UNITED STATES COAST GUARD (COAST GUARD) FINAL ENVIRONMENTAL ASSESSMENT / OVERSEAS ENVIRONMENTAL ASSESSMENT FOR THE SPECIAL PURPOSE CRAFT – HEAVY WEATHER (SPC-HWX) II ACQUISITION

DOCUMENT NUMBER: DSS-USCG-2024-19495

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This Coast Guard final environmental assessment (FEA) / final overseas environmental assessment (FOEA) was prepared in accordance with Environmental Planning Policy, COMDTINST 5090.1 (series) and is in compliance with the National Environmental Policy Act of 1969 (42 U.S.C. §§ 4321 to 4370h) and the Council on Environmental Quality Regulations dated 14 September 2020 (40 C.F.R. §§ 1500–1508).

This FEA serves as a concise public document to briefly provide sufficient evidence and analysis for determining the need to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI). This FEA/FOEA concisely describes the proposed action, the need for the proposal, the alternatives, and the environmental impacts of the proposal and alternatives. This FEA/FOEA also contains a comparative analysis of the action and alternatives, a description of any mitigation measures, and a list of the FEA/FOEA preparers.

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Date: 2025.04.02 14:14:09 -04'00'

4/2/25

Date | Paul Andron, Environmental Preparer | Lead Systems Engineer, Assistant Program Manager, CG-9325

I reviewed the FEA and submitted my written comments to the Proponent.

HOGAN.JESSICA.MARY.1513506631

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Date: 2025.04.02 14:36:05 -04'00'

4/2/25

Date | Jessica Hogan, Environmental Reviewer | Environmental Protection Specialist | Warrant Level II

I reviewed the FEA and submitted my written comments to the Proponent.

HOGAN.JESSICA.MARY.1513506631

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Date: 2025.04.03 09:33:21 -04'00'

Date | Jessica Hogan, Environmental Reviewer | Environmental Protection Specialist | Warrant Level II

In reaching my decision/recommendation on the Coast Guard's proposed action, I considered the information contained in this FEA and considered and acknowledge the written comments submitted to me from the Environmental Reviewers.

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Date | Mark Porvaznik, Proponent | Program Manager, CG-9325

SPECIAL PURPOSE CRAFT – HEAVY WEATHER (SPC-HWX) II ACQUISITION FINAL ENVIRONMENTAL ASSESSMENT/ OVERSEAS ENVIRONMENTAL ASSESSMENT

March 2025

U.S. Department of Homeland Security
United States Coast Guard

U.S. Coast Guard Headquarters
2100 Second Street, SW
Washington, DC 20593-0001

Prepared by:
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FINAL ENVIRONMENTAL ASSESSMENT/OVERSEAS ENVIRONMENTAL ASSESSMENT for SPECIAL PURPOSE CRAFT-HEAVY WEATHER (SPC-HWX) II ACQUISITION

Designation:	Environmental Assessment/ Overseas Environmental Assessment
Title of Proposed Action:	Special Purpose Craft-HWX II Acquisition
Project Location:	Washington and Oregon, U.S. Exclusive Economic Zone
Lead Agency:	United States Coast Guard
Point of Contact:	Paul Andron, Lead Systems Engineer, SPC-HWX II APM, Boat Acquisition Program (CG-9325), Coast Guard Directorate, 2703 Martin Luther Kind Ave, SE, Washington, D.C. 20593-7816 Email address: Paul.T.Andron@uscg.mil
Date:	March 2025

Abstract

The United States Coast Guard (Coast Guard) prepared this Environmental Assessment/Overseas Environmental Assessment (EA/OEA) 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 in the United States' Pacific Northwest (PNW). To meet mission requirements, the Coast Guard operated four 52-foot (ft; 16-meter [m]) first generation Special Purpose Craft – Heavy Weather (SPC-HWX) to serve in these challenging surf conditions. The SPC-HWX augmented the capability of the Coast Guard's fleet of 47 ft (14 m) Motor Lifeboats (47 MLB), which provide surf and heavy weather response capability throughout the Coast Guard. However, in 2021, the SPC-HWX fleet was removed from service. Before removal from service, all four SPC-HWX were assigned to stations in the U.S. Pacific Northwest (PNW): Grays Harbor (Washington), Cape Disappointment (Washington), Yaquina Bay (Oregon), and Coos Bay (Oregon).

The Proposed Action is for the acquisition of up to six SPC-HWX II, four in operation and training status and two as Maintenance Relief Hulls. Each SPC-HWX II would have a service design life of 25 years. The SPC-HWX II would be designed to replace the capabilities provided by the SPC-HWX servicing the PNW and would be assigned to the same stations as the SPC-HWX. The following three Alternatives were analyzed in this EA/OEA:

- The No Action Alternative would use the existing 47 MLBs to support Coast Guard missions in the PNW.
- Alternative 1 (Preferred Alternative, referred to as the "Proposed Action") would include the construction and operation of up to six SPC-HWX II to fulfill mission requirements.
- Alternative 2 would include the acquisition of fewer SPC-HWX IIs.
- In this EA/OEA, the Coast Guard broadly analyzed potential impacts on physical, biological, and socioeconomic environmental resources resulting from proposed activities under the alternatives. Evaluated resources included: ambient sound; bottom habitat and sediments; vegetation; invertebrates; birds; fish; essential fish habitat; sea turtles; marine mammals; cultural resources; subsistence fishing and hunting; commercial fishing and aquaculture; recreation and tourism; and other socioeconomic resources (e.g., marine and riverine construction, mineral extraction, research, energy production, transportation and shipping).

Executive Summary

ES.1 Proposed Action

The United States (U.S.) Coast Guard (Coast Guard) proposes to acquire at least four, but up to six, Special Purpose Craft – Heavy Weather second generation (SPC-HWX II) vessels within the U.S. Pacific Northwest (PNW) to operate from the shore out to 150 nautical miles (nm; 278 kilometers [km]). The four operational SPC-HWX II would be stationed at Grays Harbor (Washington), Cape Disappointment (Washington), Yaquina Bay (Oregon), and Coos Bay (Oregon).

ES.2 Purpose and Need for Action

The Coast Guard ensures the Nation's maritime safety, security, and stewardship. To meet this mission, the Coast Guard must replace the capabilities of the first generation SPC-HWX servicing the PNW, which have all been removed from service. The Proposed Action is for the acquisition of up to six SPC-HWX II, four in operation and training status and two as Maintenance Relief Hulls. Each SPC-HWX II would have a service design life of 25 years. There is no redundant vessel capability within the Coast Guard, Department of Homeland Security, or other government agency. The purpose and need for the Proposed Action is to maintain the Coast Guard's presence in the PNW, capability to execute its missions, and provide longer range Search and Rescue (SAR) in extreme weather conditions in the PNW that exceed the operational capabilities, range capabilities, and towing limits of the 47 ft (14 m) Motor Lifeboats (47 MLB). The SPC-HWX II would be designed to replace the capabilities provided by the SPC-HWX servicing the PNW while implementing today's industry standards with regards to safety, environmental compliance, and other standards. The SPC-HWX II would implement modern design changes to optimize performance and improve standardization.

ES.3 Public Involvement

Regulations from the CEQ[1] direct agencies to involve the public in preparing and implementing their NEPA procedures. The Coast Guard prepared a Draft EA/OEA to inform the public of the Proposed Action and to allow the opportunity for public review and comment. The public review period began with issuance of the Notice of Intent (NOI) in the following publications:

The Chinook Observer, The Bulletin, https://chinookobserver.com, Ilwaco, WA

Lincoln County Leader, https://www.newportnewstimes.com, Salem OR

The Oregonian, https://www.oregonlive.com, Portland, OR

The notice indicated the dates of the public review period and that the Draft EA/OEA would be made available on the following website: https://www.dcms.uscg.mil/NEPA as well as at the following public libraries:

Ilwaco Timberland Library, 158 First Ave N, Ilwaco, WA 98624, (360)642-3908

Westport Timberland Library, 101 E Harms Dr, Westport, WA 98595, (360)268-0521

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[1] The Coast Guard has elected to follow the CEQ regulations at 40 C.F.R. Parts 1500–1508, in addition to the Coast Guard's procedures implementing NEPA at https://www.dcms.uscg.mil/NEPA, to meet the agency's obligations under NEPA, 42 U.S.C. §§ 4321 et seq.

Newport Public Library, 35 NW Nye St, Newport, OR 97365, (541)265-2153

Coos Bay Public Library, 525 Anderson Ave, Coos Bay, OR 97420, (541)269-1101.

Subsequently a Notice of Availability was issued on 15 January 2025 informing the public of the Draft EA/OEA's availability and invited the public to comment. The scoping period lasted 30 days, concluding on 15 February 2025, and zero comments were received.

ES.4 Alternatives Considered

For the purposes of this EA/OEA, the Coast Guard evaluated three alternatives: the Proposed Action, the acquisition of fewer assets, and the No Action Alternative (i.e., no SPC-HWX II would be acquired). No other reasonable alternatives exist that would meet the purpose and need while offering fewer environmental impacts. Therefore, only the three alternatives are considered herein.

ES.5 Summary of Environmental Resources Evaluated in the EA/OEA

CEQ regulations implementing the National Environmental Policy Act (NEPA) specify that an EA/OEA should address those resource areas potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact. The resources evaluated in this EA/OEA are as follows: ambient sound; bottom habitat and sediments; vegetation; invertebrates; birds; fish; essential fish habitat; sea turtles; marine mammals; cultural resources; subsistence fishing and hunting; commercial fishing and aquaculture; recreation and tourism; and other socioeconomic resources (e.g., marine and riverine construction, mineral extraction, research, energy production, transportation and shipping). Table ES-1 provides a summary of the resources eliminated from analysis and rationale for each.

ES.6 Summary of Potential Environmental Consequences of Action Alternatives

Table ES-2 provides a tabular summary of the potential impacts to resources analyzed in Chapter 3 of this EA/OEA. Table ES-3 provides a rationale for those stressors that were considered but eliminated from further analysis in this EA/OEA.

Table ES-1. Resources Eliminated from Analysis

Resource	Justification for Removal from Further Consideration
Physical Environment	
Airspace	The majority of aircraft use associated with the Proposed Action would occur over the water in offshore locations. Low flying aircraft may be used during helicopter training, but helicopters would not interfere with regular public airspace usage given that the offshore locations are not in frequently used flight corridors. 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 Proposed Action would not involve any construction or other activities that may affect terrestrial sediments. 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 primarily occur on or in oceanic waters. An SPC-HWX II may occasionally escort another vessel along the lower Columbia River, but this portion of the river is heavily trafficked. 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. 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 area would be shipwrecks. SPC-HWX II training and operations would be conducted at and above the water's surface, so it would not disturb shipwrecks. Gunnery training, the only portion of the Proposed Action that may result in Military Expended Materials (MEM), would be limited to established ranges, so MEM would not disturb submerged resources. Therefore, the Proposed Action would not impact or harm archaeological and historical resources.
Cultural resources	Coast Guard would avoid cultural resources in the proposed action area. The physical stressors associated with the Proposed Action would not be expected to affect cultural recourses. Anchoring, excluding an emergency, would only occur in designated anchorages. Designated anchorages would not be expected to contain any cultural resources. The only potential impact or harm to cultural resources would be from vessel movement in very shallow water, which is extremely unlikely. Therefore, the Proposed Action would not impact or harm cultural resources. Any resources related to subsistence use are discussed in Section 3.5.

Resource	Justification for Removal from Further Consideration
Estuarine economic resources	Although coastal estuaries are part of the proposed action area, the SPC-HWX II would rarely enter estuaries other than the lower Columbia River or the estuaries where vessel homeports can be found. Any entry into other estuaries would be limited to occasional transit for relevant Coast Guard missions, such as PWCS, and the vessel would only transit within navigational channels. No training would occur within these estuaries. Due to the limited presence in these estuaries and that the vessel would only transit within navigational channels, the Proposed Action would not impact or harm economic resources within the estuaries.
Waterfront 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.

Table ES-2. Summary of Impacts to Resources from the Proposed Action

Resource	Fathometer Noise	Vessel Noise	Helicopter Noise	Gunnery Noise	Vessel Movement	Helicopter Movement	Military Expended Materials (MEM)
Physical Resources							
Ambient Sound	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm
Bottom Habitat and Sediments	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm
Biological Resources							
Vegetation	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm
Invertebrates	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm	**NEPA/E.O. 12114:** No significant impact or harm
Birds	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** No effect	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA
Fish	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** No effect	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** No effect	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** No effect	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA
Essential Fish Habitat	**NEPA/E.O. 12114:** No significant impact or harm **MSA:** No reduction in quality or quantity of EFH	**NEPA/E.O. 12114:** No significant impact or harm **MSA:** No reduction in quality or quantity of EFH	**NEPA/E.O. 12114:** No significant impact or harm **MSA:** No reduction in quality or quantity of EFH	**NEPA/E.O. 12114:** No significant impact or harm **MSA:** No reduction in quality or quantity of EFH	**NEPA/E.O. 12114:** No significant impact or harm **MSA:** No reduction in quality or quantity of EFH	**NEPA/E.O. 12114:** No significant impact or harm **MSA:** No reduction in quality or quantity of EFH	**NEPA/E.O. 12114:** No significant impact or harm **MSA:** No reduction in quality or quantity of EFH

Resource	Fathometer Noise	Vessel Noise	Helicopter Noise	Gunnery Noise	Vessel Movement	Helicopter Movement	Military Expended Materials (MEM)
Sea turtles	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** No effect	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** No effect	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** No effect	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** No effect	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA
Marine mammals	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA	**NEPA/E.O. 12114:** No significant impact or harm **ESA:** NLAA
Socioeconomic Resources							
Cultural Resources	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact
Subsistence Fishing and Hunting	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact
Commercial Fishing and Aquaculture	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA/:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact
Recreation and Tourism	**NEPA/:** No significant impact	**NEPA/:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA/:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact
Other Socioeconomic Resources	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact	**NEPA:** No significant impact

Definitions: Endangered Species Act (ESA); Executive Order (E.O.); May affect, not likely to adversely affect (NLAA) (under Section 7 of the ESA); Magnuson Steven's Fishery Conservation and Management Act (MSA)

The Coast Guard has consulted with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) regarding compliance with the ESA. On December 4, 2024, the USFWS Oregon Office sent a letter concurring with the Coast Guard that the Proposed Action may affect, but is not likely to adversely affect, ESA-listed species under their jurisdiction. The Coast Guard is actively pursuing informal consultation with NMFS; however, a letter of concurrence has not yet been received. The Coast Guard is committed to working with NMFS to minimize impacts as required under Section 7 of the ESA to avoid jeopardy of species and adverse modification or destruction of critical habitat. Although critical habitat is designated within the proposed action area for several ESA-listed species, no essential features present in the proposed action area would be affected by the Proposed Action for all designated critical habitat.

Table ES-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	Air emissions	Vessel movement; helicopter movement	The Proposed Action would generate air emissions from vessels, and potentially from aircraft, but the action is not subject to the General Conformity Rule because all coastal counties of Washington and Oregon are in attainment of the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. Air emissions would be minimal and of short-duration and would not be expected to appreciably contribute to total air emissions within the proposed action area.
Ambient sound	n/a	Vessel movement; Helicopter movement; MEM	There would be no impacts to ambient sound from any physical stressors.
Bottom habitat and sediments	n/a	Fathometer noise; Vessel noise; Helicopter noise; Gunnery noise	There would be no impacts to bottom habitats and sediments from any acoustic stressors.
	n/a	Helicopter movement	Helicopters would only operate above the water's surface and would not impact bottom habitat or sediments.
	Bottom disturbance	Vessel movement	If an SPC-HWX II is required to anchor, excluding an emergency, it 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. Other than anchoring, vessel movement would have no impact on bottom habitat and sediments.
	Degradation of MEM[1]	MEM	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. Therefore, it is extremely unlikely that the degradation of MEM would impact or harm bottom habitat and sediments.
	n/a	Tow lines	There would be no impacts to bottom habitats and sediments from tow lines, which would only be used at the water's surface and would be retrieved (e.g., not left behind).
Water Quality	n/a	Fathometer noise, Vessel noise, Helicopter noise, Gunnery noise	There would be no impacts to water quality from any acoustic stressors.

Impacted Resources	Stressor(s)	Source(s) of Stressor	Rationale for Elimination from Analysis
	Discharge of ballast water	Vessel movement	Coast Guard vessels are mandated to comply with the Clean Water Act (CWA). Any discharges from vessels are conducted pursuant to the CWA as well as the Ocean Dumping Act. Therefore, the Proposed Action would not impact or harm water quality.
	Suspension of sediments	Vessel movement	SPC HWX II may temporarily transit through shallow water environments at slow speeds while enroute to mission areas. Minimal disruption of sediments may occur, but vessel movement would not impact or harm sediments.
	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. Therefore, it is extremely unlikely that MEM would impact or harm water quality.
Biological Resources			
Vegetation	n/a	Fathometer noise; Vessel noise, Helicopter noise; Gunnery noise	Sounds associated with SPC-HWX II operations would not impact the growth or distribution of vegetation.
	Disturbance	Helicopter movement	All helicopter movement would occur above the surface of the water. Helicopters would deploy from Coast Guard air stations and would be at altitude when transiting through the proposed action area. Any effects to floating vegetation from the rotor wash would be minimal and would not damage the vegetation. Therefore, it is extremely unlikely that helicopter movement would impact or harm floating vegetation. No effects would be expected to vegetation below the surface.
	Bottom disturbance	Vessel movement (anchoring); MEM	If an SPC-HWX II is required to anchor, excluding an emergency, it would anchor in designated anchorages. Other vessels would also routinely use these designated areas, and thus, minimal vegetation would be expected to occur due to regular bottom disturbance. Therefore, it is extremely unlikely that anchoring would impact or harm vegetation. MEM would be too small to damage or drag vegetation (at the surface or present in the water column) as it sinks through the water column. Benthic vegetation is not expected offshore where gunnery training would occur. Population-level impacts to vegetation as a result of MEM associated with the Proposed Action would not be expected. Therefore, it is extremely unlikely that MEM would impact or harm vegetation.

Impacted Resources	Stressor(s)	Source(s) of Stressor	Rationale for Elimination from Analysis
	Disturbance; entanglement	Tow lines	Disturbance because 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 vegetation at the surface and infrequent SPC-HWX II towing 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 in the water column. Therefore, it is extremely unlikely that tow lines would impact or harm vegetation.
Invertebrates	TTS or PTS[2]; masking; behavioral response	Fathometer noise	High-frequency noise is outside the range of best hearing of invertebrates; therefore, the likelihood of fathometer noise disrupting normal behavioral patterns of invertebrates is negligible. In addition, the *de minimis* characteristics (Section 3.2.1.1) indicate that fathometer noise would not impact invertebrates.
	TTS or PTS[2]; masking; behavioral response	Helicopter noise	Helicopters training with SPC-HWX II 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 helicopter noise disrupting normal behavioral patterns of 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 invertebrates. As these sounds are not intense or of long duration, it is unlikely helicopter noise would impact or harm invertebrates that may detect low frequency sounds.
	TTS or PTS[2]; masking; behavioral response	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. Due to the infrequency of gunnery training (once per year per vessel) and the low intensity of sound after passing the air-water interface, it is extremely unlikely that gunnery noise would impact or harm invertebrates.
	Behavioral response; strike	Helicopter movement	Helicopter movement would occur above the water's surface. Helicopters would deploy from Coast Guard air stations and would be at altitude when transiting through the proposed action area, minimizing potential for rotor wash at or below the surface. Therefore, no effects to any aquatic

Impacted Resources	Stressor(s)	Source(s) of Stressor	Rationale for Elimination from Analysis
			invertebrates would be expected. No impacts to any invertebrates on land are expected as there will be no overlap with helicopter training events.
	Bottom disturbance	Vessel movement (anchoring); MEM	If an SPC-HWX II is required to anchor, excluding an emergency, it would anchor in designated anchorages. Other vessels would also routinely use these designated areas, which are generally soft sediment areas. No invertebrates associated with hard bottoms would be expected to occur, and invertebrates associated with soft bottom would regularly be disturbed in designated anchorages. Therefore, it is extremely unlikely that anchoring associated with the Proposed Action would impact or harm invertebrates. 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. MEM would only be associated with gunnery training, which is limited to once per year per vessel. Therefore, it is extremely unlikely that gunnery noise would impact or harm invertebrates. Population-level impacts to invertebrates as a result of MEM associated with the Proposed Action would not be expected.
	Entanglement (tow lines)	Vessel movement	Potential for entanglement would be extremely low. Tow lines associated with the Proposed Action would not be expected to have any loops or slack, and the density of macro invertebrates that could overlap with the presence of the tow line would be low. Therefore, it is extremely unlikely that entanglement in tow lines would impact or harm invertebrates.
Birds	TTS or PTS[2]; masking; behavioral response	Fathometer 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 near an SPC-HWX II, impacts are considered negligible. Therefore, it is extremely unlikely that fathometer noise would impact or harm birds.

