: Biscayne Bay; Charleston Estuarine System; Florida Bay, Indian River Lagoon Estuarine System; Jacksonville Estuarine System; Northern Georgia/Southern South Carolina Estuarine System; Northern North Carolina Estuarine System; Northern South Carolina Estuarine System;		

Common Name	***Scientific Name***	***Stock(s) within the Proposed Action Areas***	***ESA-Listing Status***	***Critical Habitat***
		Puerto Rico and U.S. Virgin Islands; Southern Georgia Estuarine System; Central Georgia Estuarine System; Southern North Carolina Estuarine System; Western North Atlantic Northern Migratory Coastal; Western North Atlantic Southern Migratory Coastal; Western North Atlantic Offshore Pacific: California Coastal; CA/OR/WA offshore; Hawaiian Islands Stock Complex Gulf of Mexico: Northern Gulf of Mexico Bay, Sound and Estuary (NMFS dividing into 31 stocks); Choctawhatchee Bay, Terrebonne-Timbalier Bay Estuarine System; St. Joseph Bay; Barataria Bay Estuarine System; Mississippi Sound, Lake Borgne, Bay Boudreau; Northern Gulf of Mexico Continental Shelf; Gulf of Mexico Eastern Coastal; Gulf of Mexico Northern Coastal; Gulf of Mexico Western Coastal;		

Common Name	***Scientific Name***	***Stock(s) within the Proposed Action Areas***	***ESA-Listing Status***	***Critical Habitat***
		Northern Gulf of Mexico Oceanic		
Cuvier's beaked whale	*Ziphius cavirostris*	Western North Atlantic, Northern Gulf of Mexico, Alaska, CA/OR/WA, [Puerto Rico and USVI]		
Dall's porpoise	*Phocoenoides dalli*	Alaska, CA/OR/WA		
Dwarf sperm whale	*Kogia sima*	Western North Atlantic, CA/OR/WA, Northern Gulf of Mexico		
False killer whale	*Pseudorca crassidens*	Western North Atlantic, Northern Gulf of Mexico, Hawaiian Islands, American Samoa, Palmyra Atoll		83 FR 35062; July 24, 2018
Fraser's dolphin	*Lagenodelphis hosei*	Western North Atlantic, Northern Gulf of Mexico, Hawaii		
Gervais' beaked whale	*Mesoplodon europaeus*	Western North Atlantic, Northern Gulf of Mexico		
Harbor porpoise	*Phocoena phocoena*	Gulf of Maine/Bay of Fundy, Monterey Bay, Morro Bay, Northern California-Southern Oregon, Northern Oregon/WA Coast, San Francisco-Russian River, Central California, Washington Inland Waters, Gulf of Alaska, Bering Sea, Southeast Alaska		
Hubb's beaked whale	*Mesoplodon carlshubbi*			
Killer whale	*Orcinus orca*	Western North Atlantic, Eastern North Pacific: AK Resident, Northern Resident, Offshore, Transient (part of	Endangered: Southern Resident	71 FR 69054; November 29, 2006

Common Name	***Scientific Name***	***Stock(s) within the Proposed Action Areas***	***ESA-Listing Status***	***Critical Habitat***
		West Coast Transient), Southern Resident; AT1 Transient, Gulf of AK, Aleutian Islands, Bering Sea Transient, West Coast Transient; Northern Gulf of Mexico, Hawaii		
Long-beaked common dolphin	*Delphinus delphis bairdii*	California		
Long-finned pilot whale	*Globicephala melas*	Western North Atlantic		
Longman's beaked whale	*Indopacetus pacificus*	Hawaii		
Melon-headed whale	*Peponocephala electra*	Western North Atlantic, Northern Gulf of Mexico, Hawaii		
Mesoplodont beaked whale	*Mesoplodon*	Western North Atlantic, CA/OR/WA		
Narwhal	*Monodon Monoceros*	Unidentified		
Northern bottlenose whale	*Hyperoodon ampullatus*	Western North Atlantic		
Northern right whale dolphin	*Lissodelphis borealis*	CA/OR/WA		
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	North Pacific, CA/OR/WA Northern and Southern		
Pantropical spotted dolphin	*Stenella attenuata*	Western North Atlantic, Northern Gulf of Mexico, Hawaii		
Pygmy killer whale	*Feresa attenuata*	Western North Atlantic, Northern Gulf of Mexico, Hawaii		
Pygmy sperm whale	*Kogia breviceps*	Western North Atlantic, CA/OR/WA, Northern Gulf of Mexico, Hawaii		
Risso's dolphin	*Grampus griseus*	Western North Atlantic, CA/OR/WA,		

Common Name	*Scientific Name*	*Stock(s) within the Proposed Action Areas*	*ESA-Listing Status*	*Critical Habitat*
		Northern Gulf of Mexico, Hawaii		
Rough-toothed dolphin	*Steno bredanensis*	Western North Atlantic, Northern Gulf of Mexico, Hawaii, American Samoa		
Short-beaked common dolphin	*Delphinus delphis*	Western North Atlantic, CA/OR/WA		
Short-finned pilot whale	*Globicephalus macrorhynchus*	Western North Atlantic, CA/OR/WA, Northern Gulf of Mexico [Puerto Rico and USVI], Hawaii		
Sowerby's beaked whale	*Mesoplodon bidens*	Western North Atlantic		
Sperm whale	*Physeter macrocephalus*	North Atlantic, Northern Gulf of Mexico, North Pacific, CA/OR/WA [Puerto Rico and USVI]	Global: Endangered	
Spinner dolphin	*Stenella longirostris*	Western North Atlantic, Northern Gulf of Mexico [Puerto Rico and USVI], Hawaiian Islands stock complex, American Samoa		
Stejneger's beaked whale	*Mesoplodon stejnegeri*	Alaska		
Striped dolphin	*Stenella coeruleoalba*	Western North Atlantic, CA/OR/WA, Northern Gulf of Mexico, Hawaii		
True's beaked whale	*Mesoplodon mirus*	Western North Atlantic		
White-beaked dolphin	*Lagenorhynchus albirostris*	Western North Atlantic		

Table G- 8. Pinniped, Sirenian, and Carnivore Presence in the Proposed Action Areas

Common Name	*Scientific Name*	*Stock(s) within the Proposed Action Areas*	*ESA-Listing Status*	*Critical Habitat*
Pinnipeds - Otariids				
California sea lion	*Zalophus californianus*	United States		
Guadalupe fur seal	*Arctocephalus philippii townsendi*	Mexico		
Northern fur seal	*Callorhinus ursinus*	California, Eastern Pacific		
Steller sea lion	*Eumetopias jubatus*	Western DPS, Eastern DPS	Endangered: Western DPS	58 FR 45269; August 27, 1993
Pinnipeds - Phocids				
Bearded seal	*Erignathus barbatus nauticus*	Bering Stock	Endangered	Proposed: 86 FR 1433; January 8, 2021
Harbor seal	*Phoca vitulina*	Western North Atlantic, California, Oregon/Washington stock; Washington Inland, Alaska [Aleutian Islands, Pribilof Islands, Bristol Bay, N. Kodiak, S. Kodiak, Prince William Sound, Cook Inlet/Shelikof Strait, Glacier Bay/Icy Strait, Lynn Canal/Stephens Passage, Sitka/Chatham Strait, Dixon/Cape Decision, Clarence Strait]		
Harp seal	*Pagophilus groenlandicus*	Western North Atlantic		
Hawaiian monk seal	*Neomonachus schauinslandi*	Hawaii	Endangered	80 FR 50925; August 21, 2015
Hooded seal	*Cystophora cristata*	Western North Atlantic		
Gray seal	*Halichoerus grypus*	Western North Atlantic		
Northern elephant seal	*Mirounga angustirostris*	California breeding		
Ribbon seal	*Histriophoca fasciata*	Alaska		
Ringed seal	*Pusa hispida hispida*	Alaska		87 FR 19232; April 1, 2022

Common Name	***Scientific Name***	***Stock(s) within the Proposed Action Areas***	***ESA-Listing Status***	***Critical Habitat***
Spotted seal	*Phoca largha*	Alaska		
Sirenians				
West Indian Manatee	*Trichechus manatus*	Antillean (Puerto Rico), Florida	Threatened	42 FR 47840; September 22, 1977
Carnivores - Mustelids				
Sea otter	*Enhydra lutris*	Northern sea otter (Southcentral Alaska, Southeast Alaska, Southwest Alaska, Washington); Southern (California)	Threatened	74 FR 51988; October 8, 2009
Carnivores - Ursids				
Polar bear	*Ursus maritimus*	Southern Beaufort Sea stock, Alaska Chukchi/Bering Sea stock	Threatened	75 FR 76085; December 7, 2010
Carnivores - Odobenids				
Pacific walrus	*Odobenus rosmarus divergens*	Alaska		

APPENDIX H SPECIES WITH POTENTIAL PRESENCE IN TRANSIT AREAS

The following are the list of species whose range overlaps with potential OPC transiting areas (Table H-1). The evaluation of impacts in Chapter 3 from fathometer noise, vessel noise, and vessel movement would also be applicable to the species below (Table H- 1), in particular for marine mammals and the risk of a collision with a vessel while in transit. Since many of the homeports have not been finalized, Table H- 2 provides a comprehensive list of all marine mammals that may be within the transit area. However, once homeports are final, this list would likely need to be modified and thus, should be considered preliminary. Conclusions for each species are similar to the conclusions provided in the previous sections, as appropriate for each group/species below.