Impacted Resources	Stressor(s)	Source(s) of Stressor	Rationale for Elimination from Analysis
Fish	TTS or PTS[2]; masking; behavioral response	Helicopter noise, Helicopter movement	Helicopters in transit to training locations would fly at or above 2,000 ft (610 m) in environmentally sensitive areas and in other areas at altitudes not below 1,500 ft (457 m) (COMDTINST M3710.1 (series)), as long navigationally safe to do so. Helicopters would deploy from Coast Guard air stations and would be at altitude when transiting through the proposed action area. Helicopter noise would only be detected in a narrow cone directly beneath the helicopter as it moves throughout the proposed action area. The noise would only be detected by fish once it has travelled through the air-water interface. Given that fish would need to be traveling directly in the narrow cone beneath the helicopter to perceive the minimal noise that has passed through the air-water interface, the likelihood of helicopter noise or movement disrupting normal behavioral patterns of fish at or beneath the surface is negligible and would not impact or harm fish.
		Gunnery noise	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 not likely be detected by fish in their habitat unless they are near the source, and even if a fish is close enough to perceive the sound, the intensity would be greatly reduced by passing through the air-water interface. Due to the infrequency of gunnery training (once per year per vessel), the lower density of fish in offshore waters, and the minimal intensity of gunnery noise underwater, it is extremely unlikely that gunnery noise would impact or harm fish.
	Entanglement (tow lines)	Vessel movement	The risk of entanglement is considered negligible due to (1) implementation of Coast Guard Standard Operating Procedure (SOPs) (Appendix B); (2) the unlikely overlap between fish at the water's surface and the infrequent tows performed by an SPC-HWX II; and (3) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel. Therefore, it is extremely unlikely that entanglement in tow lines would impact or harm fish.
Essential fish habitat (EFH)	n/a	Helicopter noise; Gunnery noise; Helicopter movement	Sounds and movement associated with helicopter and gunnery training would occur above the water's surface. Helicopters would deploy from Coast Guard air stations and would be at altitude when transiting through the proposed action area. Any physical movements would have no impact on fish habitat. Noise associated with both trainings may enter the water, but the noise would be so attenuated after passing through the air-water interface, it is extremely unlikely that it would cause any impact or harm to EFH.

Impacted Resources	Stressor(s)	Source(s) of Stressor	Rationale for Elimination from Analysis
	Bottom disturbance	Vessel movement (anchoring)	If an SPC-HWX II is required to anchor, excluding an emergency, it would anchor in designated anchorages. Other vessels would also routinely use these designated areas, and thus, the benthic habitat within these designated anchorages would be regularly disturbed absent anchoring of the SPC-HWX II. Therefore, it is extremely unlikely that anchoring associated with the Proposed Action would impact or harm EFH.
Sea turtles	TTS or PTS[2]; masking; behavioral response	Fathometer noise	The frequency range of the fathometer (Section 3.2.1.1) is expected to range from 50 to 200 kHz, and the CPT-S (High Chirp) ranges from 170 to 230 kHz. The source level associated with the fathometer (205 decibels [dB]) is a maximum level that was taken directly next to the source. However, the Coast Guard would not operate the fathometer at the maximum level during the Proposed Action. The level of sound diminishes significantly outside of the downward-focused, narrow beam width of the sound directly below the vessel. Additionally, fathometer noise is transient due to vessel movement, and both vessels and sea turtles would be moving throughout the vast proposed action area. While the lower frequencies of fathometer noise may overlap with the higher frequencies of sea turtle hearing, sea turtle peak hearing is between 100 and 400 Hertz (Hz) (Appendix F), well below fathometer operating frequencies. Accordingly, any perception of fathometer noise by sea turtles is expected to be extremely minimal. Thus, fathometer noise is not expected to cause impact or harm to sea turtles.
		Helicopter noise; Helicopter movement	Helicopter training would only occur in offshore areas, where sea turtle densities are low. Helicopters associated with SPC-HWX II 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 1,500 ft (457 m) (COMDTINST M3710.1 (series)), unless in emergency situations (which are not part of the Proposed Action) or for navigational safety. Helicopters would deploy from Coast Guard air stations and would be at altitude when transiting through the proposed action area. Therefore, the likelihood of helicopter movement disrupting normal behavioral patterns of sea turtles at or beneath the surface is negligible. Helicopter noise would dissipate over the altitude distance; however, in the unlikely event that a sea turtle at the water's surface detects helicopter noise, any behavioral response to passing aircraft would be temporary and minimal and would not cause population-level effects. Accordingly, helicopter noise and movement is

Impacted Resources	Stressor(s)	Source(s) of Stressor	Rationale for Elimination from Analysis
			extremely unlikely to overlap with sea turtles and would not be expected to impact or harm sea turtles.
		Gunnery noise	Gunnery noise overlaps with the hearing range of sea turtles; however, sound generated by a muzzle blast is intense, but very brief and limited to the duration of gunnery training. Detection of gunnery noise would be limited at the surface (not underwater). Based on the infrequency of the training (once per year per vessel), the location of the training at established ranges in offshore waters, and Coast Guard SOPs (Appendix B) (e.g., lookouts), the potential impacts to sea turtles from gunnery training associated with the Proposed Action would be extremely unlikely and would not be expected to impact or harm sea turtles. There would be no population-level impacts to sea turtles as a result of gunnery noise.
	Bottom disturbance	Vessel movement (anchoring)	If an SPC-HWX II is required to anchor, excluding an emergency, it would anchor in designated anchorages. Other vessels would also routinely use these designated areas. Sea turtles are most often present near the seafloor when foraging, but prey resources would be minimal within designated anchorages due to the routine disturbance by anchors. Sea turtles are unlikely to occur near the seafloor within designated anchorages both due to minimal foraging opportunity and the regular disturbance of anchors. Therefore, it is extremely unlikely that anchoring associated with the Proposed Action would impact or harm sea turtles.
	Entanglement (tow lines)	Vessel movement	The risk of entanglement is considered negligible due to (1) implementation of Coast Guard SOPs (Appendix B); (2) the unlikely overlap of sea turtles at the surface and SPC-HWX II towing operations; and (3) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel. In addition, there are no sea turtles expected in the Columbia River where towing of vessels would most likely occur. Accordingly, entanglement in tow lines is extremely unlikely to overlap with sea turtles and would not be expected to impact or harm sea turtles.
Marine mammals	Bottom disturbance	Vessel movement (anchoring)	If an SPC-HWX II is required to anchor, excluding an emergency, it would anchor in designated anchorages. Other vessels would also routinely use these designated areas. Marine mammals are not often present near the seafloor, and they would be particularly rare within designated anchorages due to the routine disturbance by anchors. Therefore, it is extremely unlikely that

Impacted Resources	Stressor(s)	Source(s) of Stressor	Rationale for Elimination from Analysis
			anchoring associated with the Proposed Action would impact or harm marine mammals.
	Entanglement (tow lines)	Vessel movement	The risk of entanglement is considered negligible due to (1) implementation of Coast Guard SOPs (Appendix B); (2) the unlikely overlap of marine mammals at the surface and SPC-HWX II towing operations; and (3) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel. In addition, there are no marine mammals expected in the Columbia River where towing of vessels would most likely occur. Accordingly, entanglement in tow lines is extremely unlikely to overlap with marine mammals and would not be expected to impact or harm marine mammals.
Socioeconomic and Cultural Resources			
Socioeconomic and cultural resources	n/a	Fathometer noise; Vessel noise; Helicopter noise; Gunnery noise	There would be no impacts to socioeconomic or cultural resources from any acoustic stressor associated with the Proposed Action.
	Bottom disturbance	Vessel movement (anchoring)	If an SPC-HWX II is required to anchor, excluding an emergency, it would anchor in designated anchorages. Other vessels would also routinely use these designated areas. Designated anchorages would not be expected to contain any cultural resources or socioeconomic uses of the seafloor other than for anchorage. Therefore, it is extremely unlikely that anchoring associated with the Proposed Action would impact or harm socioeconomic or cultural resources.
Public health and safety	Physical interactions	MEM	Gunnery training would occur in offshore ranges, making it extremely unlikely that the public would encounter MEM.
Accessibility to marine resources	Restrictions due to operations	Helicopter movement	Due to the limited helicopter training throughout a large, proposed action area, the public would not be restricted from use of marine resources because of helicopter movement.

[1] MEM include expended shells and targets that would not be recovered after gunnery training (Section 3.2.2.3).
[2] Temporary Threshold Shift (TTS) and Permanent Threshold Shift (PTS) are not anticipated from any of the acoustic stressors associated with the Proposed Action.

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Acronyms and Abbreviations

°N	degrees North latitude
°S	degrees South latitude
AINJ	Auditory injury
ATON	Aids to Navigation
BIAs	biological important areas
BOEM	Bureau of Offshore Energy Management
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Coast Guard	U.S. Coast Guard
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
D13	Coast Guard District 13
dB	decibels
dB re 1 µPa	decibels referenced at 1 micropascals
dB re 20 µPa	decibels referenced at 20 micropascals
dBA	A-weighted decibels
DPS	Distinct Population Segment
EA	Environmental Assessment
EEZ	U.S. Exclusive Economic Zone
EFH	Essential Fish Habitat
ENOW	Economics: National Ocean Watch
E.O.	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FMC	Fishery Management Council
FMP(s)	Fishery Management Plan(s)
FR	Federal Register
ft	foot (feet)
HAPC	Habitat Areas of Particular Concern
HF	high frequency marine mammal hearing group
hp	horsepower
Hz	hertz
in	inch(es)
kHz	kilohertz
km	kilometer(s)
LF	low frequency marine mammal hearing group
LMR	Living Marine Resource
m	meter(s)
MBTA	Migratory Bird Treaty Act
MEM	Military Expended Materials
MF	mid-frequency marine mammal hearing group
mi	mile(s)
47 MLB	47 ft (14 m) Motor Lifeboats
MMPA	Marine Mammal Protection Act

MPA	Marine Protected Areas
mph	miles per hour
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSRO	Maritime Security and Response Operations
NAAQS	National Ambient Air Quality Standards
Navy	U.S. Department of the Navy
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
nm	nautical mile(s)
NMFS	National Marine Fisheries Service
NMSA	National Marine Sanctuaries Act
NOAA	National Oceanic and Atmospheric Administration
OEA	Overseas Environmental Assessment
OLE	Other Law Enforcement
OW	otariid and non-phocid marine carnivore
PBF	Physical and Biological Features
PCE	Primary Constituent Elements
PFMC	Pacific Fishery Management Council
PIW	person-in-the-water
PNW	U.S. Pacific Northwest
PTS	Permanent Threshold Shift
PW	phocid marine mammal hearing group
PWCS	Port, Waterways, and Coastal Security
SAR	Search and Rescue
SEL	Sound Exposure Level
SIP	State Implementation Plan
SOP(s)	Standard Operating Procedure(s)
SPL	Sound Pressure Level
SPC-HWX	Special Purpose Craft – Heavy Weather
SPC-HWX II	Special Purpose Craft – Heavy Weather-second generation
SRKW	Southern Resident Killer Whale
TTS	Temporary Threshold Shift
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
yd	yard
µPa	micropascal

CHAPTER 1 Purpose of and Need for the Proposed Action

1.1 Introduction

The United States (U.S.) Coast Guard (Coast Guard) is a military, multi-mission, maritime service within the Department of Homeland Security and one of the nation's armed services. In executing its various missions, the Coast Guard protects the public, the environment, and the United States' economic and security interests in national and international waters that include the Nation's coasts, ports, and inland waterways.

Coast Guard operations occur within inland (e.g., the Great Lakes, the Mississippi River), coastal (within 12 nautical miles [nm; 22 kilometers (km)] from shore), and offshore waters. These responsibilities include Search and Rescue (SAR) inshore, offshore, and in the coastal zone, in extreme weather conditions to prevent loss of life, injury, and property damage at sea.[2] To meet mission requirements, the Coast Guard operated four 52-foot (ft; 16-meter [m]) first generation Special Purpose Craft – Heavy Weather (SPC-HWX) to serve in these challenging surf conditions. The SPC-HWX augmented the capability of the Coast Guard's fleet of 47 ft (14 m) Motor Lifeboats (47 MLB), which provide surf and heavy weather response capability throughout the Coast Guard. However, in 2020, the Coast Guard restricted the four aging SPC-HWX vessels from operating in seas above 4 ft (1.2 m), and in 2021, the fleet was removed from service. Before removal from service, all four SPC-HWX were assigned to stations in the U.S. Pacific Northwest (PNW): Grays Harbor (Washington), Cape Disappointment (Washington), Yaquina Bay (Oregon), and Coos Bay (Oregon).

The Coast Guard prepared this Environmental Assessment (EA)/Overseas Environmental Assessment (OEA) to analyze the potential impacts from the acquisition of up to six and operation of up to four, second generation Special Purpose Craft – Heavy Weather (SPC-HWX II) pursuant to the requirements of the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] §§ 4321 *et seq.*); regulations issued by the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] §§ 1500 *et seq.*); Executive Order (E.O.) 12114; Department of Homeland Security Directive Number 023-01; and Coast Guard Commandant Instruction M16475.1D.

1.2 Purpose and Need for the Proposed Action

The Coast Guard ensures the Nation's maritime safety, security, and stewardship. To meet this mission, the Coast Guard must replace the capabilities of the first generation SPC-HWX servicing the PNW, which have all been removed from service.

The Proposed Action is for the acquisition of up to six SPC-HWX II, four in operation and training status and two as Maintenance Relief Hulls. Each SPC-HWX II would have a service design life of 25 years. There is no redundant vessel capability within the Coast Guard, Department of Homeland Security, or other government agency. The purpose and need for the Proposed Action is to maintain the Coast Guard's presence in the PNW, capability to execute its missions, and provide longer range SAR in extreme weather conditions in the PNW that exceed the operational capabilities, range capabilities, and towing limits of the 47 MLB. The SPC-HWX II would be designed to replace the capabilities provided by the SPC-HWX servicing the PNW while implementing today's industry standards with regards to safety,

[2] Emergency response is not a part of the Proposed Action. Emergency response training would be conducted and is considered part of the Proposed Action.

environmental compliance, and other standards. The SPC-HWX II would implement modern design changes to optimize performance and improve standardization.

1.3 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. 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 SAR; marine safety; port, waterways, and coastal security; drug interdiction; migrant interdiction; aids to navigation (ATON); marine environmental protection; living marine resources (LMR); other law enforcement (OLE) (e.g., illegal fishing); defense readiness; and ice operations; of these, the SPC-HWX II would support the following Coast Guard missions:

- SAR
- Marine Safety
- Port, Waterways, and Coastal Security (PWCS)
- Drug Interdiction
- Migrant Interdiction
- ATON & Waterways Management
- Marine Environmental Protection
- LMR
- OLE

1.4 Applicable Laws and Directives

The Coast Guard has prepared this EA/OEA 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[3]:

- NEPA (42 U.S.C. §§ 4321 *et seq.*; July 16, 2020) requires an environmental analysis for major federal actions that have the potential to significantly impact the quality of the environment;
- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR parts 1500-1508);
- E.O. 12114 (44 FR 1957; January 9, 1979) directs federal agencies to be informed of, and take account of, environmental considerations when making decisions regarding major federal actions outside the United States, its territories, and possessions;
- Coastal Zone Management Act (CZMA) (16 U.S.C. §§ 1451-1465);
- Endangered Species Act (ESA) (16 U.S.C. §§ 1531-1544);
- Implementing the National Environmental Policy Act, Department of Homeland Security Directive 023-01 (series);
- Implementation of the National Environmental Policy Act, Department of Homeland Security Instruction Manual 023-01-001-01 (series);
- U.S. Coast Guard Environmental Planning Policy, COMDTINST 5090.1 (series);

[3] 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 EA/OEA, refer to Appendix A.

- U.S. Coast Guard Environmental Planning Implementing Procedures; and
- U.S. Coast Guard Natural Resource Management COMDTINST 5090.3A.

1.5 Public and Agency Participation and Intergovernmental Coordination

Regulations from the CEQ direct agencies to involve the public in preparing and implementing their NEPA procedures. The Coast Guard prepared a Draft EA/OEA to inform the public of the Proposed Action and to allow the opportunity for public review and comment. The public review period began with issuance of the Notice of Intent (NOI) in the following publications:

The Chinook Observer, The Bulletin, https://chinookobserver.com, Ilwaco, WA

Lincoln County Leader, https://www.newportnewstimes.com, Salem OR

The Oregonian, https://www.oregonlive.com, Portland, OR

The notice indicated the dates of the public review period and that the Draft EA/OEA would be made available on the following website: https://www.dcms.uscg.mil/NEPA as well as at the following public libraries:

Ilwaco Timberland Library, 158 First Ave N, Ilwaco, WA 98624, (360)642-3908

Westport Timberland Library, 101 E Harms Dr, Westport, WA 98595, (360)268-0521

Newport Public Library, 35 NW Nye St, Newport, OR 97365, (541)265-2153

Coos Bay Public Library, 525 Anderson Ave, Coos Bay, OR 97420, (541)269-1101.

Subsequently a Notice of Availability was issued on 15 January 2025 informing the public of the Draft EA/OEA's availability and invited the public to comment. The scoping period lasted 30 days, concluding on 15 February 2025, and zero comments were received. This Final EA/OEA will be publicized on the Coast Guard's Office of Environmental Management website to notify the public of its publication.

The Coast Guard has consulted with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) regarding compliance with the ESA. On December 4, 2024, the USFWS Oregon Office sent a letter concurring with the Coast Guard that the Proposed Action may affect, but is not likely to adversely affect, ESA-listed species under their jurisdiction. The Coast Guard is actively pursuing informal consultation with the NMFS; however, a letter of concurrence has not yet been received. The Coast Guard is committed to working with NMFS to minimize impacts as required under Section 7 of the ESA to avoid jeopardy of species and adverse modification or destruction of critical habitat.

Coastal Consistency Determinations under the CZMA were submitted to the Washington Department of Ecology and Oregon Department of Land Conservation and Development. On November 19, 2024, the Washington Department of Ecology sent a letter concurring with the Coast Guard that the Proposed Action is consistent with Washington's Coastal Zone Management Plan. No response was received from the Oregon Department of Land Conservation and Development within 60 days of submission of the Coastal Consistency Determination, so the Coast Guard presumed concurrence pursuant to 15 CFR § 930.41.

CHAPTER 2 Proposed Action and Alternatives

The Coast Guard is proposing to acquire up to six SPC-HWX II with planned design service lives of 25 years each to fulfill mission requirements (Section 2.2) in the proposed action area. Four of the SPC-HWX II would be operational, and two would be Maintenance Relief Hulls that would be placed in storage.

Several possible alternatives to completing the Proposed Action were considered (Section 2.6). Under the No Action Alternative, the Coast Guard would fulfill its missions in Coast Guard District 13 (D13) using existing assets, like the 47 MLB. Other alternatives considered included using whatever replacement hulls the Coast Guard could purchase, lease, or inherit from others, as the need arose.

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 area where the SPC-HWX II would provide support (Section 2.1), this EA/OEA analyzes expected operations and training activities based on the SPC-HWX's operation and training activities.

2.1 Description of Proposed Action Area

The PNW proposed action area (Figure 2-1) includes state and territorial seas extending 150 nm (278 km) from Washington State, near the US-Canadian border, south to Oregon and up the Columbia River as far as Portland, Oregon. The PNW proposed action area is off the coast of Washington, near Vancouver Island, British Columbia, Canada, and the Strait of Juan de Fuca, seaward of the Olympic Coast National Marine Sanctuary, and off the coast of Oregon. Similar to the SPC-HWX, the SPC-HWX II would service D13 from the following deepwater ports: Station Grays Harbor, Washington; Station Cape Disappointment, Washington; Station Yaquina Bay, Oregon; and Station Coos Bay, Oregon. A brief description of the four Coast Guard stations is provided in Table 2-1.

Additionally, as of 2009, Washington is home to 127 marine protected areas (MPAs) and Oregon is home to five (Oregon Department of Fish and Wildlife 2024b; Van Cleve et al. 2009). Although many of Washington's MPAs are within Puget Sound, outside of the proposed action area, some of its largest, including the Olympic Coast National Marine Sanctuary, overlap with the proposed action area. All five Oregon MPAs are along the coast within the proposed action area. However, the MPAs will not be discussed further as they do not possess any unique resources that need additional discussion beyond what is already covered herein.

Coast Guard Air Stations would support helicopter training activities with the SPC-HWX II (Section 2.5) as part of the Proposed Action (i.e., training). Air Station North Bend would support any training extending from Pacific City, Oregon (Stations Coos Bay and Yaquina Bay) west to approximately 50 nm (93 km) offshore, and Sector Columbia River would support training off Washington (Stations Cape Disappointment and Grays Harbor).

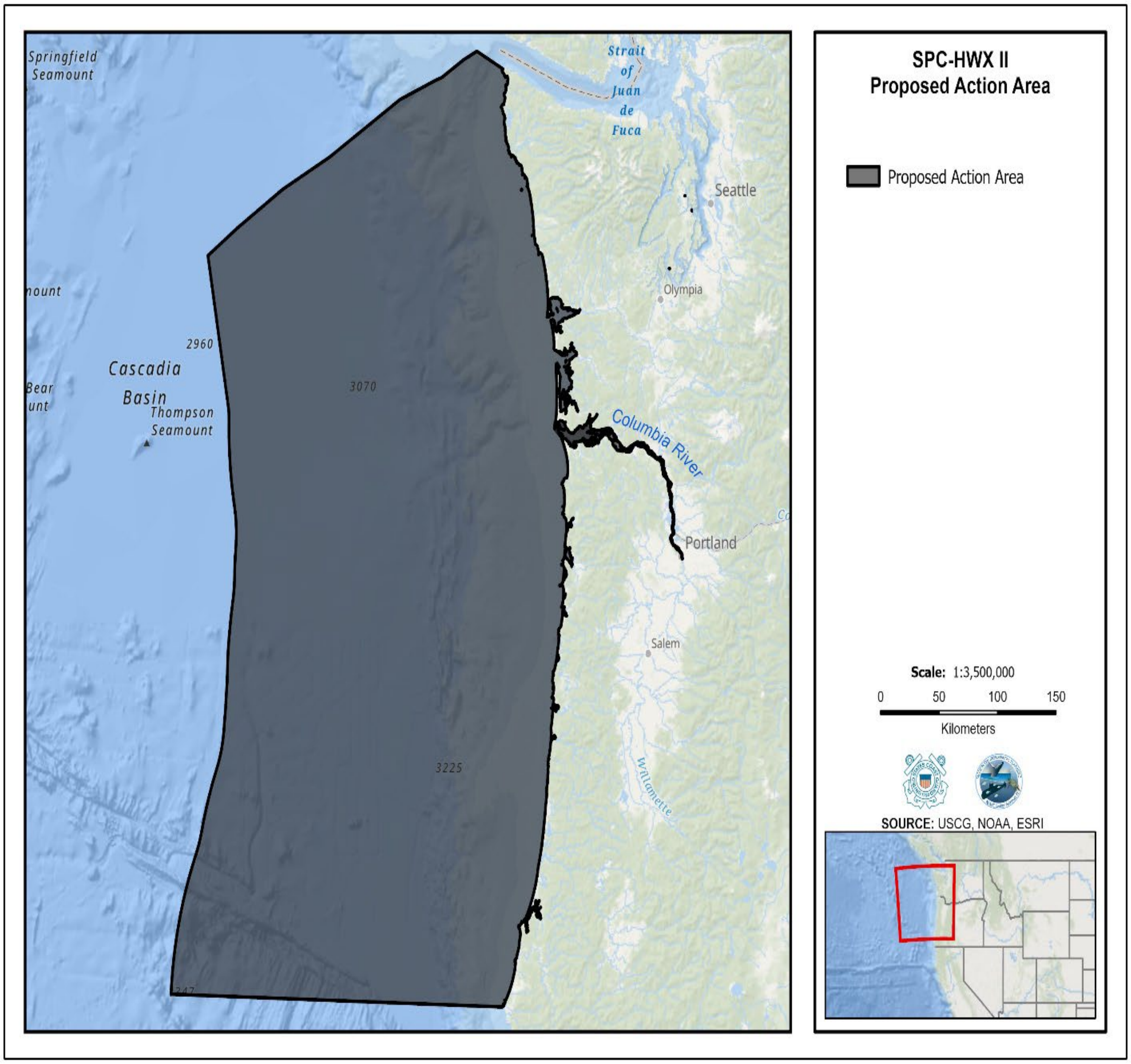

Figure 2-1. Overview of the Proposed Action Area for the SPC-HWX II

Table 2-1. Description of Coast Guard's SPC–HWX II Stations

Coast Guard Station	Description of Location	Description of Operations*
Grays Harbor, Washington	Grays Harbor is an estuarine bay located 45 miles (mi; 72 km) north of the mouth of the Columbia River, in Grays Harbor County, Washington. Coast Guard Station Grays Harbor is on the South Bay side of the peninsula in Westport, Washington. Grays Harbor's area of responsibility extends more than 63 mi (101 km) (along the Washington coastline from the Queets River in the north, to Ocean Park in the south and 50 mi (80 km) offshore (U.S. Coast Guard 2003).	75 percent is SAR; the other 25 percent is law enforcement, marine environmental protection, and recreational boating safety.
Cape Disappointment, Washington	Station Cape Disappointment is situated at the mouth of the Columbia River, at the extreme southwestern corner of Ilwaco Washington, on the north side of the Columbia River bar and just west of Baker Bay and Sand Island, Oregon. Cape Disappointment's area of responsibility reaches from Ocean Park on the Washington Coast, south to Tillamook Head on the Oregon Coast.	Considered the largest SAR station in the PNW. Primary missions include SAR to commercial and recreational mariners within 50 nm (93 km) of the Columbia River entrance and law enforcement near the approaches to the Columbia River. Cape Disappointment is regarded as one of the most treacherous river bars in the world. Station Cape Disappointment conducts an average of 450–500 SAR cases a year.
Yaquina Bay, Oregon	Station Yaquina Bay is located in Newport, Oregon, east of the Yaquina Bay Bridge in Yaquina Bay. Yaquina Bay is a tidal estuary; the harbor itself is from the widening of the Yaquina River, just inside the entrance. It is moderately exposed to waves, close to the Siletz River, which floods every year. This station's area of responsibility extends from Cape Perpetua to Spencer Creek, totaling 27 mi (44 km) of Oregon coastline.	Primary mission is SAR, responding to approximately 590 cases per year, followed by law enforcement, responding to approximately 200 cases per year.
Coos Bay, Oregon	Station Coos Bay is located in the mouth of Coos Bay at Charleston Boat Basin, Oregon. It is considered the seventh largest port on the West Coast. Station Coos Bay's area of operations extends from the Coos River to Cape Blanco, Oregon.	Primary mission is SAR, followed by Marine Safety and LMR (fisheries).

*Emergency response is not part of the Proposed Action.

2.2 Proposed Action (Preferred Alternative)

Under the Proposed Action, the Coast Guard would acquire and operate at least four, but up to six, SPC-HWX II with planned design service lives of 25 years each to fulfill mission requirements in the proposed action area (Section 2.1). The Coast Guard anticipates that four SPC-HWX II in operational status would support the Coast Guard mission in the PNW similar to the SPC-HWX, while two SPC-HWX II in Maintenance Relief Hull status would be placed in storage at the Port of Astoria's facility. Completed construction of one new SPC-HWX II is scheduled annually until all six have been constructed. Full operational capability would be achieved when all planned SPC-HWX IIs are operational, having undergone approximately one year of assessments to become "Ready for Operations." Coast Guard SPC-HWX II operations and training (Section 2.5) would occur after delivery of each SPC-HWX II from the shipbuilder to the Coast Guard. For example, if the first planned SPC-HWX II delivery to the Coast Guard is expected in 2026, it would be operational in 2027. Following the same example and a planned annual construction schedule, then the last SPC-HWX II would be expected to be delivered in 2032 and Ready for Operations after assessments are completed.

For each SPC-HWX II, a major dry dock maintenance event would occur approximately every seven years. When a SPC-HWX II is under maintenance, one of the two SPC-HWX II Maintenance Relief Hulls would be entered into service to support the missions in the area of operation for the vessel in drydock. A propulsion test would likely occur after these events and involve running the SPC-HWX II at speeds between 0 – 20 knots (0 – 23 miles per hour [mph]) to execute all SPC-HWX II maneuvers.

While the Coast Guard must work toward environmental compliance prior to the design and build of an SPC-HWX II, the vessels are not expected to impact the environment or any ESA-listed species until they are operational. Vessel operations, as well as training exercises would occur after delivery of each SPC-HWX II to the Coast Guard to meet the Coast Guard's mission responsibilities in the proposed action area (Section 2.1). Required vessel design and capabilities are considered essential for successful accomplishment of the SPC-HWX II missions are provided in Section 2.3. Similar to the existing 47 MLB fleet and the decommissioned SPC-HWX, the Proposed Action would include vessel operations as well as training exercises to meet the Coast Guard's mission responsibilities in the proposed action area. The Proposed Action does not include emergency response but would include training for SAR. Any Coast Guard response during a SAR mission is considered an emergency and is not a part of the Proposed Action. Any potential environmental consequences that could occur at the implementation phase of shore infrastructure would be completed by Coast Guard, independent of this EA/OEA. Some infrastructure improvements may be required to accommodate the vessels at each of the homeport locations but are beyond the bounds of the analysis for this EA/OEA. Preliminary designs are underway; however, the nature and extent of these improvements is unknown at the present time and are not available for analysis. Analysis for these actions will be evaluated for each location as more information becomes available. Table 2-2 summarizes the key performance parameters for the proposed SPC-HWX II.

2.2.1 Special Purpose Craft – Heavy Weather II Capabilities and Design

The design of the SPC-HWX II would increase the reliability, maintainability, system safety, survivability, human factors, and standardizations to support the Coast Guard missions in the PNW. The SPC-HWX II (Figure 2-2), would be 64 ft (19.5 m) in length, with a 22 ft (6.7 m) beam width, and have a draft of 7 ft (2 m) (Table 2-2) with twin Diesel engines driving fixed-pitch propellers, and a bow thruster. Each

SPC-HWX II would have the ability to operate in heavy weather and surf conditions to safely transit[4] hazardous bar conditions, 35 ft (11 m) seas, and 25 ft (7.6 m) breaking surf. Required vessel capabilities, performance thresholds, and objectives considered essential for SPC-HWX II are provided in Section 2.3, which also includes a summary of the proposed SPC-HWX II's anticipated operational duties.

To meet mission requirements, SPC-HWX II would be equipped for longer transits and improved transit and intercept speed, allowing for rapid responses, a reduction in overall transit time, and an increase in on-scene availability. During any patrol, a SPC-HWX II would be able to sustain operations at sea for up to 48 hours.

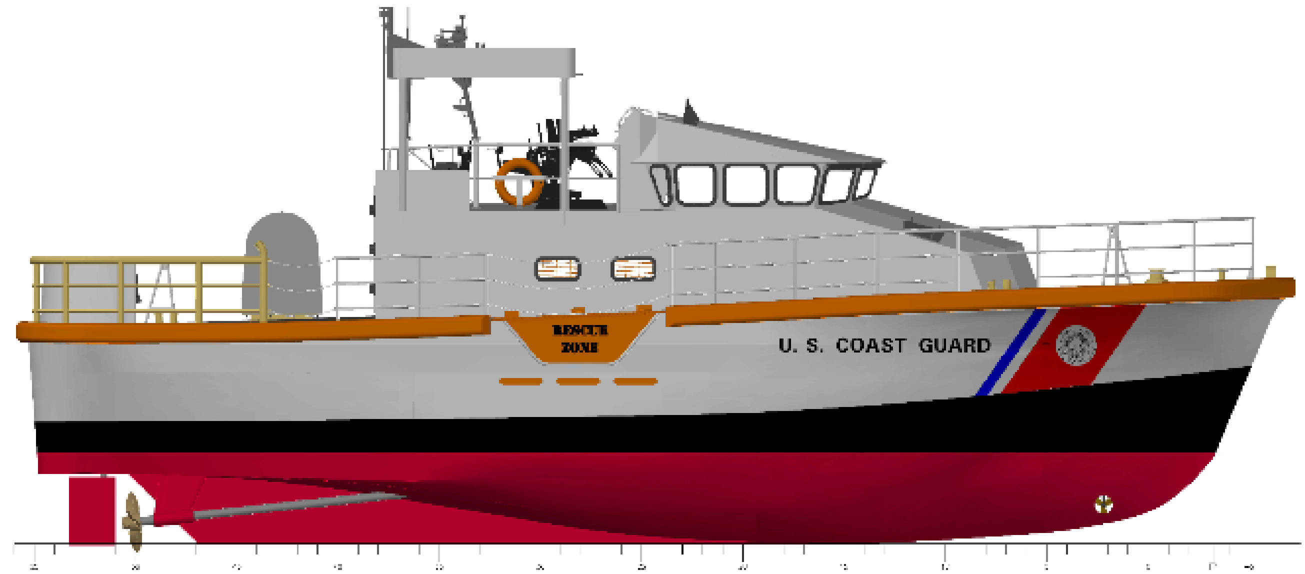

Figure 2-2. Notional SPC-HWX II Vessel Design

[4] In this context, "transit" may not be a straight-line course as the SPC-HWX II would likely be required to adjust course and speed to avoid the worst seas and provide the safest ride for the crew and vessel.

Table 2-2. SPC-HWX II Key Performance Parameters

Requirements		*SPC-HWX II*
Access	**Length (maximum)**	64 ft 0 in (19.5 m) overall
	Beam (maximum)	22 ft (6.7 m) with fendering
	Draft (maximum)	7 ft (2 m)
Operating Environment	**Breaking Surf**	25 ft (7.6 m)
	Seas	35 ft (11 m)
	Winds	60+ knots (69 mph)
Performance and Stability	**Speed (maximum)**	20 knots (23 mph)
	Speed (cruising)	16+ knots (18.4 mph)
	Range (minimum)	500+ nm (at 16 knots)
	Bollard Pull (minimum)	18,000+ pounds (8,165 kilograms)
	Stability	Self-righting with any single buoyant compartment flooded. Two compartment hull damage stability.
Endurance	At least 48 hours for extended missions	
Berthing	Berthing for two crew members. Vessel outfitted for a crew of four.	

Vessel Speeds

The SPC-HWX II would operate at a broad range of speeds to support Coast Guard missions and would be able to operate continuously at speeds of 5 knots (5.8 mph) or less with the propulsion system fully engaged. The SPC-HWX II would have the ability to sustain speeds of 20 knots (23 mph) maximum speed, and 16 knots (18.4 mph) cruising speed, with a range of 500 nm (926 km) at the sustained cruising speed (16 knots) condition with a 10 percent reserve in calm seas. Higher speeds would only be used to intercept another vessel (e.g., during SAR or drug interdiction missions) and for a short period of time, and then the SPC-HWX II would resume fuel-efficient speeds.

Towing and Anchoring

Two powered towline reels, one with 1,200 ft (366 m) of 5-inch (in; 12.7-centimeter) circumference and the other with 900 ft (274 m) of 3.25-in (8.26-centimeter) circumference, would be used to store the towlines and deploy when needed and, in conjunction with a capstan, to stow the towlines back on the reel when shortening at tow or when the tow is complete. The SPC-HWX II would be required to anchor rapidly in response to an emergency, such as propulsion system failure. The anchor would be stowed and powered with a winch for deployment and retrieval.

Weapons Mount

The SPC-HWX II would have a forward mount for an automatic weapon (7.62 millimeter [mm] M240 or equivalent). Although internal lockable storage racks would be provided for an automatic weapon, a service rifle, a service shotgun, and a canister of ammunition for each weapon, the weapons would only be on board when the crew is on board. Gunnery training is discussed in Section 2.5.3.

2.2.1.1 Navigational Systems

The SPC-HWX II would be equipped with standard navigational technologies, with the following components from the Coast Guard's approved-Scalable Integrated Navigation System: radar, Global Positioning System, fathometer (depth sounder), chart plotting, and electronic compass. While the vessel is underway, the single beam echosounder (fathometer) would be on at all times for navigational safety. The fathometer frequencies can range from 50–200 kilohertz (kHz), and the CPT-S (High Chirp) ranges from 170–230 kHz, which is the assumed operating frequency for the Proposed Action. Each SPC-HWX II would have navigational displays at all primary crew seating locations and a remote electro-optical/infrared camera mounted on the mast or an arch to provide greater visibility both fore and aft to aid in navigation.

2.3 SPC-HWX II Operations, Mission Support, and Training

For the past 60 years, the Coast Guard operated four 52-ft SPC-HWX in the PNW. The SPC-HWX augmented the capability of the Coast Guard's fleet of 47 MLB, which provide surf and heavy weather response capability throughout the Coast Guard. The SPC-HWX provided the capability for longer range SAR in extreme weather conditions that exceed the capabilities of the 47 MLB. This is particularly important in rough waters of the PNW where patrol vessels and smaller cutters are restricted in their ability to cross breaking bars and perform missions in these advanced sea states. The SPC-HWX conducted SAR missions in the coastal and offshore zone to prevent loss of life, injury, and property damage at sea. It is expected that SPC-HWX II would conduct operations in a similar manner as the SPC-HWX.

Similar to the 52-ft SPC-HWX vessels, the planned 64-ft SPC-HWX II's primary mission would be to respond to SAR and continue to provide extreme, long-range, surf, and heavy weather response from four units in the PNW: Grays Harbor (Washington), Cape Disappointment (Washington), Yaquina Bay (Oregon), and Coos Bay (Oregon) (Section 2.1). As a multi-mission Coast Guard asset with an emphasis on surf and heavy weather operations, the SPC-HWX II would continue to provide the basic capabilities of the retired SPC-HWX vessels, while continuing to expand multi-mission capabilities and perform in a wide range of conditions. These missions include the following: PWCS; SAR; Drug Interdiction; Migrant Interdiction; ATON & Waterways Management; Marine Environmental Protection; LMR; and OLE activities.

The SPC-HWX II 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; towing and escorting crippled vessels to safety;
3. Marine Safety, conducting maritime security operations, before, during, and after a threat (e.g., terrorist incident) occurs against the U.S. Maritime Domain;
4. DI, respond to calls to support the boarding and inspection of suspect vessel, detention of suspects, towing of vessels, and transfer of contraband;
5. MI, respond to calls to support the boarding and inspection of suspect vessel, detention of suspects, towing of vessels, and transfer of migrants;
6. ATON & Waterways Management, carry appropriate equipment and respond to calls to verify the navigation aids on stations within the limits of the station crew's navigational capability, and to provide platform for mobile ATON teams to verify aid locations;
7. MEP, provide the first line of defense in the MEP program by being the first to respond to a reported incident and coordinating the subsequent actions. Conduct routine MEP patrols, towing oil containment booms, and transferring specialized personnel and equipment to the incident scene;

8. LMR by patrolling to determine impacts of marine traffic on the protected species, to prevent traffic in protected areas and critical habitats, and to inspect fishing vessels for compliance with federal laws; and
9. OLE by conducting patrols, monitoring illegal activity, coming alongside other vessels for boarding, and interdicting domestic or foreign vessels that may be engaged in illegal operations.

Generally, on a weekly basis, the SPC-HWX II crew would conduct SAR training including person-in-the-water (PIW) recovery and helicopter drills (Section 2.5). 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 a SPC-HWX II 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 SPC-HWX II.

Ports located along the SPC-HWX II transit route may be used for activities such as passenger/crew transfer and refueling or resupplying of the SPC-HWX II. Anchoring may occur in a port where docking a vessel of this size is not supported, but the vessel would typically tie up to another Coast Guard unit or at a commercial facility. Crews may train to anchor primarily for emergency drills and rarely, if ever, anchor for missions or during transit.

Table 2-3 provides a summary of the activities associated with the Proposed Action and the Coast Guard's missions. This table also classifies the missions and capabilities as primary, secondary, or collateral. Sections 2.3.1 to 2.3.6 provide further details on associated mission activities performed by the SPC-HWX II.

In 2023, 47 MLBs supported a total of 202 hours at Grays Harbor, 689 hours at Cape Disappointment, 212 hours at Coos Bay, and 248 hours at Yaquina Bay Stations with two vessels operating at each station. The percentage of hours devoted to specific missions for the 2023 Calendar year (CY 2023) is presented in Table 2-4. It is assumed that both the SPC-HWX II and 47 MLBs would continue with a similar percentage (combined) of resource hours once the SPC-HWX II are operational.

Table 2-3. SPC-HWX II Capabilities Related to Coast Guard Roles and Missions

Capabilities / *Mission*	Monitor Coastal Activities	Monitor Inland/Port Activities	Monitor Navigation Aids & Hazards	Maintain Station	Search Surface	Detect Surface Vessels	Electronically Identify Surface Contacts	Intercept Surface TOI (Inland and Coastal)	Intercept Surface TOI (Offshore)	Position Unit	Transport Equipment	Transport Boarding Team	Transport Personnel	Tow a Vessel	Rescue Persons in Distress	Operate in Dangerous of Hazardous Environ.	Damage Control	Navigate	Establish Voice Communication	Track Vessels	Share Information	Monitor Communications
Search and Rescue				P	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P
Marine Safety		S			P	P	P			S	S	S	S			S	S	S	S	S	S	S
Ports, Waterways and Coastal Security	S	S		S		S	S	S		S	S	S	S			S	S	S	S	S	S	S
Drug Interdiction	S	S		S	S	S	S	S		S	S	S	S	S		S	S	S	S	S	S	S
Migrant Interdiction	S	S		S	S	S	S	S		S	S	S	S	S		S	S	S	S	S	S	S
Aids to Navigation & Waterways Management			C	C						C	C						C	C	C		C	
Marine Environ. Protection	S	S		S	S	S	S	S		S	S	S	S				S	S	S	S	S	S
Living Marine Resources	S	S		S	S	S	S	S		S	S	S	S	S			S	S	S	S	S	S
Other Law Enforcement	C	C		C	C	C	C	C		C	C	C	C	C			C	C	C	C	C	C

P = Primary missions/Capabilities; S = Secondary missions/Capabilities; C = Collateral missions/Capabilities
Any activities related to an emergency response are not considered a part of the Proposed Action; The SPC-HWX II would not support the following Coast Guard missions: Defense Readiness and Ice Operations or Capabilities such as Monitoring Offshore Activities.

Table 2-4. 47 MLBs' Average Resource Hours from 2019 to 2023 Per Vessel

Resource	CG STA Grays Harbor	CG STA Cape disappointment	CG STA Yaquina Bay	CG STA Coos Bay
Search and Rescue	69.6	111.9	62.8	61.8
Marine Safety	53.7	128.3	93.3	88.9
Aids to Navigation	0.1	0.7	0.5	0.4
Living Marine Resources	5.7	8.8	5.9	15.8
Ports, Waterways, Coastal Security	10.4	29.2	0.0	0.7
Other Law Enforcement	0.2	3.94	0.0	0.0
Support	157.3	313.7	207.2	256.9

Source: 47 MLB Resource Hours for CY19-23 for Coast Guard Stations Grays Harbor, Cape disappointment, Coos Bay and Yaquina Bay' document received 03/13/2024

2.3.1 Search and Rescue (SAR)

The primary missions for the SPC-HWX II are SAR missions in the coastal and offshore area of the proposed action area. 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. Time for supporting the SAR mission is dependent on the distance the emergency is from the SPC-HWX II, but based on the SPC-HWX II Station, a response could range from two to 48 hours. SAR takes precedence over all other missions except national defense and homeland security operations; actual SAR missions are considered emergencies, which are not part of the Proposed Action. However, crews must be trained for such a response, and SAR training is considered part of the Proposed Action Section 2.5.1). Coast Guard training sorties would last approximately four hours.