Table H- 1. Species with Potential Presence in Transit Areas

Species Group	***Representative Species***	***Description***
Marine Vegetation		
Phylum Cyanobacteria	Blue-green algae	Photosynthetic bacteria that are abundant constituents of phytoplankton and benthic algal communities, accounting for the largest fraction of carbon and nitrogen fixation by marine vegetation; existing as single cells or filaments, the latter forming mats or crusts on sediments and reefs.
Phylum Phaeophyta (Ochrophyta)	Brown algae	Brown algae are large multi-celled seaweeds that can include pieces or floating mats (e.g., Sargassum spp., Macrocystis pyrifera).
Phylum Haptophyta (Chrysophyta, Prymnesiophyceae)	Coccolithophores	Single-celled marine phytoplankton that surround themselves with microscopic plates of calcite. They are abundant in the surface layer of the ocean.
Phylum Ochrophyta (Heterokonta, Chrysophyta, Bacillariophyceae)	Diatoms	Single-celled algae with a cylindrical cell wall (frustule) composed of silica. Diatoms are a primary constituent of the phytoplankton group.
Phylum Dinophyta (Pyrrophyta)	Dinoflagellates	Most are single-celled, marine species of algae with two whip-like appendages (flagella). Some live inside other organisms, and some produce toxins.
Phylum Chlorophyta	Green algae	May occur as single-celled algae, filaments, and seaweeds.
Phylum Rhodophyta	Red algae	Single-celled algae and multi-celled large seaweeds; some form calcium deposits.

Species Group	***Representative Species***	***Description***
Marine Invertebrates		
Kingdom Protozoa	Foraminifera, radiolarians, ciliates	Benthic and planktonic single-celled organisms. Shells typically made of calcium carbonate or silica (University of California Berkeley 2019b).
Phylum Nematoda	Roundworms	Small worms. Many live in close association with other animals (typically as parasites) (University of California Berkeley 2019c).
Phylum Cnidaria	Corals, anemones, hydroids, jellyfish	Benthic and pelagic animals with stinging cells. Sessile corals are main builders of coral reef frameworks. Cnidarians may be solitary or may form colonies (Cairns and Bayer 2009; Cairns et al. 2009; Segura-Puertas et al. 2009).
Phylum Mollusca	Cephalopods, bivalves, sea snails, chitons	Mollusks are a diverse group of soft-bodied invertebrates with a specialized layer of tissue called a mantle. Mollusks may be swimming active predators (squid), benthic predators or grazers (sea snails), or filter feeders (clams). Mollusks can be found at all water depths (Moretzsohn et al. 2009).
Phylum Arthropoda – Crustacea	Shrimp, crab, barnacles, copepods	Diverse group of animals, some of which are immobile. Most have an external skeleton. Various feeding modes from predator to filter feeder (Perry and Larsen 2004).
Flying Insects		
Lepidoptera	Butterflies and moths	Occur worldwide with some species occurring in coastal areas.
Diptera	Flies and mosquitos	Abundant worldwide and live in freshwater aquatic, semi-aquatic, or moist terrestrial environments. May occur within transiting areas.
Birds (Seabirds and Shorebirds)		
Accipitriformes	Hawks, eagles, kites, vultures, and osprey.	Species are primarily terrestrial but may forage in coastal areas.
Anseriformes	Ducks, geese, and other waterfowl.	They have the broadest habitat preferences of any aquatic bird, occupying all aquatic habitats except pelagic zones of the ocean.
Charadriiformes	Stilts, plovers, avocets, lapwings, sandpipers, curlews, turnstones, knots, sanderlings, dunlins, dowitchers, snipes, phalaropes,	A diverse group ranging from small shorebirds to large pelagic seabirds.

Species Group	***Representative Species***	***Description***
	yellowlegs, willets, gulls, terns, and skimmers.	
Pelecaniformes	Pelicans, egrets, ibis, and herons.	These species are common amongst coastal areas and open ocean.
Suliformes	Frigatebirds, boobies, gannets, cormorants, shags, and the anhinga.	Species are broadly distributed from coastal environments to the open ocean.
Bats		
Microchiroptera	True bats	Reside in caves during wintering or maternity, hibernating from October to March. Reside in roots during summer. More common coastally. May rarely be present offshore, but would become very sparse with increased distance.
Megachiroptera	Flying foxes	Live in tropical regions of Asia, Australia, and Africa and throughout the islands of the western Pacific. May occur in coastal areas of the HI-PAC proposed action area.
Marine Fish		
Carcharhiniformes	Ground sharks	Found in all portions of the water column. Most species spend at least some time on the bottom and may occur along sandy, muddy, or rocky bottom.
Lamniformes	Bigeye thresher shark, shortfin mako	Most species are strong, pelagic hunters. May occur in coastal or open ocean waters.
Orectolobiformes	Whale shark	Found from continental shelf to open ocean. Primarily pelagic.
Myliobatiformes	Roughtail stingrays, cownose rays	Although some species are pelagic and others demersal, all species feed along the bottom. Occur on the continental shelf and in offshore waters.
Atheriniformes	Silversides	Coastal pelagic planktivores common in temperate and tropical waters worldwide.
Beloniformes	Needlefish, flying fish	Most species inhabit warmer coastal waters; however, flying fish species are common offshore.
Elopiformes	Tarpon, ladyfish	Primarily coastal; however, some may spawn offshore (e.g., ladyfish).
Gonorynchiformes	Milkfish	The milkfish is the only species. Common in tropical coastal waters of the Pacific.

Species Group	*Representative Species*	*Description*
Mugiliformes	Mullets, smelts	Cosmopolitan schooling fish that typically remain in coastal areas. May spawn offshore.
Aulopiformes	Barracudinas, greeneyes, lizardfishes	Found in all portions of the water column. Found in coastal marine and estuarine environments out to the continental slope.
Gasterosteiformes	Sticklebacks, tube snouts	Found in all portions of the water column. Found in diverse coastal marine and freshwater environments.
Perciformes	Tuna, snapper, bass	Found in all portions of the water column. The most diverse and largest order of bony fish. Contains species of varied shape and size found in all freshwater and marine waters of the world.
Syngnathiformes	Seahorses, pipefish	Found in all portions of the water column. Most common in tropical and subtropical coastal waters.
Tetraodontiformes	Filefish, trunkfish, ocean sunfish	Primarily pelagic, some offshore species benthic (living on or in the bottom sediment). Widespread, but commonly associated with reefs and rocky habitats, including offshore reefs.
Clupeiformes	Alewife, Pacific sardine	Schooling fish found along the continental shelf. Some anadromous species.
Osmeriformes	Eulachon, smelt	Common, small, silvery schooling fish abundant throughout coastal rivers, estuaries, and nearshore pelagic environments worldwide.
Salmoniformes	Salmon, trout	Found in all portions of the water column. Some species anadromous, some species freshwater or landlocked populations of anadromous species. Marine species more common in Pacific.
Cypriniformes	Carps, minnows	Found in all portions of the water column. Predominantly fresh and brackish species found in lakes, backwaters, and marshes.
Cyprinodontiformes	Killifish, topminnows	Found in all portions of the water column. Very common in brackish environments and shallow coastal waters.

Species Group	***Representative Species***	***Description***
Marine Reptiles		
Hydrophiinae	Yellow-bellied sea snake	Found in the open ocean and may occur within the NEPAC-South and HI-PAC proposed action areas. Passively drifts at the surface and is one of the most widely distributed snakes in the world.
Testudines	Sea turtles	Sea turtles returning to and leaving nesting beaches may be encountered in the transiting areas.