The SAR mission involves numerous means of rendering aid to distressed persons and vessels on (and under) the High Seas and the waters over which the United States has jurisdiction. Typical missions would require the SPC-HWX II to get underway rapidly in response to a distress call, transit at the highest possible safe speed to a search area, conduct a search, and perform a rescue mission. SAR cases could occur offshore and in the coastal zone, including breaking bars. Actions associated with a SAR response include, but are not limited to, the following: retrieving people (able-bodied, unconscious, or deceased) or material from the water, another vessel, or a structure; transferring personnel and equipment to another vessel; towing a disabled vessel; or assisting or coordinating the rescue using other Coast Guard assets. In addition, the SPC-HWX II may be required to provide medical assistance to rescued persons; transport survivors or casualties; or transfer persons to another vessel, helicopter, or shore facility. Coast Guard conducts "on the job" training, which could include any of the above-described scenarios, for example, PIW recovery training under heavy weather conditions.

2.3.2 Law Enforcement

SPC-HWX II 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. All SPC-HWX II vessels, regardless of their assigned

Station, could participate in law enforcement activities. The following elements fall under the SPC-HWX II missions, and the specific missions are in parentheses:

- Project an enforcement presence throughout the U.S. Exclusive Economic Zone (EEZ) (LMR, MI, DI);
- Prevent over-fishing, reduce mortality of protected species, and protect marine habitats by enforcing domestic and foreign fishing laws and regulations (LMR, OLE);
- Enforce the Marine Mammal Protection Act (MMPA) and ESA (LMR);
- Patrol offshore 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);
- 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).

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 or in rivers within the proposed action area. Fishery boardings typically take about an hour. OLE activities, such as DI or MI missions, would occur anywhere in the proposed action area. Although not a primary resource for DI or MI missions, the SPC-HWX II on rare occasions would conduct routine patrols, towing, and vessel boardings. 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.

Boat crews would have some LMR training specific to their area of responsibility. These trainings include species awareness, identification, and reporting requirements. The SPC-HWX II could conduct LMR missions, including fisheries patrol, on rivers and offshore. For all missions in support of law enforcement activities, vessel speeds would vary, but speeds would typically range between 5 and 20 knots (6 and 23 mph).

2.3.3 Ports, Waterways, and Coastal Security (PWCS)

The PWCS mission primarily involves maintaining the safety and security of ports and high value assets through the prevention of accidental damage to vessels and port facilities and preventing the intentional destruction, loss, or damage to port assets. The SPC-HWX II would conduct routine patrols, secure ports, provide escort, enforce security zones, conduct boardings, monitor illegal activity, detain suspects, and interdict potentially hostile vessels. SPC-HWX II could enforce security zones as a stationary asset or by patrolling along the lines of the zone with support from other Coast Guard assets like the 29 ft (9 m) Response Boat Small (RB-S II).

Similar to the SPC-HWX, SPC-HWX II PWCS patrols would typically range between two to ten hours with vessel speeds between 5 and 20 knots (6 and 23 mph). While the following could vary from mission to mission, based on the SPC-HWX historical activities, the SPC-HWX II may spend 50 percent of the time travelling at five knots (6 mph), 40 percent of the time traveling at 10 to 15 knots (12 to 17 mph), and when necessary traveling at 20 knots (23 mph) but resuming cruising speeds (16 knots [18.4 mph]) when maximum speed is no longer necessary. During all missions, navigation systems (Section 2.2.1.1) would be used for any vessel underway. The SPC-HWX II unit at Station Cape Disappointment would also conduct vessel escorts and security zones on the Columbia River occasionally as far as Portland, Oregon.

2.3.4 Marine Environmental Protection (MEP)

In case of an emergency, the SPC-HWX II could be used to provide the first to response to a reported incident and coordinate the subsequent actions. The SPC-HWX II would conduct routine patrols, tow oil containment booms, and transfer specialized personnel and equipment to the incident scene. In addition, the SPC-HWX II could be the on-scene command vessel coordinating the actions of others or be required to enforce safety zones around an environmental incident.

2.3.5 Marine Safety

The SPC-HWX II would conduct Marine Safety missions in their area of responsibility. A typical task includes patrolling to monitor boating safety and conducting boardings to inspect vessels for compliance with federal laws and regulations. Depending on the distance from the location of the SPC-HWX II, a marine safety patrol mission could last approximately two to 48 hours. While vessel speeds would vary from mission to mission, they could reach up to 20 knots (23 mph); the SPC-HWX II would typically patrol at cruising speeds of 16 knots (18.4 mph) or less, depending on the situation.

2.3.6 Aids to Navigation (ATON) & Waterways Management

The SPC-HWX II would verify that aids are on station and would transfer ATON crews so they could conduct repairs and maintenance under the Coast Guard's Nationwide ATON Program.

2.4 Vessel Operations

2.4.1 Functionality and Maneuverability Testing

Functionality and maneuverability testing for an SPC-HWX II would be similar to the testing conducted for the SPC-HWX and would occur after scheduled maintenance periods. This testing would likely occur within close proximity to the SPC-HWX II homeport (Table 2-1).

The propulsion system for SPC-HWX II would not be finalized until after contract award. Preliminary propulsion system requirements include that the engines meet current U.S. Environmental Protection Agency (EPA) "Tier" requirements applicable to their horsepower (hp); however, the specific design of the engine is unknown. The Coast Guard would coordinate with the EPA, if necessary, on tiering requirements. SPC-HWX II would have no national security exemption as a substitute for compliance with the requirements of 40 CFR §§ 1042.

2.4.2 Escorting and Towing Other Vessels

The SPC-HWX II would be required to provide escorts at varied speeds, depending on mission requirements. For example, in order to effectively escort large military vessels, the SPC-HWX II may need to operate at higher transit speeds (20 knots [23 mph]). However, if the SPC-HWX II is required to escort a fishing vessel that has been found with illegal catch on board or for safety violations, the SPC-HWX II would escort the vessel at low transit speeds (5 knots [6 mph]) to the nearest port.

All SPC-HWX IIs would be capable of towing vessels in a variety of sizes, including larger fishing vessels. The SPC-HWX II towing another vessel would not occur frequently and is not a primary mission requirement. While towing, the SPC-HWX II would operate at a speed of approximately 5 knots (6 mph).

2.5 Training

SPC-HWX II crew would conduct drills and exercises to simulate different scenarios (e.g., fire suppression [seawater is used for training], refueling at sea, vessel maneuverability in a variety of conditions, etc.).

2.5.1 Search and Rescue (SAR) Training

SAR training is considered a part of the Proposed Action. Trainings would be conducted to simulate a variety of SAR responses and could include, but are not limited to, the following: drills on deck, towing, maneuvering the SPC-HWX II in surf or heavy weather conditions, and PIW recovery. Vessel speeds during SAR training would vary, but they would not exceed 20 knots (23 mph). SAR training on each SPC-HWX II would occur weekly, but timing would be dependent on weather and other factors. The SPC-HWX II would also train with the 47 MLB about 20 times per year.

2.5.2 SPC-HWX II Training with Helicopters

Some SPC-HWX II missions require more support from aircraft than others. The Coast Guard would likely use MH-60[5] and MH-65 helicopters as support assets during SAR, Law Enforcement, and Marine Safety operations. While helicopter operations are not considered a part of the Proposed Action, they typically involve hovering above the vessel deck, lowering a rescue swimmer to the water or the vessel, hoisting a rescue basket or stokes litter from the water or the vessel, and retrieving a PIW. SPC-HWX II would train with Coast Guard MH-60 and MH-65 helicopters to practice personnel and equipment hoisting.

Approximately 10 to 15 of the annual training drills would involve a helicopter. Although aircraft operations would not be a primary functional capability directly associated with the SPC-HWX II, helicopters dispatched from an air station could support a SPC-HWX II during a SAR mission. Pilots would have received all associated training in SAR at their home-base/air station prior to arrival for training drills with the SPC-HWX II, and prior helicopter training is not considered a part of the Proposed Action. For more information on the type of helicopter training that would support the SPC-HWX II, see Section 2.3. Helicopter training events with the SPC-HWX II from start to finish would last approximately four hours, but helicopters would likely not be on scene for the entire four-hour period.

2.5.3 Gunnery Training

Live fire gunnery training with the M240 (Section 2.2.1) is expected to occur once per year per vessel lasting approximately eight hours each. These training events only occur in ranges authorized by the Coast Guard (e.g., 10 miles [mi; 16 km] offshore) and, when possible, would occur in established U.S. Department of the Navy (Navy) ranges (e.g., the Navy's Northwest Training Range), particularly when live ammunition is used. Within the established Navy ranges, the Coast Guard would follow the Navy's gunnery training protocols. For Sector Columbia River, ranges would be at least 10 mi (16 km) offshore, or the unit would use a range that is established by the Navy. The Coast Guard would follow gunnery training protocols set forth in the Boat Crew Qualification Handbook, Volume 7, Higher Level Boat Operation (BQH 16115.7) and the Maritime Security and Response Operations (MSRO) Manual, COMDTINST 16600.6 (series). During gunnery training, inert small caliber (0.762 caliber [7.62 mm in diameter and 51 mm in length]) gun rounds are fired at floating targets. Units typically use foam buoys as targets. These buoys are placed for the training event and retrieved at the end of the event.

2.6 Alternatives Carried Forward for Analysis

As required by NEPA, the Coast Guard evaluated alternatives to the SPC-HWX II acquisition program to determine whether an alternative would be environmentally preferable and/or technically economically

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[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.

feasible to the Proposed Action while still meeting the program's objectives. The Coast Guard evaluated the No Action Alternative and two action alternatives, including the Preferred Alternative, with respect to replacing the SPC-HWX. Each alternative is evaluated in Chapter 3. The Coast Guard evaluated each alternative using a specific set of criteria. The evaluation criteria included a determination of whether the alternative:

- Meets the objectives of the Proposed Action,
- Is technically and economically feasible and practical, and
- Offers a significant environmental advantage over the Proposed Action.

2.6.1 Alternative 1: Preferred Alternative

The Preferred Alternative would include the acquisition of up to six SPC-HWX II, with four vessels operational and two in Maintenance Relief Hull status. The SPC-HWX II would support the Coast Guard's mission requirements in the PNW. It is anticipated that the vessels would be stationed in Grays Harbor (Washington), Cape Disappointment (Washington), Yaquina Bay (Oregon), and Coos Bay (Oregon), and the Maintenance Relief Hulls would be placed in storage in Port Astoria (Oregon).

Once the Coast Guard takes possession from the shipbuilder of each SPC-HWX II, the ship would be made "Ready for Operations." Because the completion date for all SPC-HWX IIs is not expected until all six vessels are "Ready for Operations,"[6] the Coast Guard anticipates that supplemental NEPA documentation may be prepared. New information would be tiered to this EA/OEA and may include, but is not limited to, changes to any applicable laws and directives or to a species listing status. Additionally, more detailed NEPA analyses could be required as more information becomes available regarding SPC-HWX II homeporting and maintenance.

2.6.2 Alternative 2: Reduced Acquisition

Under Alternative 2, Reduced Acquisition, the Coast Guard would replace the capabilities of the SPC-HWX on a one-for-one basis. A challenge with this approach is that fewer vessels could increase the reliance on those vessels, which would require different maintenance schedules (with no Maintenance Relief Hulls to cover missions during maintenance) and a larger parts inventory, thereby increasing overall maintenance costs. The Coast Guard could use whatever replacement hulls could be obtained; however, there are no existing vessels available that substantially meet the Operation Requirement Document. The life cycle training and logistical costs of maintaining several unique hulls would exceed the corresponding costs of maintaining SPC-HWX II that would be built specifically to conduct missions in the PNW.

2.6.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. No SPC-HWX II would be acquired, and the 47 MLBs would continue to support Coast Guard missions in the PNW. The No Action Alternative would not meet the Coast Guard's statutory mission requirements by providing surf and

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[6] Completed construction of one new SPC-HWX II is scheduled annually until all six have been constructed. Full operational capability would be achieved when all planned SPC-HWX IIs are operational, having undergone approximately one year of assessments to become "Ready for Operations." Coast Guard SPC-HWX II operations and training (Section 2.3) would occur after delivery of each SPC-HWX II from the shipbuilder to the Coast Guard. For example, if the first planned SPC-HWX II delivery to the Coast Guard is expected in 2026, it would be operational in 2027. Following the same example and a planned annual construction schedule, then the last SPC-HWX II would be expected to be delivered in 2032 and Ready for Operations after assessments are completed.

heavy weather response capability or the capability for longer range SAR in extreme weather conditions that exceed the capabilities of the 47 MLB. As such, the No Action Alternative does not meet the purpose and need of the Proposed Action; however, as required by NEPA, the No Action Alternative is carried forward for analysis in this EA/OEA to provide a baseline for measuring environmental consequences of the Preferred Alternative.

2.6.4 Alternatives Considered but Eliminated from Analysis

In developing the Proposed Action and Alternatives, the Coast Guard assessed the viability of utilizing existing assets. However, this alternative does not exist. In 2021, the SPC-HWX fleet was removed from service and put in storage status due to an inability to provide repair and logistical support. Under this Alternative, the Coast Guard would be responsible for missions in D13 while 47 MLB assets, with limited capabilities, are available for use; when these are retired, the Coast Guard would be unable to complete these missions. Non-materiel solution approaches have been identified, but these do not resolve the heavy weather offshore response mission performance gaps identified in the Shore Based Surface Response (SBSR) Capability Analysis Report. This alternative does not meet the purpose and need of this project because the Coast Guard is mandated to carry out missions in D13 in order to ensure continued safe navigation of these areas. Market research indicates both foreign and domestically built vessels are in operation that may be modified to meet the Coast Guard's needs. However, the only viable materiel solution to replace the SPC-HWX capabilities is acquiring vessels that can operate in surf, heavy weather, and hazardous bar crossing conditions that can support all the mission tasks and subtasks.

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. All potentially relevant environmental resource areas were initially considered for analysis in this EA/OEA. In compliance with NEPA, CEQ, E.O. 12114, 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.

This chapter identifies stressors associated with the Proposed Action and analyzes potential impacts to physical resources, biological resources, 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. Although critical habitat is designated within the proposed action area for several ESA-listed species (Figure E-1[coastal] and Figure E-2[Columbia River]), no essential features present in the proposed action area would be affected by the Proposed Action for all designated critical habitat. Therefore, critical habitat will not be analyzed further in this chapter, but additional information can be found in Appendix E. The Coast Guard has consulted with the USFWS and NMFS regarding compliance with the ESA. On December 4, 2024, the USFWS Oregon Office sent a letter concurring with the Coast Guard that the Proposed Action may affect, but is not likely to adversely affect, ESA-listed species under their jurisdiction. The Coast Guard is actively pursuing informal consultation with the NMFS; however, a letter of concurrence has not yet been received. The Coast Guard is committed to working with NMFS to minimize impacts as required under Section 7 of the ESA to avoid jeopardy of species and adverse modification or destruction of critical habitat.

Each SPC-HWX II would not be expected to impact or harm the physical, biological, or socioeconomic environment until it is operational. The Coast Guard acknowledges that new information about the existing environment may become available before the first SPC-HWX II is operational, but after the publication of this EA/OEA. Therefore, the Coast Guard presents the best available information on the existing environment and potential consequences herein but anticipates that, as new information is obtained, particularly before the last SPC-HWX II becomes operational, there may be supplemental environmental assessments prepared in support of individual proposed actions and tiered to this EA/OEA. 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 they were eliminated from further consideration in this EA/OEA.

Table 3-1. Resources Eliminated from Analysis

Resource	Justification for Removal from Further Consideration
Physical Environment	
Airspace	The majority of aircraft use associated with the Proposed Action would occur over the water in offshore locations. Low flying aircraft may be used during helicopter training, but helicopters would not interfere with regular public airspace usage given that the offshore locations are not in frequently used flight corridors. 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 Proposed Action would not involve any construction or other activities that may affect terrestrial sediments. 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 primarily occur on or in oceanic waters. An SPC-HWX II may occasionally escort another vessel along the lower Columbia River, but this portion of the river is heavily trafficked. 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. 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 area would be shipwrecks. SPC-HWX II training and operations would be conducted at and above the water's surface, so it would not disturb shipwrecks. Gunnery training, the only portion of the Proposed Action that may result in Military Expended Materials (MEM), would be limited to established ranges, so MEM would not disturb submerged resources. Therefore, the Proposed Action would not impact or harm archaeological and historical resources.
Cultural resources	Coast Guard would avoid cultural resources in the proposed action area. The physical stressors associated with the Proposed Action would not be expected to affect cultural recourses. Anchoring, excluding an emergency, would only occur in designated

Resource	Justification for Removal from Further Consideration
	anchorages. Designated anchorages would not be expected to contain any cultural resources. The only potential impact or harm to cultural resources would be from vessel movement in very shallow water, which is extremely unlikely. Therefore, the Proposed Action would not impact or harm cultural resources. Any resources related to subsistence use are discussed in Section 3.5.
Estuarine economic resources	Although coastal estuaries are part of the proposed action area, the SPC-HWX II would rarely enter estuaries other than the lower Columbia River or the estuaries where vessel homeports can be found. Any entry into other estuaries would be limited to occasional transit for relevant Coast Guard missions, such as PWCS, and the vessel would only transit within navigational channels. No training would occur within these estuaries. Due to the limited presence in these estuaries and that the vessel would only transit within navigation channels, the Proposed Action would not impact or harm economic resources within the estuaries.
Waterfront 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 (i.e., fathometer noise, vessel noise, helicopter noise, gunnery noise) and physical stressors (i.e., vessel movement, helicopter movement, and military expended material [MEM]). Proposed Action activities and associated stressors are detailed in Table 3-2. Stressors that were evaluated, but not analyzed further in this EA/OEA are listed in Table 3-3. Stressors that were analyzed in this EA/OEA are listed in Table 3-4.

Table 3-2. Summary of Stressor by Activity

Activity	Includes	Frequency	Estimated Hours per Activity	Source(s) of Acoustic Stressors	Source(s) of Physical Stressors
Mission Support					
Marine Safety[1]	Routine patrols to monitor boating safety and conduct boardings to inspect vessels for compliance with federal laws and regulations.	24 sorties per year	2–10 hours per sortie	Fathometer noise; Vessel noise	Vessel movement
Law Enforcement[1]	A broad range of activities aimed at enforcing U.S. law on offshore, inshore, and coastal waters of the PNW, up to 150 nm, including fisheries enforcement, drug interdiction, migrant interdiction, and protection of LMR.	20–30 sorties per year	2– 10 hours per sortie	Fathometer noise; Vessel noise; Gunnery noise[3]	Vessel movement; MEM
Ports, Waterways, and Coastal Security[1]	Routine patrols, escorts, boardings, and other security measures to maintain the safety and security of ports and high value assets through prevention of accidental and intentional damage to vessels and ports.	5–10 sorties per year	2– 10 hours per sortie	Fathometer noise; Vessel noise; Gunnery noise[3]	Vessel movement; MEM
ATON and Waterways Management	Verification that aids are on station and provision of transfer for ATON crews to conduct repairs and maintenance under the Coast Guard's Nationwide ATON Program.	1 sortie per year[4]	2– 10 hours per sortie	Fathometer noise; Vessel noise	Vessel movement
Vessel Operations					
Functionality and Maneuverability Testing	Ensuring properly working systems after vessel maintenance	Once per year	2–6 hours, depending on activity and may occur on two consecutive days	Vessel noise	Vessel movement
Escorting and Towing Other Vessels	Escort of large military vessels, fishing vessels, or commercial ships. Occasional towing of vessels, such as fishing vessels, although towing is not a primary mission requirement.	1–2 sorties per year	2– 10 hours per sortie	Fathometer noise; Vessel noise	Vessel movement

Activity	Includes	Frequency	Estimated Hours per Activity	Source(s) of Acoustic Stressors	Source(s) of Physical Stressors
Training					
SAR Training[1,2]	The simulation of numerous means of rendering aid to distressed persons or vessels. Trainings with 47 MLB approximately 20 times per year. Helicopters would participate in approximately 10 to 15 SAR trainings per year.	90 sorties per year	2–5 hours per sortie	Fathometer noise; Vessel noise; Helicopter noise	Vessel movement; Helicopter movement
Reconnaissance by Helicopter[2]	Support SAR (see above), Law Enforcement, or Marine Safety missions; may include observations of targets of interest from the air.[1] SPC-HWX II would conduct trainings with helicopters periodically to prepare for missions.	10–15 sorties per year (excludes SAR training)	4 hours per sortie	Helicopter noise	Helicopter movement
Gunnery Training	Firing of the M240 light machine gun (or equivalent), typically at targets offshore, to complete required proficiency drills.	Once per year per vessel	8 hours per sortie	Vessel noise; Gunnery noise	Vessel movement; MEM

[1] The Proposed Action excludes the emergency response associated with these activities. SAR and Marine Environmental Protection are considered emergency responses and are not included in this table.
[2] Helicopters may support these missions, but their use would be sporadic and unanticipated when the conditions of a specific need require air support. Accordingly, helicopter support for missions is not considered part of the Proposed Action. Training with helicopters is considered part of the Proposed Action and is analyzed in this document.
[3] Gunnery use during Law Enforcement and PWCS missions is generally not anticipated, and firing of live rounds during these missions would only occur in extreme situations. Therefore, gunnery noise and MEM would not be expected to occur but have been included here because they could be associated with these missions in rare instances.
[4] Use of SPC-HWX II for ATON and Waterways Management is not part of routine activities and is limited to as-needed bases, usually in response to major weather events. An average of one sortie per year per boat is anticipated based on historical need.