Table H- 2. Marine Mammals with Potential Presence in Transit Areas

Common Name	***Scientific Name***	***MMPA Stock(s) within the Proposed Action Areas***	***ESA-Listing Status***	***Critical Habitat***
Cetaceans- Mysticetes				
Blue whale	*Balaenoptera musculus*	Western North Atlantic, Central North Pacific, Eastern North Pacific	Global: Endangered	
Bowhead whale	*Balaena mysticetus*	Western Arctic	Endangered	
Bryde's whale	*Balaenoptera edeni*	Northern Gulf of Mexico, Eastern Tropical Pacific	Endangered: Gulf of Mexico DPS	
Fin whale	*Balaenoptera physalus*	Western North Atlantic; Northeast Pacific, CA/OR/WA	Global: Endangered	
Gray whale	*Eschrichtius robustus*	Western North Pacific Eastern North Pacific	Endangered: Western North Pacific	
Humpback whale	*Megaptera novaeangliae*	Gulf of Maine, Western North Pacific, Central North Pacific, CA/OR/WA	Endangered: Western North Pacific DPS, Central North Pacific DPS Threatened: Mexico DPS	86 FR 21082
Minke whale (common)	*Balaenoptera acutorostrata*	Canadian East Coast, Alaska, CA/OR/WA		
North Atlantic right whale	*Eubalaena glacialis*	Western North Atlantic	Global: Endangered	81 FR 4837
North Pacific right whale	*Eubalaena japonica*	Eastern North Pacific	Global: Endangered	71 FR 38277
Sei whale	*Balaenoptera borealis*	Nova Scotia, *Western North*	Global: Endangered	

Common Name	***Scientific Name***	***MMPA Stock(s) within the Proposed Action Areas***	***ESA-Listing Status***	***Critical Habitat***
		Atlantic, Eastern North Pacific		
Cetaceans - Odontocetes				
Atlantic spotted dolphin	*Stenella frontalis*	Western North Atlantic, Northern Gulf of Mexico [Puerto Rico and USVI]		
Atlantic white-sided dolphin	*Lagenorhynchus albirostris*	Western North Atlantic		
Beluga whale	*Delphinapterus leucas*	Beaufort Sea, Eastern Chukchi Sea, Bristol Bay	Cook Inlet DPS	76 FR 20180 (Cook Inlet beluga DPS)
Common bottlenose dolphin	*Tursiops truncatus*	Atlantic: Biscayne Bay; Charleston Estuarine System; Florida Bay, Indian River Lagoon Estuarine System; Jacksonville Estuarine System; Northern Georgia/Southern South Carolina Estuarine System; Northern North Carolina Estuarine System; Northern South Carolina Estuarine System; Puerto Rico and U.S. Virgin Islands; Southern Georgia Estuarine System; Central Georgia Estuarine System; Southern North Carolina Estuarine System; Western North Atlantic Northern Migratory Coastal; Western North Atlantic Southern Migratory Coastal; Western North Atlantic Offshore		

Common Name	*Scientific Name*	*MMPA Stock(s) within the Proposed Action Areas*	*ESA-Listing Status*	*Critical Habitat*
		Pacific: California Coastal; CA/OR/WA offshore; Hawaiian Islands Stock Complex Gulf of Mexico: Northern Gulf of Mexico Bay, Sound and Estuary (NMFS dividing into 31 stocks); Choctawhatchee Bay, Terrebonne-Timbalier Bay Estuarine System; St. Joseph Bay; Barataria Bay Estuarine System; Mississippi Sound, Lake Borgne, Bay Boudreau; Northern Gulf of Mexico Continental Shelf; Gulf of Mexico Eastern Coastal; Gulf of Mexico Northern Coastal; Gulf of Mexico Western Coastal; Northern Gulf of Mexico Oceanic		
Dall's porpoise	*Phocoenoides dalli*	Alaska, CA/OR/WA		
False killer whale	*Pseudorca crassidens*	Western North Atlantic, Northern Gulf of Mexico, Hawaii		83 FR 35062
Harbor porpoise	*Phocoena phocoena*	Gulf of Maine/Bay of Fundy, Monterey Bay, Morro Bay, Northern California-Southern Oregon, Northern Oregon/WA Coast, San Francisco-Russian River, Central California, Washington Inland		

Common Name	*Scientific Name*	*MMPA Stock(s) within the Proposed Action Areas*	*ESA-Listing Status*	*Critical Habitat*
		Waters, Gulf of Alaska, Bering Sea, Southeast Alaska		
Killer whale	*Orcinus orca*	Western North Atlantic, Eastern North Pacific: AK Resident, Northern Resident, Offshore, Transient (part of West Coast Transient), Southern Resident; AT1 Gulf of AK, Aleutian Islands, Bering Sea Transient, West Coast Transient; Northern Gulf of Mexico	Endangered: Southern Resident	71 FR 69054
Long-beaked common dolphin	*Delphinus delphis bairdii*	California		
Long-finned pilot whale	*Globicephala melas*	Western North Atlantic		
Narwhal	*Monodon monoceros*	Unidentified		
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	North Pacific, CA/OR/WA Northern and Southern		
Pantropical spotted dolphin	*Stenella attenuata*	Western North Atlantic, Northern Gulf of Mexico		
Risso's dolphin	*Grampus griseus*	Western North Atlantic, CA/OR/WA, Northern Gulf of Mexico		
Short-beaked common dolphin	*Delphinus delphis*	Western North Atlantic, CA/OR/WA		
Short-finned pilot whale	*Globicephalus macrorhynchus*	Western North Atlantic, CA/OR/WA, Northern Gulf of Mexico [Puerto Rico and USVI]		
Sperm whale	*Physeter macrocephalus*	North Atlantic, Northern Gulf of Mexico, North Pacific, CA/OR/WA [Puerto Rico and USVI]	Global: Endangered	

Common Name	***Scientific Name***	***MMPA Stock(s) within the Proposed Action Areas***	***ESA-Listing Status***	***Critical Habitat***
Spinner dolphin	*Stenella longirostris*	Western North Atlantic, Northern Gulf of Mexico [Puerto Rico and USVI]		
Stejneger's beaked whale	*Mesoplodon stejnegeri*	Alaska		
Striped dolphin	*Stenella coeruleoalba*	Western North Atlantic, CA/OR/WA, Northern Gulf of Mexico		
Pinnipeds - Otariids				
California sea lion	*Zalophus californianus*	United States		
Guadalupe fur seal	*Arctocephalus philippii townsendi*	Mexico		
Northern fur seal	*Callorhinus ursinus*	California, Eastern Pacific		
Steller sea lion	*Eumetopias jubatus*	Western DPS, Eastern DPS	Endangered: Western DPS	58 FR 4569
Pinnipeds - Phocids				
Bearded seal	*Erignathus barbatus nauticus*	Alaska	Endangered	
Harbor seal	*Phoca vitulina*	Western North Atlantic, California, Oregon/Washington stock; Washington Inland, Alaska [Aleutian Islands, Pribilof Islands, Bristol Bay, N. Kodiak, S. Kodiak, Prince William Sound, Cook Inlet/Shelikof Strait, Glacier Bay/Icy Strait, Lynn Canal/Stephens Passage, Sitka/Chatham Strait, Dixon/Cape Decision, Clarence Strait]		
Harp seal	*Pagophilus groenlandicus*	Western North Atlantic		
Hawaiian monk seal	*Neomonachus schauinslandi*	Hawaii	Endangered	80 FR 50925

Common Name	***Scientific Name***	***MMPA Stock(s) within the Proposed Action Areas***	***ESA-Listing Status***	***Critical Habitat***
Hooded seal	*Cystophora cristata*	Western North Atlantic		
Gray seal	*Halichoerus grypus*	Western North Atlantic		
Northern elephant seal	*Mirounga angustirostris*	California breeding		
Ribbon seal	*Histriophoca fasciata*	Alaska		
Ringed seal	*Pusa hispida*	Alaska	Threatened	87 FR 19232
Spotted seal	*Phoca largha*	Alaska		
Sirenians				
West Indian Manatee	*Trichechus manatus*	Antillean (Puerto Rico), Florida	Threatened	42 FR 47840
Carnivores - Mustelids				
Sea otter	*Enhydra lutris*	Northern sea otter (Southcentral Alaska, Southeast Alaska, Southwest Alaska, Washington); Southern (California)	Endangered: Alaska DPS	71 FR 51988
Carnivores - Ursids				
Polar bear	*Ursus maritimus*	Southern Beaufort Sea stock, Alaska Chukchi/Bering Sea stock	Threatened	75 FR 76086

APPENDIX I RESPONSES TO PUBLIC COMMENTS

I.1. Introduction

This Draft PEIS/POEIS assessed how operations and training activities associated with the OPC program acquisition strategy could potentially impact human and natural resources. Following publication of the Notice of Availability (NOA) to prepare a Programmatic EIS/OEIS in the Federal Register, the Coast Guard prepared the Draft PEIS/POEIS in accordance with the NEPA and EO 12114, as implemented by the CEQ Regulations (40 CFR §§ 1500 et seq.); DHS Directive Number 023-01, Rev 01 and DHS Instruction Manual 023-01-001-01, Rev 01; and Coast Guard Commandant Instruction 5090.1.

Following a 45-day public comment period on the Draft PEIS/POES, the Coast Guard reviewed and responded to comments in writing and, if appropriate, incorporate changes in the Final PEIS/POEIS. The Final PEIS/POEIS will be circulated for a 30-day wait period. Following the 30-day wait period, the Coast Guard will prepare a Record of Decision that will formally document the selected alternative for the project and mitigation to be implemented by the Coast Guard, and address substantive new comments received on the Final PEIS/POEIS.

I.2. Receipt of Draft PEIS Comments

The initial 45-day public comment period for the Draft PEIS/POEIS began on September 20, 2021 and was published in the Federal Register (86 FR 52162) and on agency websites. The comment period ended on November 4, 2021. In total, three comments were received. Comments were received from an anonymous commenter, Aarin King, and the U.S. Environmental Protection Agency and have been included in their entirety below. The letter received from the U.S. Environmental Protection Agency has been edited so that lines of the text may be cited by number for reference and response.

Each letter, email, or federal register comment was given a unique identification number. All submitted comments were systematically reviewed for content. Comments were numbered for reference. Substantive comments were given particular attention for response. Substantive comments are defined as comments that:

- Question the accuracy of the information in the document;
- Question the adequacy of the environmental analysis;
- Propose other alternatives;
- Suggest the need for changes in the Draft PEIS/POEIS or revisions to one of the alternatives considered; or
- Provide new or additional information relevant to the analysis.

I.3. Comment Responses

The Coast Guard is not required to respond to every comment made by every person. According to NEPA regulations, "all substantive comments received on the draft statement (or summaries thereof where the response has been exceptionally voluminous), should be attached to the final statement whether or not the comment is thought to merit individual discussion by the agency in the text of the statement" (40 CFR 1503.5(b)). Under NEPA regulations, a Final EIS must include responses to substantive comments received on the Draft EIS. If the comment resulted in changes to the EIS text, then it is stated in the response, but not all responses required that the text in the Final EIS be modified.

Where appropriate, if the text of this Final PEIS/POEIS was revised based on a comment received, the section where the change was made is noted in the response to comments. The Coast Guard appreciates the public's interest in the Proposed Action and their participation in the NEPA process.

I.4. Comments Received

Comment letters which contained scoping or Draft PEIS/POEIS comments were reproduced with line numbering and are included in this section. The comments to the Federal Register docket are also included in their entirety below. The Coast Guard's responses are presented alongside each comment. These commenters are listed in Table I- 1.

Table I- 1. Comments Submitted and the Assigned Document ID Number for Reference

Comment Submitted By	***Document ID Number***
Scoping Comments	
Ricquitta Johnson	001
Mary Colligan, U.S. Fish and Wildlife Service	002
Comments to the Draft PEIS/POEIS	
Anonymous	003
Aarin King	004
Robert Tomiak, U.S. Environmental Protection Agency	005

These documents are below in their entirety for reference.

United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE

1011 East Tudor Road
Anchorage, Alaska 99503

In Reply Refer to:
FWS/IR11/FES

Captain Andrew T. Pecora,
U.S. Coast Guard Headquarters
2703 Martin Luther King Jr. Avenue, SE, Stop 7800
Washington, DC 20593

Dear Captain Pecora:

The U.S. Fish and Wildlife Service (Service) has reviewed the U.S. Coast Guard (USCG) Offshore Patrol Cutter (OPC) Acquisition Program's *Notice of Intent (NOI) for the Preparation of a Programmatic Environmental Impact Statement (PEIS)/Overseas Environmental Impact Statement (POEIS)* published in the *Federal Register* (Docket Number USCG–2020–0667). TheOPC Program proposes the acquisition of up to 21 OPCs and operation of up to 25 total OPCs with planned design lives of 30 years to fulfill mission requirements. The proposed action areas are in the Atlantic Ocean, Gulf of Mexico, the Caribbean Sea, and Pacific Ocean, including Alaska, Hawaii, and Pacific Islands.

Authorities: Our comments are submitted in accordance with the provisions of the National Environmental Policy Act of 1969 (83 Stat. 852; as amended; 42 U.S.C. 4321 et seq.), the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), the Marine Mammal Protection Act (MMPA) of 1972 (as amended, 16 U.S. Code § 1361), the Migratory Bird Treaty Act (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.), and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

Potentially Affected Fish and Wildlife Trust Resources: The Service's trust resources are natural resources we are entrusted to protect for the benefit of the American people. Within the proposed action area in Alaska, these resources include migratory birds, species listed under the ESA (i.e., polar bear, northern sea otter, Steller's eider, spectacled eider, and short-tailed albatross), designated critical habitats, species protected by the MMPA (i.e., polar bear, northernsea otter, and Pacific walrus), and the habitats upon which these species depend.

Comments and Recommendations:

<u>Specific Comments</u>

The NOI states, "The Proposed Action may affect, but is not likely to adversely affect any ESA-listed marine invertebrates, flying insects, birds, bats, fish, marine reptiles, and marine mammals." We believe these determinations, pursuant to section 7 of the ESA, are premature inthe absence of an effects analysis, and it is unlikely that the Service would concur with the suite of determinations as currently presented. We recommend the USCG contact our Fairbanks Fish and Wildlife Conservation Office (FFWCO, ak_fisheries@fws.gov) to discuss the ESA section 7process, effect determinations, and potential mitigation measures appropriate for the listed species in the Alaska portion of the USCG's action area. The NOI mentions the MMPA and USCG's anticipated request for a Letter of Authorization to "take" marine mammals (through Level B harassment). We recommend the USCG contact ourMarine Mammals Management (MMM) Office (FW7_MMM_reports@fws.gov) to develop plans to mitigate impacts from operations to northern sea otters, Pacific walrus, and polar bears,and to determine if authorizations for incidental take of these species will be needed. Early coordination with MMM facilitates mitigation planning and the take authorization process.

General Comments

The Service appreciates the information provided by the USCG in the NOI. We provide additional comments and recommendations for consideration in the development of the PEIS/POEIS in Enclosure 1. Enclosure 2, *Pacific Walrus Information and Guidelines to ReduceLikelihood of Take*, is provided specifically to help avoid and minimize impacts to Pacific walrus.

Conclusion: We appreciate this opportunity to provide comments on the NOI for the PEIS/OPEIS. If you have any questions regarding our comments, please contact Conservation Planning Assistance Branch Chief, Dr. Bob Henszey (bob_henszey@fws.gov or 907-456-0323)at the FFWCO or the MMM Proactive Conservation Coordinator, Ms. Amy Kirkham (amy_kirkham@fws.gov).

Sincerely,

MARY COLLIGAN

Digitally signed by MARY COLLIGAN
Date: 2020.12.31 11:24:55 -09'00'

Assistant Regional Director
Fisheries and Ecological
Services - AlaskaRegion

Enclosure 1: U.S. Fish and Wildlife Service (Service) Comments and Recommendationsfor the U.S. Coast Guard (USCG) Offshore Patrol Cutter Acquisition Program; Preparation of a Programmatic Environmental Impact Statement (PEIS)/Overseas Environmental Impact Statement (POEIS)

General Comments

- Please clarify how many of the 25 cutters are proposed as icebreakers. We understand six icebreaker cutters are already proposed under the Polar Security Cutter Program. Also, please clarify the total cutter complement stationed in Alaska.
- Ice is diminishing in the Arctic. Many species are reliant on the platforms for resting, calving (Pacific walrus) and hunting (polar bear). We recommend analysis and impact assessment for ice reliant species like walrus and polar bear. For example, how often will cutters divert rather than cut through large sections of ice?
- Available sea ice is decreasing and destruction of this seasonal platform should be considered in an impact analysis. For example, sea ice above the continental shelf is very important for walrus, are considerations proposed to avoid impacts to this sensitive feature? What impacts to ice related algae growth are anticipated in the spring? What are the impacts of broken up ice to the pelagic community?
- Ships are assumed to be stationed all over the world. With less ice, and open-water conditions, the threat of invasive species spreading from hull fowling and ballast water release is increased. Please assess the potential impact from invasives and provide an invasive species management plan to prevent the introduction and/or spread of invasives.
- We recommend developing ship lighting plans to reduce collisions with migrating birds offshore. Certain light configurations may increase attraction, disorientation, and collision risk for migratory birds in flight.
- If new bombing training areas are proposed, those locations should be made available in the PEIS/POEIS so potential impacts at those locations can be evaluated.
- Please clarify if joint exercises with the U.S. Navy and Air Force in Alaska are planned, and if so, provide an impact analysis of these exercises.
- Because the ships will be much larger, the Service suggests carrying advanced and comprehensive spill response equipment, if not done so already. We also recommend forming active partnerships with spill response agencies in Alaska for rapid response, which should also include joint spill response exercises.
- Please define elements of marine expended materials (MEM). Do they include buoys, sonar, and scientific equipment? Please quantify the amount of waste anticipated and use that information to assess the impacts of MEM.
- The PEIS/POEIS should clarify the impacts of waste management including the impacts of overboard dumping and incineration.