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	Air emissions	Vessel movement; helicopter movement	The Proposed Action would generate air emissions from vessels, and potentially from aircraft, but the action is not subject to the General Conformity Rule because all coastal counties of Washington and Oregon are in attainment of the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. Air emissions would be minimal and of short-duration and would not be expected to appreciably contribute to total air emissions within the proposed action area.
Ambient sound	n/a	Vessel movement; Helicopter movement; MEM	There would be no impacts to ambient sound from any physical stressors.
Bottom habitat and sediments	n/a	Fathometer noise; Vessel noise; Helicopter noise; Gunnery noise	There would be no impacts to bottom habitats and sediments from any acoustic stressors.
	n/a	Helicopter movement	Helicopters would only operate above the water's surface and would not impact bottom habitat or sediments.
	Bottom disturbance	Vessel movement	If an SPC-HWX II is required to anchor, excluding an emergency, it 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. Other than anchoring, vessel movement would have no impact on bottom habitat and sediments.
	Degradation of MEM[1]	MEM	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. Therefore, it is extremely unlikely that the degradation of MEM would impact or harm bottom habitat and sediments.
	n/a	Tow lines	There would be no impacts to bottom habitats and sediments from tow lines, which would only be used at the water's surface and would be retrieved (e.g., not left behind).
Water Quality	n/a	Fathometer noise, Vessel noise, Helicopter noise, Gunnery noise	There would be no impacts to water quality from any acoustic stressors.

Impacted Resources	Stressor(s)	Source(s) of Stressor	Rationale for Elimination from Analysis
	Discharge of ballast water	Vessel movement	Coast Guard vessels are mandated to comply with the Clean Water Act (CWA). Any discharges from vessels are conducted pursuant to the CWA as well as the Ocean Dumping Act. Therefore, the Proposed Action would not impact or harm water quality.
	Suspension of sediments	Vessel movement	SPC HWX II would temporarily transit through shallow water environments where disruption of sediments could occur. However, since the proposed draft of the vessel is 7 ft (2.1 m) and the vessel would not transverse areas with less than 7 ft (2.1 m) of water, any sediment disturbance would be minimal. Therefore, the Proposed Action 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. Therefore, it is extremely unlikely that MEM would impact or harm water quality.
Biological Resources			
Vegetation	n/a	Fathometer noise; Vessel noise, Helicopter noise; Gunnery noise	Sounds associated with SPC-HWX II operations would not impact the growth or distribution of vegetation.
	Disturbance	Helicopter movement	All helicopter movement would occur above the surface of the water. Helicopters would deploy from Coast Guard air stations and would be at altitude when transiting through the proposed action area. Any effects to floating vegetation from the rotor wash would be minimal and would not damage the vegetation. Therefore, it is extremely unlikely that helicopter movement would impact or harm floating vegetation. No effects would be expected to vegetation below the surface.
	Bottom disturbance	Vessel movement (anchoring); MEM	If an SPC-HWX II is required to anchor, excluding an emergency, it would anchor in designated anchorages. Other vessels would also routinely use these designated areas, and thus, minimal vegetation would be expected to occur due to regular bottom disturbance. Therefore, it is extremely unlikely that anchoring would impact or harm vegetation. MEM would be too small to damage or drag vegetation (at the surface or present in the water column) as it sinks through the water column. Benthic vegetation is not expected offshore where gunnery training would occur. Population-level impacts to vegetation as a result of MEM associated with the Proposed Action would not be expected. Therefore, it is extremely unlikely that MEM would impact or harm vegetation.

Impacted Resources	Stressor(s)	Source(s) of Stressor	Rationale for Elimination from Analysis
	Disturbance; entanglement	Tow lines	Disturbance because 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 vegetation at the surface and infrequent SPC-HWX II towing 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 in the water column. Therefore, it is extremely unlikely that tow lines would impact or harm vegetation.
Invertebrates	TTS or PTS[2]; masking; behavioral response	Fathometer noise	High-frequency noise is outside the range of best hearing of invertebrates; therefore, the likelihood of fathometer noise disrupting normal behavioral patterns of invertebrates is negligible. In addition, the *de minimis* characteristics (Section 3.2.1.1) indicate that fathometer noise would not impact invertebrates.
	TTS or PTS[2]; masking; behavioral response	Helicopter noise	Helicopters training with SPC-HWX II 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 helicopter noise disrupting normal behavioral patterns of 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 invertebrates. As these sounds are not intense or of long duration, it is unlikely helicopter noise would impact or harm invertebrates that may detect low frequency sounds.
	TTS or PTS[2]; masking; behavioral response	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. Due to the infrequency of gunnery training (once per year per vessel) and the low intensity of sound after passing the air-water interface, it is extremely unlikely that gunnery noise would impact or harm invertebrates.
	Behavioral response; strike	Helicopter movement	Helicopter movement would occur above the water's surface. Helicopters would deploy from Coast Guard air stations and would be at altitude when transiting through the proposed action area, minimizing potential for rotor wash at or below the surface. Therefore, no effects to any aquatic invertebrates would be expected. No impacts to any invertebrates on land are expected as there will be no overlap with helicopter training events.
	Bottom	Vessel movement	If an SPC-HWX II is required to anchor, excluding an emergency, it would anchor in

Impacted Resources	Stressor(s)	Source(s) of Stressor	Rationale for Elimination from Analysis
	disturbance	(anchoring); MEM	designated anchorages. Other vessels would also routinely use these designated areas, which are generally soft sediment areas. No invertebrates associated with hard bottoms would be expected to occur, and invertebrates associated with soft bottom would regularly be disturbed in designated anchorages. Therefore, it is extremely unlikely that anchoring associated with the Proposed Action would impact or harm invertebrates. 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. MEM would only be associated with gunnery training, which is limited to once per year per vessel. Therefore, it is extremely unlikely that gunnery noise would impact or harm invertebrates. Population-level impacts to invertebrates as a result of MEM associated with the Proposed Action would not be expected.
	Entanglement (tow lines)	Vessel movement	Potential for entanglement would be extremely low. Tow lines associated with the Proposed Action would not be expected to have any loops or slack, and the density of macro invertebrates that could overlap with the presence of the tow line would be low. Therefore, it is extremely unlikely that entanglement in tow lines would impact or harm invertebrates.
Birds	TTS or PTS[2]; masking; behavioral response	Fathometer 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 near an SPC-HWX II, impacts are considered negligible. Therefore, it is extremely unlikely that fathometer noise would impact or harm birds.

Impacted Resources	Stressor(s)	Source(s) of Stressor	Rationale for Elimination from Analysis
Fish	TTS or PTS[2]; masking; behavioral response	Helicopter noise, Helicopter movement	Helicopters in transit to training locations would fly at or above 2,000 ft (610 m) in environmentally sensitive areas and in other areas at altitudes not below 1,500 ft (457 m) (COMDTINST M3710.1 (series)), as long navigationally safe to do so. Helicopters would deploy from Coast Guard air stations and would be at altitude when transiting through the proposed action area. Helicopter noise would only be detected in a narrow cone directly beneath the helicopter as it moves throughout the proposed action area. The noise would only be detected by fish once it has travelled through the air-water interface. Given that fish would need to be traveling directly in the narrow cone beneath the helicopter to perceive the minimal noise that has passed through the air-water interface, the likelihood of helicopter noise or movement disrupting normal behavioral patterns of fish at or beneath the surface is negligible and would not impact or harm fish.
		Gunnery noise	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 not likely be detected by fish in their habitat unless they are near the source, and even if a fish is close enough to perceive the sound, the intensity would be greatly reduced by passing through the air-water interface. Due to the infrequency of gunnery training (once per year per vessel), the lower density of fish in offshore waters, and the minimal intensity of gunnery noise underwater, it is extremely unlikely that gunnery noise would impact or harm fish.
	Entanglement (tow lines)	Vessel movement	The risk of entanglement is considered negligible due to (1) implementation of Coast Guard Standard Operating Procedure (SOPs) (Appendix B); (2) the unlikely overlap between fish at the water's surface and the infrequent tows performed by an SPC-HWX II; and (3) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel. Therefore, it is extremely unlikely that entanglement in tow lines would impact or harm fish.
Essential fish habitat (EFH)	n/a	Helicopter noise; Gunnery noise; Helicopter movement	Sounds and movement associated with helicopter and gunnery training would occur above the water's surface. Helicopters would deploy from Coast Guard air stations and would be at altitude when transiting through the proposed action area. Any physical movements would have no impact on fish habitat. Noise associated with both trainings may enter the water, but the noise would be so attenuated after passing through the air-water interface, it is extremely unlikely that it would cause any impact or harm to EFH.

Impacted Resources	Stressor(s)	Source(s) of Stressor	Rationale for Elimination from Analysis
	Bottom disturbance	Vessel movement (anchoring)	If an SPC-HWX II is required to anchor, excluding an emergency, it would anchor in designated anchorages. Other vessels would also routinely use these designated areas, and thus, the benthic habitat within these designated anchorages would be regularly disturbed absent anchoring of the SPC-HWX II. Therefore, it is extremely unlikely that anchoring associated with the Proposed Action would impact or harm EFH.
Sea turtles	TTS or PTS[2]; masking; behavioral response	Fathometer noise	The frequency range of the fathometer (Section 3.2.1.1) is expected to range from 50 to 200 kHz, and the CPT-S (High Chirp) ranges from 170 to 230 kHz. The source level associated with the fathometer (205 decibels [dB]) is a maximum level that was taken directly next to the source. However, the Coast Guard would not operate the fathometer at the maximum level during the Proposed Action. The level of sound diminishes significantly outside of the downward-focused, narrow beam width of the sound directly below the vessel. Additionally, fathometer noise is transient due to vessel movement, and both vessels and sea turtles would be moving throughout the vast proposed action area. While the lower frequencies of fathometer noise may overlap with the higher frequencies of sea turtle hearing, sea turtle peak hearing is between 100 and 400 Hertz (Hz) (Appendix F), well below fathometer operating frequencies. Accordingly, any perception of fathometer noise by sea turtles is expected to be extremely minimal. Thus, fathometer noise is not expected to cause impact or harm to sea turtles.
		Helicopter noise; Helicopter movement	Helicopter training would only occur in offshore areas, where sea turtle densities are low. Helicopters associated with SPC-HWX II 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 1,500 ft (457 m) (COMDTINST M3710.1 (series)), unless in emergency situations (which are not part of the Proposed Action) or for navigational safety. Helicopters would deploy from Coast Guard air stations and would be at altitude when transiting through the proposed action area. Therefore, the likelihood of helicopter movement disrupting normal behavioral patterns of sea turtles at or beneath the surface is negligible. Helicopter noise would dissipate over the altitude distance; however, in the unlikely event that a sea turtle at the water's surface detects helicopter noise, any behavioral response to passing aircraft would be temporary and minimal and would not cause population-level effects. Accordingly, helicopter noise and movement is extremely unlikely to overlap with sea turtles and would not be expected to impact or harm sea turtles.
		Gunnery noise	Gunnery noise overlaps with the hearing range of sea turtles; however, sound generated by a muzzle blast is intense, but very brief and limited to the duration of

Impacted Resources	Stressor(s)	Source(s) of Stressor	Rationale for Elimination from Analysis
			gunnery training. Detection of gunnery noise would be limited at the surface (not underwater). Based on the infrequency of the training (once per year per vessel), the location of the training at established ranges in offshore waters, and Coast Guard SOPs (Appendix B) (e.g., lookouts), the potential impacts to sea turtles from gunnery training associated with the Proposed Action would be extremely unlikely and would not be expected to impact or harm sea turtles. There would be no population-level impacts to sea turtles as a result of gunnery noise.
	Bottom disturbance	Vessel movement (anchoring)	If an SPC-HWX II is required to anchor, excluding an emergency, it would anchor in designated anchorages. Other vessels would also routinely use these designated areas. Sea turtles are most often present near the seafloor when foraging, but prey resources would be minimal within designated anchorages due to the routine disturbance by anchors. Sea turtles are unlikely to occur near the seafloor within designated anchorages both due to minimal foraging opportunity and the regular disturbance of anchors. Therefore, it is extremely unlikely that anchoring associated with the Proposed Action would impact or harm sea turtles.
	Entanglement (tow lines)	Vessel movement	The risk of entanglement is considered negligible due to (1) implementation of Coast Guard SOPs (Appendix B); (2) the unlikely overlap of sea turtles at the surface and SPC-HWX II towing operations; and (3) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel. In addition, there are no sea turtles expected in the Columbia River where towing of vessels would most likely occur. Accordingly, entanglement in tow lines is extremely unlikely to overlap with sea turtles and would not be expected to impact or harm sea turtles.
Marine mammals	Bottom disturbance	Vessel movement (anchoring)	If an SPC-HWX II is required to anchor, excluding an emergency, it would anchor in designated anchorages. Other vessels would also routinely use these designated areas. Marine mammals are not often present near the seafloor, and they would be particularly rare within designated anchorages due to the routine disturbance by anchors. Therefore, it is extremely unlikely that anchoring associated with the Proposed Action would impact or harm marine mammals.
	Entanglement (tow lines)	Vessel movement	The risk of entanglement is considered negligible due to (1) implementation of Coast Guard SOPs (Appendix B); (2) the unlikely overlap of marine mammals at the surface and SPC-HWX II towing operations; and (3) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel. In addition, there are no marine mammals expected in the Columbia River where towing of vessels would most likely occur. Accordingly, entanglement in tow lines is extremely unlikely to overlap with marine

Impacted Resources	Stressor(s)	Source(s) of Stressor	Rationale for Elimination from Analysis
			mammals and would not be expected to impact or harm marine mammals.
Socioeconomic and Cultural Resources			
Socioeconomic and cultural resources	n/a	Fathometer noise; Vessel noise; Helicopter noise; Gunnery noise	There would be no impacts to socioeconomic or cultural resources from any acoustic stressor associated with the Proposed Action.
	Bottom disturbance	Vessel movement (anchoring)	If an SPC-HWX II is required to anchor, excluding an emergency, it would anchor in designated anchorages. Other vessels would also routinely use these designated areas. Designated anchorages would not be expected to contain any cultural resources or socioeconomic uses of the seafloor other than for anchorage. Therefore, it is extremely unlikely that anchoring associated with the Proposed Action would impact or harm socioeconomic or cultural resources.
Public health and safety	Physical interactions	MEM	Gunnery training would occur in offshore ranges, making it extremely unlikely that the public would encounter MEM.
Accessibility to marine resources	Restrictions due to operations	Helicopter movement	Due to the limited helicopter training throughout a large, proposed action area, the public would not be restricted from use of marine resources because of helicopter movement.

[1] MEM include expended shells and targets that would not be recovered after gunnery training (Section 3.2.2.3).
[2] Temporary Threshold Shift (TTS) and Permanent Threshold Shift (PTS) are not anticipated from any of the acoustic stressors associated with the Proposed Action.

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

Impacted Resources	Stressor(s)	Source(s) of Stressor	Section
Physical Resources			
Ambient sound	In-air noise	Vessel noise; helicopter noise; gunnery noise	Section 3.3.1
	In-water noise	Fathometer noise; vessel noise; helicopter noise; gunnery noise	
Bottom habitat and sediments	Bottom disturbance	MEM	Section 3.3.2
Biological Resources			
Vegetation	Strike	Vessel movement	Section 3.4.1
	Bottom disturbance; anchoring	Vessel movement; MEM	
Invertebrates	Masking; behavioral response	Vessel noise	Section 3.4.2
	Strike; behavioral response	Vessel movement	
Birds	Masking; behavioral response	Vessel noise; helicopter noise; gunnery noise	Section 3.4.3
	Strike; behavioral response	Vessel movement; helicopter movement	
	Ingestion	MEM	
Fish	Masking; behavioral response	Fathometer noise; vessel noise	Section 3.4.4
	Strike; behavioral response	Vessel movement	
	Ingestion	MEM	
Essential fish habitat	Reduction of quality of acoustic habitat of water column	Fathometer noise; vessel noise	Section 3.4.5
	Reduction of water quality of water column	Vessel movement	
	Reduction of benthic habitat	MEM	
Sea turtles	Masking; behavioral response	Vessel noise	Section 3.4.6
	Strike; behavioral response	Vessel movement	
	Ingestion	MEM	
Marine mammals	Masking; behavioral response	Fathometer noise; vessel noise; helicopter noise; gunnery noise	Section 3.4.7

Impacted Resources	Stressor(s)	Source(s) of Stressor	Section
	Strike; behavioral response	Vessel movement; helicopter movement	
	Ingestion	MEM	
Socioeconomic and Cultural Resources			
Subsistence Hunting and Fishing	Vessel traffic; increased Coast Guard presence (e.g., coastal security, marine safety, SAR); behavioral response of biological resources (e.g., subsistence fishing catch)	Vessel movement	Section 3.5.1.1
Commercial Fishing and Aquaculture	Vessel traffic; increased Coast Guard presence (e.g., coastal security, marine safety, SAR); behavioral response of biological resources (e.g., commercial fishing catch)	Vessel movement	Section 3.5.1.2
Recreation and Tourism	Vessel traffic; increased Coast Guard presence (e.g., coastal security, marine safety, SAR); behavioral response of a biological resources (e.g., recreational fishing catch)	Vessel movement	Section 3.5.1.3
Transportation and Shipping, Mineral Extraction, Marine Construction, and Scientific Research	Vessel traffic; increased Coast Guard presence (e.g., coastal security, marine safety, SAR)	Vessel movement	Section 3.5.1.4

3.2.1 Acoustic Stressors

The Proposed Action would include the introduction of sound into the water and air. Sources of sound include the noise created by the SPC-HWX II navigation systems (fathometer), vessel noise (engine and other operational equipment noises made by the vessel), helicopter noise (both in-air and the air to water transfer), and gunnery noise. Table 3-5 provides the sound characteristics of the sources associated with the Proposed Action.

Table 3-5. Characteristics of Sound Sources Associated with the Proposed Action

Source Type	Frequency Range	Source Level (1 µPa= in-water 20 µPa= in-air)[1]	Associated Action
Large vessels (SPC-HWX II)	20–300 Hz	190[2] dB re 1 µPa at 1 m	All actions
Single-beam fathometer (i.e., fathometer)	3.5–1,000 kHz (50–200 kHz is the typical range for commercially available devices)	205[3] dB re 1 µPa at 1 m	Law enforcement, PWCS, marine safety, ATON and waterways management, escort and towing other vessels, SAR training, helicopter training
Helicopter (low flying; 100 ft above sea surface)	20 Hz–5 kHz	136 dB re 20 µPa 138 dB re 1 µPa	SAR training, helicopter training
Gunnery	Ranging from 150 Hz–2.5 kHz (peak from 900 Hz–1.5 kHz)	139–161 dB re 20 µPa at 50 ft (15 m)	Law enforcement, PWCS, gunnery training

[1] 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 dB 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] This source level is a conservative estimate that the Coast Guard has used as an estimated source level for large vessels. As the SPC HWX II would be a maximum of 64 ft (19.5 m), the source level would be expected to be lower. Kipple and Gabriele (2007) measured source levels of vessels ranging from 40 to 100 ft (12 to 30 m) to be between 160 and 182 dB re 1 µPa at 1 m for vessels traveling at 10 knots. Given the 16 knot cruising speed of the SPC HWX II, the Coast Guard used the more conservative 190 dB re 1 µPa at 1 m herein.
[3] 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; Kipple and Gabriele 2007; Luz 1983; National Marine Fisheries Service 2012; Richardson et al. 1995; U.S. Coast Guard 2013; Ylikoski et al. 1995)

Based on the Coast Guard's analysis of the Proposed Action, the acoustic stressors would not be expected to cause injury or a hearing threshold shift as none of the sound levels of acoustic stressors associated with the Proposed Action (fathometer noise, vessel noise, helicopter noise, or gunnery noise) should reach levels that would cause Permanent Threshold Shift (PTS) or Temporary Threshold Shift (TTS) in any marine species (Table 3-3).

3.2.1.1 Fathometer Noise

Each SPC-HWX II would employ a fathometer (i.e., echosounder) for its navigation system. A Global Position System would be used instead of the traditional doppler speed log, so fathometer noise would be the only noise associated with the navigation systems. Fathometer noise is typically highly directional to obtain specific navigational data. The specifications for this system are discussed in detail in Section 2.2.1 and summarized in Table 3-5. The fathometer frequencies can range from 50–200 kHz, and the CPT-S (High Chirp) ranges from 170–230 kHz, which is the assumed operating frequency for the Proposed Action. As described in Section 2.2.1, this analysis of the fathometer only evaluates effects from the echosounder's main lobe, since that would represent the highest energy output.

The Coast Guard proposed to adopt the U.S. Navy's definition of acoustic sources, defined as *de minimis* (U.S. Navy 2013), as any in-water active acoustic source with the following: narrow beam widths; downward directed transmissions; short pulse lengths; frequencies outside known hearing ranges (e.g., marine mammals); low source levels; or a combination of any of these factors. A *de minimis* acoustic source is not expected to result in take of protected species. These *de minimis* sources are qualitatively analyzed to determine the appropriate determinations under 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 area.
- Source levels of 160 decibels referenced at 1 micropascals (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 will attenuate to less than 140 dB within 10 m (33 ft) and less than 120 dB within 100 m (328 ft) of the source. Ranges would be even shorter for a source less than 160 dB re 1 µPa source level.

Based on the short pulse length, narrow beam width, downward-directed beam, manner of system operation, and the *de minimis* criteria, the navigation system (i.e., fathometer/single beam echosounder) could be considered *de minimis*. However, for some biological resources, the frequency range (50–200 kHz) does overlap with the hearing range of certain species, and the potential effect of that overlap with hearing is discussed in greater detail below.

In general, marine species are expected to exhibit no more than short-term and inconsequential responses to the fathometer noise given its characteristics (e.g., narrow, high-frequency, downward-directed beam focused directly beneath the vessel). Due to the minimal expected response, no quantitative modeling was conducted. A qualitative discussion is provided below focusing only on those species whose hearing range overlaps with the frequency range of these sources.

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 (Haxel et al. 2013). 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. For the purposes of this document, vessel noise excludes the noise produced by the fathometer, which is analyzed separately (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 (e.g., diesel engines), gears, and major auxiliaries (e.g., diesel generators) (Ross 1976). Commercial ships radiate noise underwater with peak spectral power at 20–200 hertz (Hz) (Ross 1976). 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).

Although the exact noise characteristics generated by the SPC-HWX II are unknown at this time, the design would be a maximum of 64 ft (19 m), classifying it as a large vessel. Descriptions of SPC-HWX II is provided in Section 2.2.1, and sound source characteristics (e.g., for a large vessel) are provided in Table 3-5. In general, large vessels, like the SPC-HWX II, would be expected to emit vessel noise with a frequency range of 20–300 Hz with a source level of no more than 190 dB re 1 µPa at 1 m. SPC-HWX II vessels may be in the proposed action area at any given time for any duration and could overlap spatially and temporally with other vessels within the proposed action area.

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 SPC-HWX II 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. Exposure to in-air vessel noise would be limited to a terrestrial resource or the brief periods when an aquatic resource has its head above the water's surface. Given that most SPC-HWX II operations happen away from land, there are no impacts expected to terrestrial resources from vessel noise and any co-occurrence of an aquatic animal above the surface and an SPC-HWX II is considered rare. Therefore, exposure to in-air vessel noise would be minimal. Vessel noise associated with the Proposed Action would not be expected to rise to a level sufficient to cause hearing threshold shifts in any species, nor is vessel noise sufficient to cause injury. The potential effects of vessel noise to animals would be limited to masking or behavioral or physiological responses, and there would be potential for disturbance of socioeconomic resources. Each of these potential impacts are analyzed below.

3.2.1.3 Helicopter Noise

While helicopters would support Coast Guard missions (e.g., SAR, Law Enforcement, Marine Safety), these missions are considered to be emergencies and are not part of the Proposed Action. However, the Proposed Action would include the introduction of in-air and in-water sound from helicopters participating in SPC-HWX II trainings. The primary helicopter expected to be used during the Proposed Action would be the MH-60 Jayhawk. Helicopter training would typically involve hovering above the vessel deck or water's surface, lowering a rescue swimmer to the water or to the vessel, hoisting a rescue basket or stokes litter from the water or the vessel, and retrieving a person in water or other person in distress. Training events with helicopters would last approximately 4 hours (from start to finish), and helicopters are not expected to be on scene the entire time (Table 3-2).

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 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 helicopter, the less sound reaches the sea surface (Eller and Cavanagh 2000; Richardson et al. 1995). Given in-air transmission loss with distance, a 136 dB re 20 µPa helicopter source level at 100 ft (31 m) would measure a sound pressure level (SPL) of approximately 106 dB re 20 µPa at the air-water interface (i.e., sea surface). Thus, the noise level at the water's surface would be significantly less than 106 dB re 20 µPa measured for a helicopter at an altitude of 100 ft (31 m). Helicopters in flight to training locations would fly at or above 2,000 ft (610 m) in environmentally sensitive areas and in other areas at altitudes not below 1,500 ft (457 m) (COMDTINST M3710.1 (series)), as long as navigationally safe to do so. For the purpose of this analysis, 106 dB re 20 µPa measured for a helicopter at an altitude of 100 ft (31 m) will be utilized to analyze noise associated with helicopters actively training with the SPC-HWX II.

Helicopters generate noise in flight, which propagates through the air and may be detected by species above water (e.g., birds or marine mammals with their heads above water) or by species that dive or forage below the water's surface (e.g., marine mammals). Given the minimal hours used for helicopter training over the large, proposed action area, the amount of time spent exposed to helicopter noise for any individual, either in air or under the water, would be extremely limited, which decreases the potential for effects to these species. Additionally, due to the impedance of helicopter noise across the air-water interface, only low flying helicopter could cause species underwater and directly beneath the helicopter to be temporarily (while the helicopter is present above the animal) exposed to helicopter noise. The limited helicopter noise associated with the Proposed Action would be so minor that it is not expected to cause injury or hearing threshold shift (Appendix C) to any exposed resource (Table 3-3). Thus, potential effects of helicopter noise to birds or marine mammals include masking or behavioral or physiological reactions (see Table 3-3 for all other resources).

3.2.1.4 Gunnery Noise

Each SPC-HWX II would have a forward mount for an automatic weapon (7.76 millimeters (mm) M240 or equivalent). Although internal lockable storage racks would be provided for an automatic weapon, a service rifle, a service shotgun, and a canister of ammunition for each weapon, the weapons would only be on board when the crew is on board.

Gunnery training aboard the SPC-HWX II would include the firing of inert (i.e., non-explosive) gun rounds. Noise associated with weapons firing and impact of non-explosive munitions are described in Table 3-5, and noise would be localized to the training area. Per Coast Guard policy, gunnery training is required once a year per boat and typically lasts approximately eight hours per event. These training events only occur in ranges authorized by the Coast Guard. For Coast Guard Sector Columbia River (which includes all four stations in the Proposed Action), ranges would be at least 10 mi (16 km) offshore, or the unit would use the offshore Navy's training range. The Coast Guard would follow gunnery training protocols set forth in the Boat Crew Qualification Handbook, Volume 7, Higher Level Boat Operation (BQH 16115.7) and the MSRO Manual, COMDTINST 16600.6 (series).

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 to 1.5 kHz) and a source level of 139 to 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.

Gunnery training would occur sufficiently far from the water's surface that it would not be expected to cause physical injury from acoustic sources to any species. Appendix C provides a general description of temporary and permanent hearing threshold shifts and an evaluation of hearing thresholds for biological resources in the proposed action area. The mitigation zone established as part of the Coast Guard Standard Operating Procedures (SOPs; Appendix B) would extend beyond the distance to which species would likely experience PTS or TTS from weapons firing; therefore, mitigation would help reduce or avoid the potential for exposure to these impacts. Acoustic impacts from weapons firing would be concentrated in space and duration. Between the establishment of a mitigation zone during gunnery training, the limited amount of training that would occur in the large proposed action area, and the fact that most animals would primarily have their heads below the water's surface and would only be exposed to dampened sound after it crosses the air-water interface, neither PTS nor TTS would be expected to occur. Thus, potential effects of gunnery noise to birds or marine mammals include masking or behavioral or physiological reactions (see Table 3-3 for all other resources).

3.2.2 Physical Stressors

The Proposed Action would include the use of vessels and helicopters that could impact the physical environment. In addition, gunnery training would produce MEM that would be introduced into the physical environment (i.e., inert bullets, target fragments).

3.2.2.1 Vessel Movement

The Proposed Action would involve a maximum of four SPC-HWX IIs operational at any given time, which are detailed in Sections 2.1 through 2.5. SPC-HWX IIs would generally operate at speeds between 5 and 16 knots, depending on the activity. The cruising speed for the vessels is 16 knots. The maximum speed of the SPC-HWX IIs would be 20 knots, but speeds above 16 knots would be limited to when operationally necessary. When conducting operations requiring enhanced safety, such as towing, the SPC-HWX II would operate at a speed of approximately 5 knots. Depending on a variety of factors, escort speeds could range from 5–20 knots. Support for ATON would be variable. Slower speeds would be expected when verifying if aids are on station, and cruising speeds would be expected for provision of transfer for ATON crews.

The potential effects 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 affect animals by altering their behavior patterns or causing injury or death from vessel collisions. An individual's 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 also may 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).

3.2.2.2 Helicopter Movement

While helicopters would support Coast Guard missions (e.g., SAR, Law Enforcement, Marine Safety), these are emergencies and are not part of the Proposed Action. However, helicopters are expected to participate in SPC-HWX II trainings. The primary helicopter expected to be used during the Proposed Action would be the MH-60 Jayhawk. The use of helicopters as part of the Proposed Action is discussed in Section 2.3. Helicopters in flight to training locations would fly at or above 2,000 ft (610 m) in environmentally sensitive areas and in other areas at altitudes not below 1,500 ft (457 m) (COMDTINST M3710.1 (series)), as long navigationally safe to do so. Helicopter training would typically involve hovering above the vessel deck or water's surface, lowering a rescue swimmer to the water or to the vessel, hoisting a rescue basket or stokes litter from the water or the vessel, and retrieving a person in water or other person in distress and would not be planned in environmentally sensitive areas, including above designated critical habitat. During training, helicopters would operate at displacement speeds relative to the movement of the SPC-HWX II (typically maximum speeds of six knots).

The potential impacts from helicopter movement include disturbance, collision, injury, or death. The only resources that would be at risk for physical contact would be birds as no other resource would occur sufficiently above the water's surface to have a physical encounter. Given that helicopters would hover above the water's surface with minimal impacts below the surface, helicopter movement would not be expected to affect any resource that is fully below the surface (e.g., invertebrates, fish). In the extremely unlikely event that a marine mammal were to have its head at the water's surface when the helicopter is present during a training event, that individual may exhibit a behavioral or physiological response to the presence of the helicopter (Appendix C); however it is often difficult to differentiate between a response from helicopter noise and helicopter movement.

3.2.2.3 Military Expended Material

Potential MEM associated with gunnery training is detailed in Section 2.5.3. Gunnery training would occur only in ranges authorized by the Coast Guard. For Sector Columbia River (which includes all four stations in the Proposed Action), ranges would be at least 10 mi (16 km) offshore, or the unit would use the offshore Navy's training range. As only designated ranges are used for gunnery training, areas with sensitive marine resources (e.g., federally-designated critical habitat) are not used for gunnery training.

The Coast Guard would follow gunnery training protocols set forth in the Boat Crew Qualification Handbook, Volume 7, Higher Level Boat Operation (BQH 16115.7) and the MSRO Manual, COMDTINST 16600.6 (series). Per Coast Guard policy, gunnery training is required once a year per boat and typically lasts approximately eight hours per event.

During gunnery training, inert small caliber (0.762 caliber [7.62 mm diameter, 51 mm length]) gun rounds are fired at floating targets (typically foam buoys). MEM associated with gunnery training would include these inert small caliber projectiles and any pieces of the foam buoys or other targets that cannot be recovered. As gunnery training would occur at least 10 mi (16 km) from shore and most MEM would be expected to sink quickly, MEM would only be expected to occur in offshore waters of the proposed action area, not in coastal waters or the waters of the Columbia River.

The potential impacts from MEM include disturbing an animal as an object descends to the seafloor and ingestion, which could lead to injury or death. Given the small size of any MEM associated with the Proposed Action (i.e., small caliber gun rounds and non-recoverable target fragments), no injury would be expected to any species if it were struck by descending MEM. Any behavioral or physiological reactions to descending MEM would be rare and minimal due to the low likelihood of encounter and the small size of the MEM. Accordingly, only the potential risk of ingestion will be evaluated for animals. For non-animal resources (e.g., vegetation, Essential Fish Habitat (EFH), socioeconomic resources), the primary potential impact would be bottom disturbance.

3.3 Physical Resources

The Proposed Action would occur primarily at and near the surface of the water with minimal actions below the surface (e.g., sinking of MEM) or within the airspace (e.g., helicopter training). 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 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 helicopter movement within the proposed action area. All wastewaters would be retained onboard and disposed of on land in accordance with state standards.

Gray water may be discharged, but it would only be discharged in areas where it is not restricted by any local, state, national, or international law. Ambient sound and bottom habitat and sediments in the proposed action area, 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.

3.3.1 Ambient Sound

3.3.1.1 Affected Environment

Biological, abiotic, and anthropogenic (manmade) sounds make up the existing ambient sound environment. The proposed action area includes combinations of sources that create the in-air and in-water ambient sound environment. In-air noise over the open ocean tends to be lower than in locations closer to shore as anthropogenic sounds are the primary contributor to in-air noise. In offshore areas, wind, waves, and marine bird calls dominate. 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). The PNW is a naturally noisy environment, where high energy wave and current activity produces extensive ambient noise. Above the surface, high wave energy and strong winds likewise result in louder than average ambient noise levels. In deep water locations with high sea states, like the offshore waters of the proposed action area, the average ambient noise spectra tends to be between 73 and 80 dB, with vessels being the major contributor to noise between 20 and 500 Hz and wind, wave, and precipitation being the largest contributors to noise above 300 Hz (National Marine Fisheries Service 2020).

Coastal waters tend to have higher ambient noise levels than the open ocean. In a study of ambient sound near the Port of Newport, Oregon, in relatively shallow water (164 ft [50 m]), ambient noise was dominated by surf-generated noise (less than 100 Hz), ship noise (present in 66 percent of total hours monitored), wind-induced wave breaking, and baleen whale vocalization (Haxel et al. 2013).

Specific ambient noise levels were not available for the Columbia River. However, ambient sound levels in freshwater habitats, such as rivers, depend primarily on the hydrology (i.e., abiotic sources of sound), especially the volume and speed of the water flow with cavitation and transport of sediment, whereas biotic sources only significantly contribute to the overall ambient sound levels in stagnant or slowly flowing freshwater habitats with otherwise low noise levels (Wysocki et al. 2007). In a study of several freshwater sites throughout New England, differences in the frequency structure among habitat types (i.e., brook/creek, pond/lake, and river) were observed. River habitats had the highest levels at all higher frequency bands (above 500 Hz) (Rountree et al. 2020). While rivers have highly variable ambient sound levels, common ranges for rivers include 109–135 dB (Amoser and Ladich 2005; Wysocki et al. 2007).

3.3.1.2 Environmental Consequences to Ambient Sound

Impacts to ambient sound would potentially result from fathometer noise, vessel noise, helicopter noise, and gunnery noise associated with the Proposed Action.

Vessel and fathometer noise are already present within the existing environment of the PNW due to regular vessel traffic in the Columbia River, coastal areas, and offshore environment. The Proposed Action would involve the addition of noise from a maximum of four vessels at any given time, spread out throughout the proposed action area. 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). It would be expected that the operations of SPC-HWX IIs and helicopters (and their resulting noise) associated with the Proposed Action would be similar to the noise from other ships and aircraft in the proposed action area and would not appreciably increase the ambient sound (in air or underwater) beyond the immediate vicinity of an operating vessel.

Helicopter and gunnery noise would both occur above the water's surface. Given in-air transmission loss with distance, a 136 dB re 20 µPa helicopter source level at 100 ft (31 m) would measure a SPL of approximately 106 dB re 20 µPa at the air-water interface (i.e., sea surface), and the SPL would decrease further after crossing the air-water interface. Additionally, helicopters in flight to training locations would only fly at or above 2,000 ft (610 m) in environmentally sensitive areas and in other areas at altitudes not below 1,500 ft (457 m); therefore, SPL would already substantially diminish before reaching the air-water interface. Similarly, gunnery noise would reduce substantially upon crossing the air-water interface. As both helicopter and gunnery training would be limited during the Proposed Action (10–15 events per year for helicopters and one event per vessel per year for gunnery) and helicopter and gunnery noise would be substantially reduced after passing the air-water interface, helicopter and gunnery noise would not be expected to increase ambient sound within the proposed action area.

Although unlikely due to the elevated ambient noise levels in the PNW, fathometer noise, vessel noise, helicopter noise, and gunnery noise may temporarily increase ambient sound levels. However, any increase would be limited to the immediate vicinity of each source and, thus, would be very brief because of the transient and temporary duration of the Proposed Action.

3.3.1.3 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, ambient sound within the proposed action area would potentially experience passing increases to ambient sound associated with the area immediately around a transient sound source (e.g., an SPC-HWX II; a helicopter), but the sound would only be perceptible above existing ambient noise levels in very close proximity to the source. In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 1 would not result in significant adverse impacts to ambient noise. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 1 would not result in significant harm to ambient noise.

3.3.1.4 Impacts Under Alternative 2

Under Alternative 2, any potential impacts to ambient sound would be similar to those discussed for activities under Alternative 1. The key difference under Alternative 2 would be that only four vessels would be acquired rather than six. This may result in minimal reduction in effects because there would be no Maintenance Relief Hulls to operate while another vessel is undergoing maintenance. However, the difference would not result in substantive changes to the potential for, or types of, impacts to ambient sound. The difference in impacts to ambient sound between Alternatives 1 and 2 would be imperceptibly small. In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 2 would not result in significant adverse impacts to ambient noise. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 2 would not result in significant harm to ambient noise.

3.3.1.5 Impacts Under the No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. No SPC-HWX II would be acquired, and the 47 MLBs would continue to support Coast Guard missions in the PNW. Therefore, baseline conditions of the existing environment would remain unchanged. There would be no significant impact or harm to ambient sound with implementation of the No Action Alternative.

3.3.2 Bottom Habitat and Sediments

3.3.2.1 Affected Environment

Based on the characteristics of the substrate, benthic communities are broadly divided into two categories: soft-bottom and hard-bottom communities. Soft-bottom communities occur in areas with weak current flows, and the bottom is composed of fine sediments like sand and silt. This is suitable habitat for burrowing organisms, like polychaete worms, amphipods, and bivalves. Soft bottoms of the sublittoral zone are essentially without a diversity of large topographic features, and the vast expanses extend for long distances. Small-feature diversity exists in many forms including ripple marks, worm tubes, and fecal mounds. Hard-bottom communities occur in areas with strong current flows, and the bottom is composed of gravel, rocks, and sand. The bottom here shifts frequently and is most suitable for sedentary or sessile filter-feeders or suspension-feeders. The benthic surfaces are uneven, and they are more likely to promote growth of seaweeds where the seafloor is within the photic zone. The majority of seafloor off Washington and Oregon is soft-bottom habitat dominated by sands (i.e., coarser grains than silt, clay, or mud) (U.S. Environmental Protection Agency 2012).

Some SPC-HWX II homeports are located within estuaries. Sediment composition in estuaries is strongly influenced by the tidal range, wave heights (near the estuary mouth), sediment availability, and sediment transport processes (Bianchi 2013; Landland and Cronin 2003). To at least some degree, most estuaries have soft, muddy substrates derived from sediments carried into the estuary by both seawater and freshwater. Estuaries in the PNW are predominantly sandy, with some coarser material along the margins (Folger 1972; Navy 2015).

Sediment transport in rivers is controlled by both the flow and the upstream sediment supply. Changes in either the flow or the upstream sediment supply will, therefore, change the sediment transport rate and the locations where sediment will either be deposited or erode. The deposition of this sediment is based on sediment size and flow rates; larger materials (i.e., cobbles, gravel) will be dropped out of fast-moving water, while smaller materials (i.e., sand, silt, clay) settle in slower moving waters. Therefore, substrate grain size is dependent on flow. The Columbia River is a major source of sand-sized sediment into the coastal waters of the PNW (Navy 2015). Substrate is generally not permanent and is subject to large changes during flooding events. Plants may be present along the bottom, especially in slower currents.

3.3.2.2 Environmental Consequences to Bottom Habitat and Sediments

Impacts to bottom habitat and sediments from the Proposed Action would be limited to MEM (objects descending to the seafloor) and vessel movement. MEM would only affect bottom habitat and sediments in waters at least 10 mi (16 km) from shore in designated ranges where gunnery training would occur.

During gunnery training, MEM would enter the water in the form of small caliber gun rounds (0.762 caliber [7.62 mm diameter by 51 mm length]) as well as any target fragments that cannot be recovered. These would sink through the water column and settle on the seafloor. Due to their small size, they would not be expected to substantially alter the bottom sediments where they land or create increased turbidity around their location of settlement.

Gunnery training would occur at least 10 mi (16 km) from shore, so MEM would not affect sensitive and diverse coastal habitats. Additionally, training would only occur in designated ranges, and these ranges would be selected to avoid sensitive benthic habitats. Gunnery training would occur only once per vessel per year, so a relatively small quantity of MEM would enter the waters of the proposed action area. Given the relative infrequency of gunnery training, the quantity of MEM associated with the Proposed

Action would be low. Therefore, any impacts to bottom habitat and sediments from MEM associated with the Proposed Action would be minimal and highly localized. MEM would not alter the ability of any seafloor within the proposed action area to function as habitat.

On rare occasions the SPC-HWX II may transit shallow waters at slow speeds while enroute to mission areas. Minimal disturbance of bottom sediment is possible, but generated turbidity is expected to be negligible.

3.3.2.3 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, any potential impacts to bottom habitat and sediments would be limited to MEM (from gunnery training). The Preferred Alternative would include the acquisition of up to six SPC-HWX II, four operational and two in Maintenance Relief Hull status, resulting in four gunnery training exercises per year (one per operational vessel). As detailed in the above analysis, potential impacts to bottom habitat and sediments would be minimal and would be limited to designated ranges (MEM impacts). The Proposed Action would not alter the ability of any seafloor within the proposed action area to function as habitat. In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 1 would not result in significant adverse impacts to bottom habitat and sediments. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 1 would not result in significant harm to bottom habitat and sediments.

3.3.2.4 Impacts Under Alternative 2

Under Alternative 2, any potential impacts to bottom habitat and sediments would be similar to those for activities under Alternative 1. The key difference under Alternative 2 versus Alternative 1 is that only four vessels would be acquired rather than six. There would be no difference in impacts from MEM because there would be four gunnery training exercises per year under either scenario. In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 2 would not result in significant adverse impacts to bottom habitat and sediments. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 2 would not result in significant harm to bottom habitat and sediments.

3.3.2.5 Impacts Under the No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. No SPC-HWX II would be acquired, and the 47 MLBs would continue to support Coast Guard missions in the PNW. Therefore, baseline conditions of the existing environment would remain unchanged. There would be no significant impacts or harm to bottom habitat and sediments with implementation of the No Action Alternative.

3.4 Biological Resources

Biological resources include living, native, or naturalized plant and animal species and the habitats within which they occur. Within this EA/OEA, biological resources are divided into seven major categories: (1) vegetation, (2) invertebrates, (3) birds, (4) fish, (5) EFH, (6) sea turtles, and (7) marine mammals. Threatened, endangered, and other special status species are discussed in their respective sections and in Appendix G.