Comments and Recommendations Specific to the Endangered Species Act (ESA)

- Vessels at sea pose a collision risk for migratory birds in flight including species listedunder the ESA (in Alaska these species are Steller's eider, spectacled eider, and short- tailed albatross). We understand up to 25 total patrol cutters would be acquisitioned andoperated. Please include an estimation of how many manned vessels (excluding small watercraft), could be operating in each proposed action area at any given time. This information will help inform estimates of collision risk.
- Please provide waste management plans, including protocols for sewage, trash, ballast, and other MEM. Please describe specific measures in each plan that would avoid or reduce impacts to trust species under the Service's jurisdiction.
- Please provide vessel lighting plans and/or descriptions of best practices for lighting manned vessels operating or anchored at night, or in poor visibility. Certain light configurations may increase attraction, disorientation, and collision risk for migratory birds, including listed eiders, in flight. We recommend deck lighting be kept to a minimum, be shielded, and directed inboard and downward to the extent possible while maintaining compliance with navigation rules. There is evidence that red steady-state lights are particularly attractive and disorienting to migratory birds, and we understand red lighting is commonly used at night to reduce eyestrain of personnel standing watch. If red lighting is included in vessel lighting plans, we recommend red lights be limited to interior spaces, and that windows be shaded to the extent practicable when indoor spaces must be lit at night.
- Please provide vessel spill prevention, control, and countermeasures plans. Please describe specific measures in each plan that would avoid or reduce impacts from spills and/or spill response to trust species under the Service's jurisdiction.

Comments and Recommendations Specific to Marine Mammals

- The NOI mentions the Marine Mammal Protection Act (MMPA) and the USCG's anticipated request for a Letter of Authorization to "take" marine mammals (through Level B harassment). However, it does not acknowledge that the Service and the National Marine Fisheries Service both have jurisdiction over marine mammal species that occur in the proposed action area. The Service has jurisdiction over polar bears, sea otters, Pacific walrus, and manatees, and only the Service may issue incidental take authorizations under section 101(a)(5)(A) or 101(a)(5)(D) of the MMPA for these species. This should be addressed in the PEIS/POEIS.
- Vessel and aircraft traffic in Alaska waters may result in take of northern sea otters, Pacific walrus, or polar bears. We understand that two offshore patrol cutters are planned to be homeported in Kodiak. Please be aware that encounters with northern sea otters are likely. Any operations that disturb Pacific walrus at coastal haulouts could cause stampedes and large numbers of trampling deaths. Walrus may also be encountered and disturbed by vessels or aircraft offshore in the Bering and Chukchi Seas. Please review the Service's Pacific Walrus Information and Guidelines to Reduce Likelihood of Take provided in Enclosure 2. As stated in these guidelines, vessels and aircraft should remain an appropriate distance from hauled out walruses. Point Lay and Cape Lisburne are

particularly sensitive haulout sites when occupied in the summer and fall.

Enclosure 2: Pacific Walrus Information and Guidelines to Reduce Likelihood of Take

BACKGROUND AND DOCUMENT PURPOSE

Harassing or disturbing walruses is against the law. The Marine Mammal Protection Act (MMPA) prohibits, with certain exceptions, the TAKE of all marine mammal species in U.S. waters. TAKE is defined as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." Harassment is defined in the MMPA as "any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild; or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering". When it cannot be avoided, take (including harassment) of small numbers of Pacific walrus incidental to specified activities may be authorized by U.S. Fish and Wildlife Service under Section 101(a)(5) of the MMPA.

The purpose of this document is to provide information on Pacific walrus in Alaska and guidelines for reducing the likelihood of take. However, adherence to these guidelines does not guarantee that take will not occur. Individuals and entities remain legally responsible for any unauthorized take that results from their actions.

If you are conducting activities within the Bering or Chukchi Sea or along associated coastlines, you may encounter walrus. If you have questions about mitigating impacts to walrus or question whether your activity may or may not require an MMPA incidental take authorization, **contact the U.S. Fish and Wildlife Service Marine Mammals Management Office** at 1-800-362-5148 or FW7_AK_Marine_Mammals@fws.gov as early as possible. Early coordination enhances mitigation planning (which may make an incidental take authorization unnecessary) and expedites the process of issuing required authorizations.

POTENTIAL DISTURBANCE AND HARM

Walrus are sensitive to disturbance from noise, sights and smells associated with human activities. Any disturbance that causes a walrus to have a significant behavioral response amounts to take, as does any action that causes walrus injury or death. Below is a **non-exhaustive** list of types of walrus incidental take:

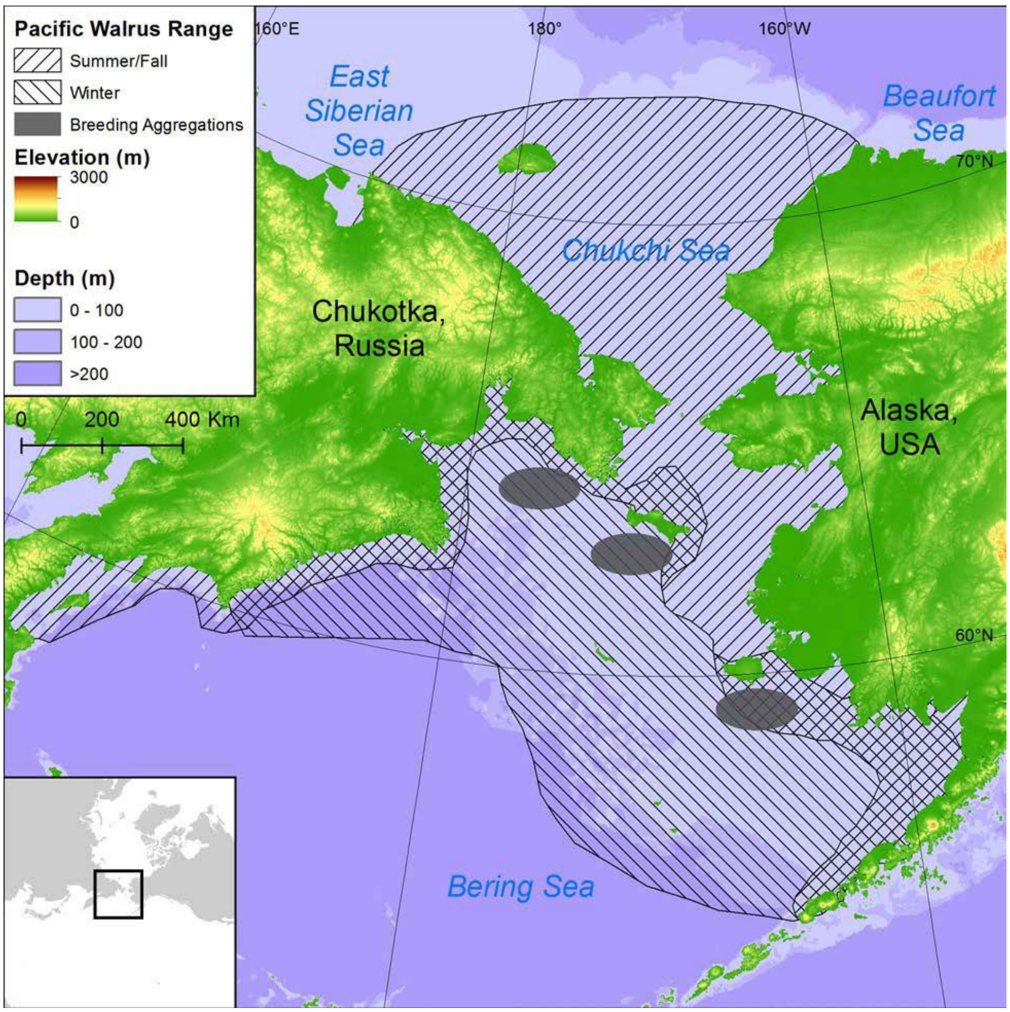
- **Causing animals hauled-out on land, rocks or ice to enter the water.** Noises, sights, and smells from human sources—including aircraft and marine vessels—may elicit a flight reaction in walrus that are hauled out and cause them to flee for the water. At terrestrial haulouts, this can cause stampedes and large numbers of trampling deaths. In any scenario, interrupting haul-out behavior and rest can have harmful effects on individuals.
- **Impacts from underwater noise.** Underwater noise from engines or other sources may disturb walruses and disrupt important behaviors, including feeding and communication. Very loud noise may be injurious and damage hearing.
- **Boat strikes.** Vessels may collide with walrus and cause serious injury or mortality.
- **Restricting animal movement and behavior.** The presence of marine vessels or other human

activity can prevent walrus from accessing areas important for feeding, resting, and other behaviors, or cause individuals (such as cows and dependent calves) to be separated.

SPECIES RANGE

The Pacific walrus's range covers a broad geographical area, which includes the continental shelf waters of the Bering and Chukchi Seas and associated coastlines. Walrus habitat use varies greatly by season andwith the presence or absence of sea ice. See range map below.

- Map (following Fay[1], p. 24) of the current annual distribution of Pacific walruses showing generalizedwinter and summer range and sites of winter breeding aggregations.



- [1] Fay, Francis H. "Ecology and biology of the Pacific walrus, *Odobenus rosmarus divergens* Illiger." *NorthAmerican Fauna* (1982): 1-279.

Known Terrestrial Haulout Locations. Consult the Pacific Walrus Coastal Haulout Database 1852-2016 (https://alaska.usgs.gov/products/data.php?dataid=74) for information regarding location, use patterns, and current occupancy of all known terrestrial haulouts in Alaska. If you are unsure if planned activities have the potential to impact a known terrestrial haulout or walruses occupying the haulout, please contact the U.S. Fish and Wildlife Service Marine Mammals Management Office.

Sensitive Areas. These are biologically important areas that may have high densities of walruses. If you plan to conduct activities that have potential to impact one of these areas or that are near these areas, please contact the U.S. Fish and Wildlife Service Marine Mammals Management Office.

Region	Area/feature	Notes
Chukchi Sea	**Hanna Shoal Pacific Walrus Use Area**	Critical feeding area
Chukchi Coast	**Point Lay Walrus Haulout**	Large, sensitive haulout
Chukchi Coast	**Cape Lisburne Walrus Haulout**	Large, sensitive haulout
Various	**Sea ice edge**	Congregation & migration area

Area-Specific Considerations and Consultations:

Round Island – Round Island is within the Walrus Islands State Game Sanctuary and subject to state regulations, which U.S. Fish and Wildlife guidelines do not supersede. Consult with the Alaska Department of Fish and Game if conducting activities within 3 miles of Round Island or using aircraftin its vicinity.

Point Lay – The Native Village of Point Lay (NVPL) requests that all marine vessels remain a minimum of 5 miles offshore (unless servicing the community) and that aircraft do not make direct flyovers of the Point Lay haulout at any altitude when walrus are present. Please consult with NVPL if you anticipate aircraft operations near the haulout or marine vessel operations within 5 miles of the haulout in July-October.

The U.S. Fish and Wildlife Service is not responsible for ensuring these consultations are completed.

TAKE AVOIDANCE GUIDELINES

Following these guidelines will reduce the likelihood that activities involving marine vessels or aircraft will result in take, but it does not absolve responsibility should unauthorized take occur.

Marine Vessel Guidelines

- Maintain an appropriate minimum distance from walruses hauled out on ice or land:
    - Marine vessels 50 feet in length or less – 0.5 miles
    - Marine vessels 50-100 feet in length – 1 mile
    - Marine vessels over 100 feet in length – 3 miles
- Reduce noise levels near haulouts. Avoid sudden changes in engine noise, using loud speakers, loud deck equipment or other operations that produce noise when in the vicinity of walrus haulouts. Note that sound carries a long way across the water and often reverberates off of cliffs and bluffs adjacent to coastal walrus haulouts, amplifying noise.
- Reduce speed and maintain a minimum distance of 0.5 miles from groups of walruses in the water.
- If walruses are observed in the water, travel in a predictable manner, avoiding sudden changes in speed or direction. Do not operate the vessel in such a way as to separate members of a group of walruses from other members of the group.
- If walruses approach the vessel or are found to be in close proximity, place boat engines in

neutral and allow the animals to pass. If vessel safety consideration prevent this carefully steer around animals.

- When weather conditions require, such as when visibility drops, adjust speed accordingly to avoid the likelihood of injury to walruses.

Aircraft Guidelines

- Unmanned aircraft system (UAS) devices:
  - Do not fly over or within 0.5 miles of walruses hauled out on land or ice.
- Single-engine fixed-wing aircraft:
  - Do not fly over or within 0.5 miles of walruses hauled out on land or ice.
  - If weather or aircraft safety require flight operations within 0.5 miles of a haulout site, maintain a 2000' minimum altitude.
  - Landings, take-offs, and taxiing should not occur within 0.5 miles of hauled out walruses.
- Helicopters and multi-engine aircraft:
  - Do not fly over or within 1 mile of walruses hauled out on land or ice.
  - If weather or aircraft safety require flight operations within 1 mile of a haulout site, maintain a 3000' minimum altitude.
  - Landings, take-offs, and taxiing should not occur within 1 mile of hauled out walruses.
- Avoid circling or turning near walruses hauled out on land or ice.
- If aircraft safety requires flight operations below recommended altitudes near a haulout, pass inland or seaward of the haulout site at the greatest lateral distance manageable for safe operation of the aircraft.

VOLUNTARY OPPORTUNISTIC REPORTS

Opportunistic reports of any walrus carcasses that are observed in the course of activities are helpful to the U.S. Fish and Wildlife Service's population monitoring efforts. If any carcasses are seen, please fill out the Marine Mammal Stranding Report – Level A Data Form as completely as possible, take photographs of the carcass(es), and submit them to the Office of Marine Mammals Management at FW7_AK_Marine_Mammals@fws.gov. The stranding form may be downloaded here: https://www.fisheries.noaa.gov/webdam/download/63696449. This document provides definitions and instructions for the form and may be helpful to reference: https://www.fisheries.noaa.gov/webdam/download/100211305

If you are unable to fill out the Level A form, providing the following information is useful: Date of death/stranding and/or date observed; specific location with coordinates if possible; Substrate (land or water); State of decomposition (Alive, Fresh Dead, Moderate Decomposition, Advanced Decomposition, Mummified/Skeletal, or Condition Unknown); Sex; Age class (Adult, Subadult, Yearling, Calf, Unknown); Body condition (emaciated, normal, robust, unknown); Presence of wounds or trauma, tissue abnormalities, behavioral abnormalities (if observed before death); Findings of human interaction (and if Yes, description); and Photographs.

The U.S. Fish and Wildlife Service appreciates your assistance.

Beach found parts: Bones, teeth or ivory from a dead walrus found on beaches or land within ¼ mile from the ocean may be collected, provided that collection is not in violation of landowner (Federal, state, or private) regulations. Collection of all animal parts is prohibited on National Park Service and U.S. Fishand Wildlife Service lands (National Wildlife Refuges). Parts may not be collected from the ocean. Collected parts must be presented to a U.S. Fish and Wildlife Service representative for registration and tagging within 30 days of collection. Contact the Office of Marine Mammals Management for registration information (1-800-362-5148 or FW7_AK_Marine_Mammals@fws.gov) or the Office of Law Enforcement, (ak_le@fws.gov). Once parts are registered, they cannot be traded or given away without permission from the U.S. Fish and Wildlife Service, Office of Law Enforcement. Beach found parts cannot be sold.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF POLICY

October 29, 2021

Andrew Haley
United States Coast Guard
2700 Martin Luther King Jr. Avenue, SE Washington, D.C. 20593

Dear Mr. Haley:

In accordance with our responsibilities under Section 309 of the Clean Air Act and the National Environmental Policy Act, the U.S. Environmental Protection Agency has reviewed the United States Coast Guard (USCG) Draft Programmatic Environmental Impact Statement (PEIS) for the Offshore Patrol Cutter (OPC) Acquisition Program (CEQ No. 20210138).