3.4.1 Vegetation

3.4.1.1 Affected Environment

As vegetation would be minimally impacted by the Proposed Action (minor impact to resilient water column vegetation and extremely limited impact to benthic vegetation), this section presents only a brief overview of vegetation within the proposed action area. 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. Vegetation in the open ocean mainly includes phytoplankton, such as cyanobacteria, diatoms, and dinoflagellates. In shallow estuarine waters (including the Columbia River), vegetation may also include various species of plants such as seaweeds, seagrasses, and wetland plants. Major taxonomic groups potentially located within the proposed action area are described in Table 3-6. No ESA-listed vegetation species are known to occur within the proposed action area.

Table 3-6. Major Groups of Vegetation Present in the Proposed Action Area

Taxonomic Group	Description	Vertical Distribution within the Proposed Action Area
Blue-green algae (Phylum Cyanobacteria)	Bacteria that are usually unicellular but may appear in colonial arrangements; many form mats that attach to substrate and rocks. Some members of this group can produce nutrients for other species through nitrogen fixation.	Pelagic or benthic within the photic zone
Green algae (Phylum Chlorophyta)	Species can occur as unicellular algae, filaments, or large anchored or pelagic seaweeds. Green algae prefer freshwater but can grow in marine water.	Pelagic or benthic within the photic zone
Brown algae (Phylum Heterokontophyta)	Predominantly large multicellular seaweeds including kelp and rockweeds that often grow on the surface of rocks but are also epiphytic, endophytic, or pelagic. Phylum Heterokontophyta grows mainly in marine water. Kelp form large underwater forests within the proposed action area, and these dense aggregations of kelp are vital habitat for many species.	Generally benthic occasionally pelagic within the photic zone
Diatoms (Phylum Heterokontophyta)	Solitary or chain forming single-celled phytoplankton group known for silica-based cell walls. Can form prolific ice or ice edge associated blooms. These organisms are normally found in marine and freshwaters during autumn and spring, liking cooler water and low light.	Pelagic or benthic within the photic zone
Dinoflagellates (Phylum Dinoflagellata)	Group of semi-motile marine protists, many of which are both autotrophic and heterotrophic. Mostly free swimming but occasionally benthic or symbiotic with coral species. Some species can cause harmful algal blooms, and some are bioluminescent.	Mostly pelagic, occasionally benthic
Red algae (Phylum Rhodophyta)	Includes both single-celled algae and multi-celled large seaweeds; some species form calcareous deposits. Rhodophyta is found all along the coasts of the PNW.	Pelagic or benthic within the photic zone
Haptophytes (Phylum Haptophyta)	Includes solitary and colonial marine phytoplankton, such as coccolithophores, and some flagellates. Haptophytes can be found in both fresh and marine water. However, they thrive in coastal and open ocean niches.	Pelagic within the photic zone
Vascular plants (Phylum Tracheophyta)	Includes seagrasses, cordgrass, and other rooted aquatic and wetland plants in marine and estuarine environments providing food and habitat for many species.	Seafloor within the photic zone

3.4.1.2 Environmental Consequences to Vegetation

Impacts to vegetation would potentially result from vessel movement associated with the Proposed Action. Marine vegetation 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 measurable or cause population level impacts as a result of vessel movement.

3.4.1.3 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, any potential impacts to vegetation would be limited to vessel movement. The Preferred Alternative would include the acquisition of up to six SPC-HWX II, four operational and two in Maintenance Relief Hull status. As detailed in the above analysis, potential impacts to vegetation would be minimal, and no population-level impacts would be expected. In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 1 would not result in significant adverse impacts to vegetation. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 1 would not result in significant harm to vegetation.

3.4.1.4 Impacts Under Alternative 2

Under Alternative 2, any potential impacts to vegetation would be similar to those discussed for activities under Alternative 1. There would be no population-level impacts to vegetation as a result of vessel movement associated with the Proposed Action. In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 2 would not result in significant adverse impacts to vegetation. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 2 would not result in significant harm to vegetation.

3.4.1.5 Impacts Under the No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. No SPC-HWX II would be acquired, and the 47 MLBs would continue to support Coast Guard missions in the PNW. Therefore, baseline conditions of the existing environment would remain unchanged. There would be no significant impact or harm to vegetation with implementation of the No Action Alternative.

3.4.2 Invertebrates

3.4.2.1 Affected Environment

Invertebrates are a large, diverse group containing tens of thousands of species distributed ubiquitously throughout the global environment (Brusca and Brusca 2003). Within the proposed action area, invertebrates inhabit coastal and offshore waters as well as waters of the Columbia River, and they occur within pelagic and benthic habitats. Major taxonomic groups potentially located within the proposed action area are described in Table 3-7. The following sections provide additional details on benthic marine invertebrates (Section 3.4.2.1.1), pelagic marine invertebrates (Section 3.4.2.1.2), and invertebrates found within the Columbia River (Section 3.4.2.1.3). No ESA-listed invertebrates occur within the proposed action area.

Table 3-7. Major Invertebrate Groups Found Within the Proposed Action Area

Common Name (Phylum)	Description	Habitat Type
Foraminifera, radiolarians, ciliates (Phylum Foraminifera)	Benthic and pelagic single-celled organisms that can be planktonic or benthic infaunal (live in the sediment). Shells are typically made of calcium carbonate or silica. Found in all marine environments.	Pelagic; Benthic
Sponges (Phylum Porifera)	Sessile epibenthic filter feeders; large species have calcium carbonate or silica structures embedded in cells to provide structural support.	Benthic
Corals, hydroids, jellyfish (Phylum Cnidaria)	Motile and sessile benthic and pelagic animals with stinging cells that can be solitary or colonial. Some form hard calcium carbonate exoskeletons. May form feeding aggregations along or under ice.	Pelagic; Benthic

Common Name (Phylum)	Description	Habitat Type
Flatworms (Phylum Platyhelminthes)	Mostly benthic infaunal species; simplest form of marine worm with a flattened body. Mostly parasitic, but some free-living species exist.	Pelagic; Benthic
Ribbon worms (Phylum Nemertea)	Mostly benthic infaunal marine worms with a long extension from the mouth (proboscis) that helps capture food. They have a non-segmented body and move on the seafloor using cilia (i.e., tiny hairs).	Benthic
Round worms (Phylum Nematoda)	Small marine worms; many live in close association with other animals (typically as parasites).	Pelagic; Benthic
Segmented worms (Phylum Annelida)	Mostly infaunal, highly mobile marine worms; many tube-dwelling species.	Benthic
Bryozoans (Phylum Bryozoa)	Lace-like animals that exist as filter feeding colonies attached to the seafloor and other substrates.	Benthic
Cephalopods, bivalves, sea snails, chitons (Phylum Molluska)	A diverse group of soft-bodied invertebrates with a specialized layer of tissue called a mantle. Mollusks such as squid are active swimmers and predators, while others, such as sea snails, are mobile predators or grazers, or sessile filter feeders (e.g., bivalves).	Pelagic; Benthic
Shrimp, crabs, lobsters, barnacles, copepods (Phylum Arthropoda – Crustacea)	A diverse group of invertebrates distinguished by a jointed exoskeleton. Some are sessile, but most are motile; all feeding modes from predator to filter feeder. Many copepods can form dense aggregations on, in, and adjacent to sea ice.	Pelagic; Benthic
Sea stars, sea urchins, sea cucumbers (Phylum Echinodermata)	Epibenthic predators and filter feeders with tube feet.	Benthic

3.4.2.1.1 Benthic Marine Invertebrates

Marine benthic invertebrates are abundant across the varied bottom habitats of the proposed action area, which includes inshore coastal areas, offshore areas of the continental slope, submarine canyons, and abyssal plains. In reviewing samples along the entire U.S. West Coast, the U.S. EPA (2012) reported diverse macrobenthic infauna along the seafloor, including 1,108 distinct species. The most abundant species identified were polychaetes (59 percent) followed by crustaceans (17 percent) and mollusks (12 percent). Diversity and number of taxa were lower in samples off Washington and Oregon than they were off California (U.S. Environmental Protection Agency 2012).

Deep-sea coral communities are found along the entire continental slope of the proposed action area. Black corals are the most common on the continental slope, but sea pens and gorgonians are also common (Hourigan et al. 2017). Studies indicated that deep corals are widespread on seamounts and continental shelves throughout the Northeast Pacific Ocean, occurring down to a depth of 15,500 ft (4,700 m)(Etnoyer and Morgan 2005; Morgan et al. 2005). Coral communities are generally limited to hard bottoms, which represent only around ten percent of the seafloor, from the shelves to depths of approximately 9,843 ft (3,000 m) off the U.S. West Coast (i.e., most common around seamounts, banks, and canyons)(Hourigan et al. 2017), limiting the distribution of coral in the offshore environment of the proposed action area. Coral and other benthic invertebrate communities off Washington have expanded since 2007 due to the designation of MPAs and the associated fishing restrictions that limit seafloor damage within these protected areas(Hourigan et al. 2017). In deep ocean floor environments where chemosynthetic bacteria form the basis of the food web, common invertebrates include tubeworms, giant white clams, mussels, gastropods, and sponges (Kojima 2002).

3.4.2.1.2 Pelagic Marine Invertebrates

The pelagic invertebrate community within the proposed action area is highly diverse, ranging in size from jellyfish-like *Pelagia* spp., which can exceed 6 ft (1.8 m) in length, to microscopic rotifers and heterotrophic protozoans (Perry 2003). However, free-floating zooplankton are the dominant invertebrate species within the water column (Table 3-7). Many members of this community, such as copepods, euphausiids, and cladocerans, are holoplanktonic, meaning they spend their entire lives as members of the planktonic community. Zooplankton inhabit all depths and often undertake daily vertical migrations of up to several hundred feet in distance. In general, copepods are the dominant group of zooplankton in terms of biomass in the proposed action area (Landry and Lorenzen 1989).. Dominant euphausiid species, which are key prey species for whales, include multiple genus of krill—predominantly *Thysanoessa* spp. and *Euphausia pacifica* (Gómez-Gutiérrez et al. 2005; Linacre 2004). Salps are more abundant in phytoplankton-rich surface waters but have been found at depths down to 3,300 ft (1,000 m) (Hubbard Jr and Pearcy 1971).

3.4.2.1.3 Invertebrates of the Columbia River

A diverse array of invertebrates is found within the Columbia River. This community of organisms includes crustaceans, aquatic insects, zooplankton, and mollusks. They inhabit both the bottom (benthic) and the surface (mainly insects) of the river. While few invertebrate studies have been conducted in the lower Columbia River, McCabe et al. (1997) sampled the river from the lowermost dam (Bonneville Dam) to the upper estuary and found that common taxa included flatworms (Turbellaria), annelids (Oligochaeta), the bivalve *Corbicula fluminea*, the amphipod *Corophium salmonis*, midge larvae (Chironomidae), and biting midge larvae (Ceratopogonidae), with *Corbicula fluminea* and Ceratopogonidae larvae being the most abundant invertebrates sampled.

Zooplankton (including dinoflagellates) are found throughout the water column of the Columbia River. They migrate to the food-rich surface waters at night to feed on phytoplankton and then return to depths before the sun rises (Collins 2021). Zooplankton are important to the food chain of the river ecosystem, consuming phytoplankton and being consumed by larger invertebrates, fish, and other organisms. Zooplankton typically occur in great abundance, and while some have limited motility, they generally move with water currents.

Aquatic insects are the largest group of invertebrates, as well as the most diverse. Aquatic insects may occur on or near the water's surface of the Columbia River, including water bugs and water striders, or near the bottom, such as water scorpions. Giant water bugs (Belostomatidae) and water scorpions (Nepidae) are typically found at the bottom of the river. Water boatman (Corixidae) and backswimmers (Notonectidae) reside just below the water's surface (Wild Columbia County 2024b). Water striders include water treaders (Mesoveliidae) and riffle bugs (Veliidae), which utilize high surface tension to help them stay on top of the water's surface, eating smaller bugs that fly near the surface (Wild Columbia County 2024b).

The main types of mollusks inhabiting the Columbia River include snails and bivalves. Freshwater snails living in the river include, but are not limited to, the following: the pleated juga (*Juga plicifera*), Olympia pebble snail (*Fluminicola virens*), New Zealand mud snail (*Potamopyrgus antipodarum*), the big-eared radix (*Radix auricularia*) (Wild Columbia County 2024a). Columbia River bivalves include, but are not limited to, the following: the western pearlshell (*Margaritifera falcata*), western ridged mussel (*Gonidea angulata*), Oregon Floater (*Anodonta oregonensis*), and invasive Asian clam (*Corbicula fluminea*)(Wild

Columbia County 2024a). These filter feeding mollusks are particularly important to the water quality of the river and serve as a food source for other animals.

Some crustacean species, such as signal crayfish (*Pacifasticus leniusculus*), are found throughout the Columbia River watershed, including the lower Columbia River (i.e., within the proposed action area) (Procopio 2024). These crayfish live in the littoral zone, often sheltering between logs, rocks, or occasionally burrowing in the seafloor(Procopio 2024; U.S. Fish & Wildlife Service 2015). Due to the benthic nature of crustaceans, they would be unlikely to be affected by the transit of vessels associated with the Proposed Action.

3.4.2.2 Environmental Consequences to Invertebrates

Impacts to 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.

3.4.2.2.1 Vessel Noise

Invertebrates in the proposed action area may be exposed to vessel noise during the Proposed Action. In general, large vessel noise would be expected to range from 20–300 Hz (Section 3.2.1.2 and Table 3-5). Potential impacts to 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 invertebrates that would be close to the vessel while it transits throughout the proposed action area. These individuals would no longer be impacted once the vessel moves out of their immediate area.

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. 2015; Wale et al. 2013). In general, vessels would be moving throughout the proposed action area, and any prolonged exposure is extremely unlikely given the extent of vessel movement, the swimming abilities of these invertebrates, and size of the proposed action area. The highest density of marine invertebrates in the proposed action area is located in the benthic zone, but it is unlikely that any vessel noise would penetrate this zone. Therefore, exposure to marine invertebrates would be limited to crustaceans and cephalopods within the water column. Vessel noise associated with the Proposed Action may impact individual crustaceans or cephalopods, within the proposed action area. However, responses to vessel noise would be short-term and temporary and no population-level impacts would be expected.

3.4.2.2.2 Vessel Movement

Vessels have the potential to impact or harm 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 strike. However, vessel hulls often have a hydrodynamic shape, and pelagic invertebrates are therefore generally disturbed, rather than struck, as the water flows around a vessel. Propeller wash (water displaced by propellers used for propulsion) can potentially disturb invertebrates in the water column and are a likely cause of zooplankton mortality (Bickel et al. 2011). Many pelagic invertebrates such as squid and zooplankton move away from the surface during the day, reducing potential exposure during daytime vessel operations. Additionally, since the highest density of invertebrates occur in the benthic zone, overlap of vessel movement and most invertebrates in the proposed action area is not expected. Although unlikely, some invertebrates could be disturbed or killed by a vessel collision, population level impacts would not be expected.

3.4.2.3 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, any potential impacts to invertebrates would be limited to vessel noise and vessel movement. The Preferred Alternative would include the acquisition of up to six SPC-HWX II, four operational and two in Maintenance Relief Hull status. As detailed in the above analysis, potential impacts to individual invertebrates would be minimal. The likelihood of lethal impacts to invertebrates is very low, and the more likely impacts from the Proposed Action would be minor and transient behavioral or physiological reactions that would not significantly disrupt normal behavior patterns. No population-level impacts would be expected. In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 1 would not result in significant adverse impacts to invertebrates. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 1 would not result in significant harm to invertebrates.

3.4.2.4 Impacts Under Alternative 2

Under Alternative 2, any potential impacts to invertebrates would be similar to those discussed for activities under Alternative 1. The key difference under Alternative 2 would be that only four SPC-HWX II would be acquired; therefore, there would be no maintenance relief hulls available to replace an SPC-HWX II undergoing maintenance. Accordingly, the total vessel presence within the proposed action area would decrease under Alternative 2 compared to Alternative 1, resulting in an overall reduction (albeit minor) in potential impacts to invertebrates. In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 2 would not result in significant adverse impacts to invertebrates. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 2 would not result in significant harm to invertebrates.

3.4.2.5 Impacts Under the No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. No SPC-HWX II would be acquired, and the 47 MLBs would continue to support Coast Guard missions in the PNW. Therefore, baseline conditions of the existing environment would remain unchanged. There would be no significant impact or harm to invertebrates with implementation of the No Action Alternative.

3.4.3 Birds

3.4.3.1 Affected Environment

The nutrient-rich waters off the Pacific Coast support an abundance and diversity of bird species (Kaplan et al. 2010), many of which may occur within the proposed action area. Only birds that overlap with the marine/aquatic habitat are considered. Bird species that may be present largely fall into two groups: (1) those that are distributed mainly on land but forage in marine habitats (shorebirds) and (2) those that are distributed in marine habitats and typically come to shore for limited purposes, such as nesting (seabirds). A combination of short-distance migrants, long-distance migrants, and year-round resident bird species may occur within the proposed action area. Typical behaviors that birds may engage in on or over the waters of the proposed action would include foraging, migrating, and resting/sleeping.

Bird species diversity tends to be highest from spring into later fall; diversity drops in winter as several species migrate or move to sheltered, inland waters (Buchanan et al. 2001; Wahl et al. 1993). The following sections provide a general description of the major taxonomic groups of birds that may occur within the proposed action area (Section 3.4.3.1.1) and ESA-listed bird species (Section 3.4.3.1.2).

3.4.3.1.1 Major Bird Groups

The following provides an overview of the predominant bird groups known to occur in the proposed action area (Table 3-8). These orders are described by representative species and their relative distributions. ESA listed bird species are discussed in detail in Section 3.4.3.1.2.

Table 3-8.Major Bird Groups Present in the Proposed Action Area

Taxonomic Order	Representative Species	Distribution within the Proposed Action Area
Accipitriformes	Bald eagles, osprey	Primarily associated with land, but some species may forage and migrate offshore, such as osprey (*Pandion haliaetus*). May occur in coastal areas throughout the proposed action area.
Anseriformes	Scoters, eiders, ducks, mergansers	Includes birds that inhabit aquatic environments, including lakes, ponds, streams, rivers, swamps, coastal shores, and marshes. May occur in shallow ocean waters and coastal areas throughout the proposed action area.
Charadriiformes	Sandpipers, knots, snipes, oystercatchers, turnstones, gulls, kittiwakes, murres, murrelets	Primarily coastal birds; ranging from small shorebirds to large pelagic seabirds. May occur throughout the marine environment and coastal areas of the proposed action area.
Gaviiformes	Loons	Populate large lakes, bays, and coastal ocean waters. Found close to shore swimming/flying at the surface or diving to catch small fish. May occur in coastal areas throughout the proposed action area.
Passeriformes	Songbirds	Strictly terrestrial but may fly over the Columbia River.
Pelecaniformes	Pelicans, egrets, ibis, herons	All members of this group hunt for fish and other aquatic prey by diving or swimming. May occur in coastal areas and open ocean throughout the proposed action area.
Podicipediformes	Grebes	Breed near inland freshwater lakes and migrate to nearshore marine environments where they may forage for fish and congregate in large numbers. May occur in coastal areas throughout the proposed action area.
Procellariiformes	Albatrosses, petrels, shearwaters	Highly pelagic and prolific seabirds that spend most of their lives at sea except during breeding and nesting seasons. May occur throughout the pelagic marine environment of the proposed action area.
Strigiformes	Owls	Occurs in terrestrial environments near the proposed action area and may fly over the Columbia River.
Suliformes	Cormorants	Species are broadly distributed. May occur in coastal environments and open ocean throughout the proposed action area.

3.4.3.1.2 ESA-Listed Bird Species

There are five bird species listed as threatened or endangered under the ESA that may occur within the proposed action area (Table 3-9). A general description of habitat preference and life history of these species is provided in this section. There is no critical habitat for any ESA-listed bird species that overlaps with the proposed action area. ESA-listed bird species are discussed in Appendix G.

Table 3-9. ESA-listed Birds within the Proposed Action Area

Common Name (*Scientific Name*)	Listing Status and Distinct Population Segment (DPS), if applicable	Likelihood of Occurrence within the Proposed Action Area
Hawaiian petrel (*Pterodroma sandwichensis*)	Endangered (32 FR 4001; March 11, 1967)	Rare; breeds in the Hawaiian Islands; during the non-breeding season they occur in offshore tropical waters of the Pacific with only seven documented sightings off Oregon and two off Washington.
Marbled murrelet (*Brachyramphus marmoratus*)	Threatened CA/OR/WA DPS (57 FR 45328; October 1, 1992)	Likely; known to nest in forested areas near the coast throughout the PNW; forage close to shore at river mouths, bays, and inlets throughout the proposed action area.
Short-tailed albatross (*Phoebastria albatrus*)	Endangered (65 FR 46643; July 31, 2000)	Likely; pelagic seabird distributed across most of the Pacific Ocean, utilizing remote islands to breed; juveniles and younger sub-adults will feed throughout the PNW, within the proposed action area.
Streaked horned lark (*Eremophila alpestris strigata*)	Threatened (78 FR 61451; October 3, 2013)	Likely; populates beaches in western Washington and Oregon; breeds on dredge spoil islands in the lower Columbia River within the proposed action area.
Western snowy plover (*Charadrius nivosus nivosus)*	Threatened (58 FR 12864; March 5, 1993)	Likely; coastal shorebird that inhabits beaches and sandy areas along the Pacific Coast; may fly over coastal portions of the proposed action area during migration.

3.4.3.2 Environmental Consequences to Birds

Impacts to birds would potentially result from vessel noise (Section 3.4.3.2.1), helicopter noise (Section 3.4.3.2.2), gunnery noise (Section 3.4.3.2.3), vessel movement (Section 3.4.3.2.4), helicopter movement (Section 3.4.3.2.5), and MEM (Section 3.4.3.2.6) associated with the Proposed Action.