According to the draft PEIS, the USCG identified a need to address its current and long-term mission demands with a reliable and operationally available presence to accomplish assigned missions in offshore waters exceeding 50 nautical miles (nm; 93 kilometers (km)). From 1964 to 1991, the USCG acquired thirty Medium Endurance Cutters (MEC); however, as the MECs age, they are becoming technologically obsolete and increasingly expensive to maintain and operate. The preferred alternative would allow the USCG to provide surface assets to bridge the operational capability gap between the National Security Cutters that patrol the open ocean and the Fast Response Cutters, which primarily operate within 50 nm (93 km) from shore to meet mission requirements and support the United States economic, commercial, maritime, and national security needs.

We understand that USCG will determine which homeports will receive OPC vessels after the PEIS and will be conducting supplemental NEPA analysis at the project level. In order to inform the selection of which homeports should be considered for receiving the OPC vessels, we recommend that USCG consider comparing the potential disproportionate adverse impacts to communities with environmental justice concerns between eligible homeports within the Final PEIS.

We appreciate the opportunity to review this draft PEIS and look forward to reviewing the final PEIS related to this project. If you have any questions, please contact Christopher Yesmant, the lead reviewer for this review, at 202- 564-4772 or by email at Yesmant.Christopher@epa.gov.

Sincerely,

Robert Tomiak Director
Office of Federal Activities

Table I- 2. Comments to the Federal Register Docket

Comment Submitted By	*Document ID Number*	*Comment*
Scoping Comments		
Ricquitta Johnson	001	USCG-2020-0667-0001
Comments to the Draft PEIS/POEIS		
Anonymous	003	Dear Captain Pecora, I am a former crew member (2016-2017) of one of the National Security Cutters (NSC) that was homeported in Charleston, SC. I know you stated that OPCs would replace the current MECs; which, are homeported in the Atlantic, Pacific, and Gulf of Mexico. While I was in Charleston, it was rumored they would refurbish the only Navy piers, in order to make room for the growing fleet. It was also rumored that Charleston will become the new "Super Hub" for a variety of Coast Guard Cutters. Was the dreading that began taking place, while I was stationed there, for the anticipation of the growing Cutter traffic? Do you plan on Homeporting a majority of OPCs there, once the piers are deemed safe? There is a lot of growth and potential in that area and I would be happy to see it put to use, for the greater of the fleet. Proud to have served, Medically Retired, Anonymous
Aarin King	004	USCG-2021-0738-0001 With achievements growing greater by neighboring countries in Coast Guard remedies to endangered port activities, the United States Cutter program has met the success record and revival of modern surveillance activities. The over object has been with drug smuggling, illegal entry into the States, and breeches in submarine warfare. There is a judicial burden that has plagued the Coast Guards fleet of cutters, the reasonable cost of disposing and tracking individuals with non-monetary return value. To keep with the lowering patrol effort for individual craft, the recommendation is to begin a fast service program to identify risk hull behaviors and attributes, this being to implement a program that would pinout damaged hulls from beam and keel lengths of the vessel. Of such would substantiate the remainder of the previous fleet ordinances, to give a subject of training and administration of before peer arrival/departure permission slips and levies. In statement, there is a cost and overburden in environmental surveillance activities that the Coast Guard and Navy already attest to in its own fleet and ranks. To push the requirements on arriving venture in the cargo and shipping lane business while being non-compromising with passenger vessels that have consistent non-shutdown operations due to stress hull fracturing and lack the direct remediation to fix/enter shipyard correspondences offered by both international maritime and United States Maritimes requirements. Not to create unpayable debts, but to give legal and substantial income to a paid aging fleet looking for end-of-life purpose without the heavy and sometimes critical work positions that may risk Sailors and Guardsmen at sea or in port. In

Comment Submitted By	*Document ID Number*	*Comment*
		moving forward with new technology and development, more non-lethal means of equipment should be projected into the new and base platforms still available, being in items such as active sonar thickness testing, low field radar, air/water-quality assurance testing and UV/infrared imaging specialties- moving toward investigation non-intrusion. Meeting the levies with impact statements holds marginal value when presenting for cause, the version of pollution seen with data stands in court when retrial for garnishment of port fines. It would be an equivalent of meeting G20 and Paris agreements at a Capital Market often seized in older and less maintained vessels that require more service tugs and fuel supply to ensure safe operations, with waivers being established due to grandfather clauses or parchment of year built(newer vessels may have unseen damage with no fines applied). Waivers need to be reassessed and with a request for increased share cost by level of stewardship applied. Give opportunity to reduce in port standbys to vessels that meet and exceed clearance surveillance and keep a streamlined access for those in the latter.

I.5. Responses to Public Comments

Responses to all scoping comments received on the Draft PEIS are included in this section. Table I- 1 (above) provides the commenter associated with the document number listed in Table I- 3. Copies of all of the comments received during scoping and the Draft PEIS/POEIS public comment period are provided above, referenced by Line Numbers in Table I- 3 below.

Table I- 3. Responses to Scoping Comments and Comments on the Draft PEIS/POEIS

Document Number	*Line Number*	*Response to Comment*
Scoping Comments		
001	Table I-2	Thank you for your participation in the National Environmental Policy Act process. Your comment is part of the official project record.
002	Line 35-47	The Coast Guard has submitted a request for consultation under Section 7 of the ESA to the United States Fish and Wildlife Service and National Marine Fisheries Service for those endangered or threatened species under their respective jurisdictions. Determinations made in this PEIS/POEIS regarding endangered or threatened species, as well as critical habitat, should be considered preliminary, as the consultation process under Section 7 of the ESA has not been completed. Please see Section ES.4 and Section 3.4.10 for additional information. Information regarding the consultation process is provided in Section 4.1.1.
002	Line 78-80	OPC's do not possess ice breaking capabilities. Please refer to the Coast Guard's Polar Security Cutter program for any questions regarding the icebreaker acquisition program. At least two OPCs would be stationed in Kodiak, Alaska.

Document Number	***Line Number***	***Response to Comment***
002	Line 81-84	Although the OPC would operate in waters where ice may be present at certain times of the year (e.g., Alaska), the OPC design does not include icebreaking capabilities and OPCs would not conduct ice operations.
002	Line 85-89	Although the OPC would operate in waters where ice may be present at certain times of the year (e.g., Alaska), the OPC would not have icebreaking capabilities and would not impact the ice. For that reason no impacts to ice-related algae growth are anticipated from OPC operations in the spring or any other season. Likewise no impacts to broken-up ice to the pelagic community will occur from OPC operations.
002	Line 90-93	The OPCs will follow Coast Guard Standard Operating Procedures with respect to ballast water. Per those procedures, if it is suspected that invasive species are in the ballast water, efforts must be made to release these species in the open ocean. Ballast water taken on board would likely be released (ballast tanks cycled or emptied) prior to entering any port or navigable shallow water.
002	Line 94-96	The OPC has a standard ship lighting plan that minimizes attraction to migrating birds and complies with safety of navigation at sea and OPC operational requirements. In accordance with Coast Guard SOPs, OPCs would set "Darken Ship" each evening at sunset to minimize emission of white light from the ship and to protect the night vision of watch-standing personnel: all portlights would be covered; red/blue lights would be used on weather decks (and only when required); and only navigational lighting would be consistently visible per the Navigation Rules and Regulations Handbook and maritime regulations regarding nighttime lighting.
002	Line 97-98	OPCs do not possess bombing capabilities and bombing is not part of the Proposed Action. No new OPC training areas are proposed at this time. If new training areas are proposed for USCG cutters, including OPCs, they will be evaluated separately in compliance with NEPA.
002	Line 99-100	The timeline and locations of specific OPC individual or joint training operations in Alaska are unknown at this time. As joint exercises in Alaska and elsewhere are scheduled, it is anticipated that they will be evaluated closer to the time they are proposed and any analyses, if necessary, would be issued via a separate document addressing all exercise participants, and would reference this PEIS/POEIS, if applicable.
002	Line 101-104	All OPCs will be equipped with spill response equipment. Should a spill occur, the Coast Guard would request ESA section 7 emergency consultation with NMFS and USFWS, if appropriate, for the response activities associated with spill cleanup.
002	Line 105-107	Military expended materials (MEM) associated with the Proposed Action include non-explosive practice munitions (inert small caliber [0.50 caliber], MK-38 standard munitions [25 mm], and large caliber munitions [57 mm]), one Nulka decoy round, and targets associated with gunnery training. They do not include buoys, sonar, or scientific equipment. The estimate quantity of munitions other than NULKA is less than one ton per OPC per year. The estimated quantity of surface and air targets expended is less than three tons per OPC during each cutter's first year, and less than one ton per OPC per year thereafter.

Document Number	***Line Number***	***Response to Comment***
002	Line 108-109	Coast Guard SOPs would ensure no impact to the at-sea environment. The OPC design is fully compliant with current waste management equipment. Any OPC waste discharges would occur in compliance with state and federal regulations and policies.
002	Line 111-116	It is roughly estimated that two OPCs would be operating or training at sea within each of the 7 proposed action areas depicted in Figure 2-1 of the PEIS/POEIS at any one time after 25 OPCs have been delivered to the fleet. OPCs would operate farther offshore than where the majority of molting would be expected to occur. When possible, OPCs would avoid transiting in areas where large flocks of molting birds would be expected to occur. Coast Guard's SOPs would also minimize potential impacts from vessel movement to seabirds.
002	Line 117-119	Coast Guard SOPs would ensure no impact to the at-sea environment. All vessel discharges would occur in compliance with state and federal regulations and policies. Additional information can be found in Appendix C.
002	Line 120-130	The OPC has a standard ship lighting plan that minimizes attraction to migrating birds and complies with safety of navigation at sea and OPC operational requirements. In accordance with Coast Guard SOPs, OPCs would set "Darken Ship" each evening at sunset to minimize emission of white light from the ship and to protect the night vision of watch-standing personnel: all portlights would be covered; red/blue lights would be used on weather decks (and only when required); and only navigational lighting would be consistently visible per the Navigation Rules and Regulations Handbook and maritime regulations regarding nighttime lighting.
002	Line 131-133	OPC's will be equipped with spill response equipment. Should a spill occur, the Coast Guard would request ESA section 7 emergency consultation with NMFS and USFWS, if appropriate, for the response activities associated with spill cleanup.
002	Line 135-142	The Coast Guard is not requesting authorization under Section 101(a)(5) of the Marine Mammal Protection Act (MMPA) at this time, because the Proposed Action discussed in this PEIS/POEIS would not deliver the first operational OPC until 2024. The Coast Guard recognizes that the USFWS has jurisdiction over polar bears, sea otters, Pacific walrus, and manatees and will request consultation with the appropriate regulatory agency (NMFS and the USFWS), if authorization is required, and closer to when the first vessel is expected to be operational.
002	Line 143-152	Thank you for providing the Service's Pacific Walrus Information and Guidelines to Reduce Likelihood of Take. During non-emergency vessel operations, including law enforcement activities, when marine mammals or sea turtles are sighted or known to be in the immediate vicinity at the time of operations (such as if helicopters sight animals along the vessel's intended course), operators would employ all possible precautions to avoid interactions or collisions with animals when navigationally safe to do so and, in the case of law enforcement activities, when practical to do so. In accordance with the instruction in the Coast Guard Air Operations Manual, Commanding Officers would implement SOPs to prevent unnecessary overflight of sensitive environmental habitat areas to include, but not be limited to, designated critical habitat, migratory bird sanctuaries, and marine mammal haul-outs and

Document Number	***Line Number***	***Response to Comment***
		rookeries. Environmentally sensitive areas would be properly annotated on pilot's chart, as required.
Comments to the Draft PEIS/POEIS		
003	Table I-2	Thank you for choosing to serve in the US Coast Guard. Future home porting decisions are being made by the Office of Cutter Forces. The OPC Program of Record is up to 25 cutters, and they will probably be homeported in major ports along both coasts. The first four will go to West Coast ports as stated in the PEIS/POEIS.
004	Table I-2	This comment recommends equipment changes and operational concept changes for OPC that exceed existing OPC operational requirements. Those recommendations have been forwarded to the Office of Cutter Forces for consideration during development of tactical operational manuals and for potential future updates to OPC operational requirements.
005	Line 329-333	The Proposed Action does not cover homeporting. Future homeporting decisions are being made by the Office of Cutter Forces. Those recommendations have been forwarded to the Office of Cutter Forces for consideration.

APPENDIX J CHANGES BETWEEN DRAFT PEIS/POEIS AND FINAL PEIS/POEIS

The Draft Offshore Patrol Cutter PEIS/POEIS was released for public review and comment September 24, 2021 through November 4, 2021 (86 FR 52162). Changes in this Final PEIS/POEIS reflect responses to substantial comments made on the Draft PEIS/POEIS during the public comment period as well as Coast Guard refinements to the PEIS/POEIS. Public comments are included in their entirety, and the responses to them are included in Table I- 3.

While most sections in the PEIS/POEIS were changed in some manner between the draft and final versions, many of those changes entailed minor modifications to improve clarity. The key changes between the Offshore Patrol Cutter Draft and Final PEIS/POEIS follow.

Executive Summary

- Section ES.3 Public Involvement: The Coast Guard conducted a 45-day public review and comment period from September 20, 2021 to November 4, 2021. See Appendix I for responses to public comments.

Chapter 1 Introduction

- Section 1.2 Purpose and Need: Updated to include: Typical OPC operations would occur between 12 nm (22 km) from shore and inside 200 nm (370 km), but they can be deployed anywhere around the globe where national interests require. This is applicable throughout the document.
- Section 1.6.3 Notification of Availability of the Draft Programmatic Environmental Impact Statement: Updated to include information regarding the Draft PEIS/POEIS public review and comments received. See Chapter 4 and Appendix I for more detail on coordination and responses to public comments.

Chapter 2 Proposed Action and Alternatives

- Section 2.3.5 Gunnery Training: Additional text was added to clarify the weapons systems onboard the OPC that would be used for training. The Mk 48 GWS with Mk 110 57 mm gun mount, Mk 38 25 mm MGS, and the M2 .50 cal. BMG are tested biannually to conduct required proficiency drills. Text was also added to describe the testing of the Mk 53 Mod 10 DLS equipped with the Nulka round. The Coast Guard plans to conduct only one propulsion testing of one inert Nulka decoy on only the lead OPC. This single, one-time test, will be conducted on an established Navy range and no additional testing of the Nulka is currently planned.
- Section 2.4 Acoustic Sources Associated with the Proposed Action: Table 2-2 has been updated to include the source level produced by the large caliber weapons training and Nulka launch detailed in Section 2.3.5.

Chapter 3 Affected Environment and Environmental Consequences

- Section 3.2.1.4 Gunnery Noise: Additional text was added to include the expected sound levels produced by the large caliber weapons training and Nulka launch detailed in Section 2.3.5.
- Section 3.2.2.3 Military Expended Materials: Additional text was added to include MEM from the large caliber weapons testing and the Nulka launch.

- Johnson's Seagrass: On April 14, 2022, NMFS issued a final rule to remove Johnson's seagrass from the Federal List of Threatened and Endangered Species (87 FR 22137). To correspond with this action, the critical habitat designation for the species was also removed. These actions are based on newly obtained genetic data that demonstrate that Johnson's seagrass is not a unique taxon but rather a clone of an Indo-Pacific species, *Halophila ovalis.* Therefore, Johnson's seagrass does not meet the statutory definition of a species and does not qualify for listing under the ESA. Therefore, discussion and analysis of consequences to the formerly ESA-listed Johnson's seagrass has been removed from the Final PEIS/POEIS.
- Section 3.4.8 Federally-Designated Critical Habitat: Updates to text regarding the proposed critical habitat for the boulder star, lobed star, mountainous star, pillar, and rough cactus corals. An additional critical habitat map has been included to document the critical habitat and proposed critical habitat of coral species within the NW-ATL-Florida and the Caribbean proposed action area (Figure 3-5). Figure 3-6 has been updated to include the proposed critical habitat for the boulder star, lobed star, and mountainous star corals.

Chapter 4 Consultation and Coordination Process

- Section 4.1.1 Consultation Process: Updated to include the status of the programmatic consultation between the Coast Guard and NMFS and the USFWS and the Coast Guard's letter to the regulatory agencies under Section 7(d) of the ESA, indicating that the Coast Guard would proceed with the contract award and vessel construction.
- Section 4.1.2 Coordination: Updated to include specifics of the public participation process during scoping and Draft PEIS/POEIS review.

Appendix G Additional Information by Species Group

- Section G.5 Marine Mammals: Updated to include tables documenting the presence of marine mammal species in the proposed action areas.

Appendix I Responses to Public Comments

- This Appendix was added since the release of the Draft PEIS/POEIS to include an explanation of the public comment process, comment responses and comments received.

Appendix J Changes Between Draft PEIS and Final PEIS

- This Appendix was added since the release of the Draft PEIS/POEIS to list the changes that occurred from the Draft PEIS/POEIS to the Final PEIS/POEIS.