3.4.3.2.1 Vessel Noise

Although the exact noise characteristics generated by the SPC-HWX II are unknown, large vessels, like the SPC-HWX II, would be expected to emit vessel noise with a frequency range of 20–300 Hz with a source level of no more than 190 dB re 1 µPa at 1 m (Table 3-5). As discussed in Appendix F, hearing capabilities of birds are between 1 and 3 kHz in air (Crowell et al. 2015) and 0.5 and 4 kHz in water. Since most vessel noise is low frequency (20–300 Hz), 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.

Bird presence would vary depending on vessel location, but in general, birds would be expected in higher concentrations closer to shore with densities decreasing with increasing distance offshore. Underwater exposure to birds from vessel noise would be very rare, limited to instances where a bird is diving in close enough proximity to an SPC-HWX II to perceive vessel noise above ambient noise. 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 area and/or the bird exits the water (either after feeding or in response to the vessel's presence).

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. 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).

Exposure of birds to in-air vessel noise would be temporary and localized to the position of the vessel as it moves throughout the proposed action area. 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. At most, birds would be expected to have a minor behavioral reaction to vessel noise but would be expected to quickly resume normal activities. No population-level impacts would be expected.

3.4.3.2.2 Helicopter Noise

As discussed in Appendix F, birds hear best in air between 1 and 3 kHz (Crowell et al. 2015). Helicopter sounds contain dominant tones from the rotors and are generally below 500 Hz (Richardson et al. 1995). MH-60 helicopter noise levels at the source average approximately 136 dB re 20 µPa in air, with frequencies between 20 Hz and 5 kHz (Table 3-5). 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). Therefore, seabirds would generally remain well below the typical helicopter flight altitudes associated with the Proposed Action (i.e., 1,500–2,000 ft (457–610 m)). Higher-altitude migrations by birds could occur over parts of the proposed action area, but these altitudes are on the order of 9,842 ft (3 km) (Alerstam and Gudmundsson 1999; Dokter et al. 2013; Piersma et al. 2022), which also would not overlap with typical helicopter altitudes. Birds would only be exposed to helicopter noise when very close to the helicopter, primarily limited to a narrow area beneath the helicopter (Appendix D).

Any helicopter noise that would enter the water would be within a narrow area directly beneath the helicopter. The sound levels within that area would quickly attenuate with depth or distance. 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 helicopter noise would be limited to behavioral or physiological reactions. Any response is expected to be short-term and temporary as the helicopter moves through the proposed action area.

In-air 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. 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). 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 B) 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, and no population-level impacts are expected.

The long-term effect of the Proposed Action on birds is expected to be negligible because any behavioral response is expected to be temporary. Any bird that exhibits a behavioral response would be expected to return to its normal behavior once the helicopter has passed through the area. Birds are either not likely to respond to helicopter 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. Repeat exposure of the same bird to multiple helicopter noise exposures is unlikely due to the limited number of helicopter trainings over the very large, proposed action area.

3.4.3.2.3 Gunnery Noise

In air, bird hearing ranges from 1–3 kHz (Appendix F), and gunnery noise ranges from 150 Hz to 2.5 kHz (Table 3-5). Therefore, birds would be expected to perceive gunnery noise. Gunnery ranges would be at least 10 mi (16 km) offshore, so only seabirds that forage or migrate greater than 10 mi (16 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. 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 before exposure to gunnery noise occurs. Gunnery noise may cause seabirds remaining in the area to disperse for some or all of the duration of the training activity (up to eight hours).

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. Although gunnery training may last for up to eight hours, it is highly unlikely that birds would remain close enough to perceive the noise for an entire training. Exposure of seabirds to gunnery noise would be brief and temporary (birds would be expected to leave the immediate area due to activities and noise) and rare (only one training per vessel per year). Startle or alert reactions to gunnery noise are not likely to disrupt major behavior patterns, such as migrating, breeding, feeding, and sheltering, or to result in serious injury to any seabirds. Although unlikely, displacement from a preferred area could result in reduced foraging success; however, due to the use of offshore ranges and the limited training that would occur as part of the Proposed Action, population-level impacts would not occur. The only ESA-listed bird species that may occur in the offshore areas selected for gunnery training is the short-tailed albatross. The likelihood of overlap between one of these highly transient birds and infrequent training events is low.

3.4.3.2.4 Vessel Movement

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 area. Regardless of vessel speeds, vessel collisions with birds are possible, particularly during periods of reduced visibility or reduced bird mobility (e.g., during molting). However, the likelihood of a vessel collision with a bird is extremely low because there would be only four vessels operating in a very large, proposed action area, limiting encounters between birds and an SPC-HWX II. 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 B), including avoiding rafting marbled murrelets during molting when they are flightless and most vulnerable, would also minimize potential for strikes.

The more likely impact from vessel movement would be behavioral disturbances, 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, such as migration, breeding, feeding, or sheltering.

3.4.3.2.5 Helicopter Movement

Potential impacts to birds from helicopter movement would be disturbance, collision, injury, or death. However, birds generally remain well below the typical helicopter flight altitudes (i.e., 1,500–2,000 ft [457–610 m]) associated with the Proposed Action. Bird responses to disturbance by helicopters may include short-term behavioral or physiological responses, such as alert responses, startle responses, or temporary increases in heart rate. The long-term effect of the Proposed Action on 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 helicopter has passed through the area. Birds are either not likely to respond to helicopter 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.

In a study of reported bird strikes from civil aircrafts 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; during trainings, helicopters would maintain their higher altitudes. Takeoffs and landings would occur only at Coast Guard airfields where procedures are in place to minimize risks associated to birds from aircraft. 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 B) 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-helicopter strike. Thus, while there is some risk of a collision between helicopter and a bird, the risk of a strike is low. In the unlikely event that a collision occur, bird mortality or injuries due to helicopter movement may result, but no population-level impacts to bird species are expected.

3.4.3.2.6 Military Expended Material

Only seabirds that forage or migrate greater than 10 mi (16 km) offshore (where gunnery training would occur) are likely to encounter MEM. Because gunnery training would not occur where seabird colonies are located, impacts to seabird colony habitat or to breeding seabird populations are not expected. The only ESA-listed bird species that may occur in the offshore areas selected for gunnery training is the short-tailed albatross, and the likelihood of overlap between one of these highly transient birds and a rare training exercise is low. All MEM would be so small that behavioral or physiological reactions to the items in the water column are unlikely.

Ingestion of MEM by birds 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, so MEM would only be available for ingestion before sinking, which would be a short period of time, particularly for gun rounds. 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 area, MEM would not present a significant impact to birds.

3.4.3.3 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, any potential impacts to birds would be limited to vessel noise, helicopter noise, gunnery noise, vessel movement, helicopter movement, and MEM. The Preferred Alternative would include the acquisition of up to six SPC-HWX II, four operational and two in Maintenance Relief Hull status. As detailed in the above analysis, potential impacts to individual birds would be minimal. The likelihood of lethal impacts to birds (e.g., vessel or helicopter strike, ingestion of MEM) is very low, and the more likely impacts from the Proposed Action would be minor and transient behavioral or physiological reactions that would not significantly disrupt normal behavior patterns. No population-level impacts would be expected.

In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 1 would not result in significant adverse impacts to birds. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 1 would not result in significant harm to birds. In accordance with the ESA, Alternative 1, the Coast Guard has determined that vessel noise, helicopter noise, gunnery noise, vessel movement, helicopter movement, and MEM may affect, but is not likely to adversely affect the ESA-listed Hawaiian petrel, marbled murrelet, short-tailed albatross, streaked horned lark, or western snowy plover. In accordance with the Migratory Bird Treaty Act (MBTA), Alternative 1 would not result in a significant adverse effect on migratory bird populations.

3.4.3.4 Impacts Under Alternative 2

Under Alternative 2, any potential impacts to birds would be similar to those discussed for activities under Alternative 1. The key difference under Alternative 2 versus Alternative 1 is that only four vessels would be acquired rather than six. This may result in minimal reduction in effects because there would be no Maintenance Relief Hulls to operate while another vessel is undergoing maintenance. However, the difference would not result in substantive changes to the potential for, or types of, impacts to birds.

In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 2 would not result in significant adverse impacts to birds. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 2 would not result in significant harm to birds. In accordance with the ESA, Alternative 2 may affect but is not likely to adversely affect the ESA-listed Hawaiian petrel, marbled murrelet, short-tailed albatross, streaked horned lark, or western snowy plover. In accordance with the MBTA, Alternative 2 would not result in a significant adverse effect on migratory bird populations.

3.4.3.5 Impacts Under the No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. No SPC-HWX II would be acquired, and the 47 MLBs would continue to support Coast Guard missions in the PNW. Therefore, baseline conditions of the existing environment would remain unchanged. There would be no significant impact or harm to birds with implementation of the No Action Alternative.

3.4.4 Fish

3.4.4.1 Affected Environment

The PNW proposed action area includes state and territorial seas extending 150 nm (278 km) from Washington State, near the US-Canadian border, south to Oregon and up the Columbia River as far as Portland, Oregon. The proposed action area includes a range of habitats including a small portion of continental shelf and continental slope, which both provide important habitat for a wide range of pelagic, demersal, and bathydemersal fish assemblages.

The offshore upwelling regions within the proposed action area provide important feeding grounds for several species of salmonids, including coho (*Oncorhynchus kisutch*), chum (*Oncorhynchus keta*), and Chinook salmon (*Oncorhynchus tshawytscha*), which are born in the streams of Oregon, California, and Washington (Duffy et al. 2005; Rice et al. 2012). The region also supports a tremendous array of rockfish (Order Scorpaeniformes), with as many as 60 species occurring in the proposed action area (Froese and Pauly 2013; Love et al. 2002; Williams et al. 2010). Fish in this area possess diverse life histories and inhabit a broad range of habitats, including nearshore demersal species, deep water bathydemersal species, and pelagic species (Washington Department of Fish and Wildlife 2011).

The proposed action area also hosts a substantial abundance of pelagic forage fish, such as Pacific herring (*Clupea pallasii*), surf smelt (*Hypomesus pretiosus*), and Pacific sand lance (*Ammodytes hexapterus*), which support bird populations in the PNW proposed action area (Rice et al. 2012).

3.4.4.1.1 Major Fish Groups

Fish can be broadly categorized by their horizontal and vertical distributions in the water column and their habitat associations. The major fish groups found in the proposed action area and their expected distribution within the proposed action area are listed in Table 3-10. The ESA-listed species within the proposed action area are listed in Table 3-11 and discussed in Section 3.4.4.1.2.

Table 3-10. Fish Orders Present in the Proposed Action Area

Order	Representative Species	Geographic Range	Distribution in the Water Column
Acipenseriformes	Sturgeon	Range includes the Aleutian Islands, Alaska, to central California. Populating freshwater rivers, coastal, and estuarine habitats (Kuhajda 2014).	Demersal
Anguilliformes	True eels, morays	Range includes the whole U.S. West Coast. Populating shallow fresh and salt waters, on muddy bottom or reef habitat (Hanke et al. 2014).	Demersal/bathydemersal
Atheriniformes	Silversides	Range includes Oregon to Baja California. Populating shallow freshwater and marine environments (Scharpf 2022).	Neritic-pelagic/reef associated
Aulopiformes	Lancetfish, daggertooths, waryfishes	Range includes the whole U.S. West Coast. Populating a wide array of habitats from near-shore coral reefs to the deep sea (Maile et al. 2020; Nelson et al. 2016).	Bathypelagic/oceanic-pelagic
Batrachoidiformes	Toadfish	Range includes Alaska to Baja California. Populating sandy or muddy bottom habitats on the continental shelf (Washington Department of Fish and Wildlife 2024c).	Demersal

Order	Representative Species	Geographic Range	Distribution in the Water Column
Beloniformes	Flying fish	Ranges from tropical to warm-temperate waters throughout the Pacific Ocean. Populating the surface layers of the open ocean (Nelson et al. 2016).	Oceanic-pelagic
Beryciformes	Squirrelfish, common fangtooth	Ranges from tropical to cold-temperate waters throughout the Pacific Ocean. Populating areas from deep-sea to nearshore coastal habitats (Nelson et al. 2016).	Bathypelagic
Carcharhiniformes	Cat sharks	Occupies a wide range of nearshore, coastal, deep-sea, and pelagic habitats from temperate to tropical seas throughout the west coast of North America (Ebert et al. 2017).	Benthopelagic/oceanic-pelagic
Chimaeriformes	Chimaeras, rat fish, ghost sharks	Found in all oceans except for the Antarctic. Populating depths of 650-8,530 ft (200-2600 m) (Shark Trust).	Demersal/bathydemersal
Clupeiformes	Pacific herring, American shad	Ranges includes Alaska to Baja California. Populating areas along the continental shelf (NOAA Fisheries 2023b).	Neritic-pelagic
Cypriniformes	Carps; minnows	Established throughout the lower Columbia River (Friesen and Ward 1999).	Benthopelagic/ pelagic
Gadiformes	Arctic cod, Pacific cod	Range includes the whole U.S. West Coast. Populating a broad range of habitats from shallow coastal waters to the Pacific continental slope (Hoff et al. 2015).	Demersal/benthopelagic
Gasterosteiformes	Stickleback, pipefish	Ranges from tropical and temperate marine waters throughout the Pacific Ocean. Often populating shallow freshwater and coastal areas (U.S. Fish & Wildlife Service 2017).	Benthopelagic
Hexanchiformes	Cow sharks	Range includes southeast Alaska to the Gulf of California. Populating the continental shelf and upper slopes down to 8,250 ft deep(2,514 m) (California Department of Fish and Game 2001).	Bathydemersal

Order	Representative Species	Geographic Range	Distribution in the Water Column
Lamniformes	Mackerel sharks	Range includes the Columbia River in Washington to Baja California. Populating diverse habitats from intertidal areas to the open ocean at depths of nearly 4,000 ft (1,219 m) (NOVA 2002).	Oceanic-pelagic
Lampriformes	Oarfish, opah	Range includes the whole U.S. West Coast populating deep ocean (NOAA Fisheries 2024f).	Oceanic-pelagic/bathypelagic
Lophiiformes	Goosefish, frogfish, batfish	Range includes the whole U.S. West Coast populating deep-sea habitats (Nelson et al. 2016).	Bathypelagic
Mugiliformes	Mullets	Found in coastal marine and brackish water in all tropical and temperate areas (Nelson et al. 2016).	Benthopelagic
Myctophiformes	Glacier lanternfish	Abundant midwater fish found throughout the world's oceans (Mensinger 2011).	Bathypelagic/oceanic-pelagic
Myxiniformes	Hagfish	Range includes southern Alaska to central Baja California. Populating deep, soft mud habitat, at depths of 53 to 3,788 ft (16 to 1154 m) (California Department of Fish and Wildlife 2023).	Demersal/bathydemersal
Notacanthiformes	Halosaurs, deep spiny eel	Range includes southern Alaska to central Baja California, often populating deep waters (Hanke et al. 2014).	Bathypelagic/benthopelagic/ bathydemersal
Ophidiiformes	Cusk eels	Range includes the Pacific Coast, spanning from Alaska to central Baja California (Hanke et al. 2015).	Demersal/bathydemersal/ benthopelagic
Osmeriformes	Capelin, eulachon, smelt	Range includes the Nort Pacific Ocean, populating marine, brackish, and freshwater habitats (Nelson et al. 2016).	All portions of water column
Perciformes	Sea bass; walleye	Occupies a wide range of nearshore, coastal, deep-sea, and freshwater habitats from temperate to tropical regions throughout the west coast of North America (Nelson et al. 2016).	All portions of water column

Order	Representative Species	Geographic Range	Distribution in the Water Column
Petromyzontiformes	Pacific lamprey, Arctic lamprey	Range includes the Pacific Rim from Japan through Alaska down to Baja California. Migrates between freshwater streams and the Pacific Ocean (Washington Department of Fish and Wildlife 2024b).	Demersal
Pleuronectiformes	Righteye flounders, sand flounders	Occupies a wide range of nearshore, coastal, and deep-sea habitats from temperate to tropical seas throughout the west coast of North America (Nelson et al. 2016).	Demersal/bathydemersal
Rajiformes	Skates, guitarfish	Range includes the Bering Sea to the Gulf of California. Populates sand and mud habitats along the continental shelf and slope (Oregon Department of Fish and Wildlife).	Demersal/bathydemersal
Saccopharyngiformes	Bobtail eel	Found in deep water throughout the Eastern Pacific Ocean from Oregon to Panama (Hanke et al. 2014).	Bathypelagic
Salmoniformes	Salmon, trout, whitefish, char	Occupies a wide range of nearshore, coastal, and freshwater habitats throughout the PNW (Finn 2007).	All portions of water column
Scorpaeniformes	Snailfish, rockfish, sculpins	Occupies a wide range of nearshore, coastal, deep-sea, and pelagic habitats from temperate to tropical seas throughout the west coast of North America (Nelson et al. 2016).	Demersal/bathydemersal
Siluriformes	Catfish	Established throughout the lower Columbia River (Washington Department of Fish and Wildlife 2024a).	Demersal
Squaliformes	Dogfish, sleeper shark	Range includes cool temperate to tropical waters in the Pacific populating the continental and insular shelves (Nelson et al. 2016).	Benthopelagic
Squatiniformes	Angel shark	Range includes Vancouver to the Gulf of California. Populating the continental shelf and littoral areas at depths of 50 to 150 ft (15 to 45 m) (Davis and Barilotti 2020).	Demersal

Order	Representative Species	Geographic Range	Distribution in the Water Column
Stephanoberycifores	Whalefish, bigscales	Occupies a wide range of deep-sea and pelagic habitats, from temperate to tropical, off the west coast of North America (Nelson et al. 2016).	Bathypelagic
Stomiiformes	Bristlemouth	Occupies deep-sea habitats from temperate to tropical waters in the Pacific Ocean (Nelson et al. 2016).	Bathypelagic
Syngnathiformes	Pipefish, seadragons	Range includes seagrass, coral reefs, and mangrove habitats in tropical, subtropical, and warm temperate seas (Fretwell and Starzomski 2014).	Oceanic-pelagic/reef associated/demersal
Tetraodontiformes	Trigger fish, file fish, molas	Occupies a wide range of nearshore, coastal, deep-sea, and pelagic habitats from temperate to tropical seas throughout the west coast of North America (Nelson et al. 2016).	Oceanic-pelagic/benthopelagic
Torpediniformes	Electric rays	Range includes the northeastern Pacific Ocean, spanning from California to British Columbia Canada (Neer et al. 2015).	Demersal
Zeiformes	Dories, rosy dory	In the eastern Pacific Ocean, species range from Canada to Chile in mid-to deep water environments (Nelson et al. 2016).	Bathydemersal/benthopelagic

Bathydemersal - living and feeding on the bottom below 656 ft (200 m).
Bathypelagic - living or feeding in open waters between 3,280 and 13,120 ft (1,000 m to 4,000 m).
Benthopelagic - living and feeding near the bottom as well as in midwaters or near the surface. Feeding on benthic as well as free swimming organisms.
Demersal - living on or near the bottom and feeding on benthic organisms.
Neritic-pelagic - shallow pelagic zone over the continental shelf and nearshore ocean ecosystems.
Oceanic-pelagic - living in the open ocean, offshore.

3.4.4.1.2 ESA-Listed Fish Species

A general description of habitat preference and life history of all ESA-listed species that may occur within the proposed action area is provided in this section. Table 3-11 summarizes these species and their likelihood of occurrence within the proposed action area. ESA-listed fish species are discussed in Appendix G.

Table 3-11. ESA-Listed Fish Species Found Within the Proposed Action Area

Common Name (*Scientific Name*)	**DPS and Listing Status**	**Likelihood of Occurrence Within the Proposed Action Area**
Bull trout (*Salvelinus confluentus*)	Columbia River DPS: Threatened	Likely; bull trout of the Columbia River DPS would be expected to occur within the Columbia River portion of the proposed action area; while most bull trout remain within rivers and streams, members of the Coastal-Puget Sound DPS enter marine waters and would be expected to occur within the coastal waters of Washington State within the proposed action area.
	Coastal-Puget Sound DPS: Threatened	
Chinook salmon (*Oncorhynchus tshawytscha*)	California Coastal ESU: Threatened	Likely; spawn in rivers of the PNW, including the Columbia River; juveniles and adults migrate to marine waters, including the proposed action area; some of the ESUs out to 120 nm.
	Central Valley spring-run ESU: Threatened	
	Lower Columbia River ESU: Threatened	
	Puget Sound ESU: Threatened	
	Sacramento River winter-run ESU: Endangered	
	Snake River fall-run ESU: Threatened	
	Snake River spring/summer-run ESU: Threatened	
	Upper Columbia River spring-run ESU: Endangered	
	Upper Willamette River ESU: Threatened	

Common Name (*Scientific Name*)	**DPS and Listing Status**	**Likelihood of Occurrence Within the Proposed Action Area**
Chum salmon (*Oncorhynchus keta*)	Columbia River ESU: Threatened	Likely; spawn in rivers of the PNW, including the Columbia River. Juveniles and adults migrate to marine waters, although presence in the proposed action area would be nearshore while migrating northward, generally occurring north of 48 °N, outside of the proposed action area.
Coho salmon (*Oncorhynchus kisutch*)	Central California Coast ESU: Endangered	Likely; spawn in rivers of the PNW, including the Columbia River; Juveniles and adults migrate to marine waters, including the proposed action area out to the 656 ft (200 m) depth contour.
	Lower Columbia River ESU: Threatened	
	Oregon Coast ESU: Threatened	
	Southern Oregon & Northern California Coasts ESU: Threatened	
Dolly Varden (*Salvelinus malma*)	Threatened due to similarity of appearance (proposed)	Potential; proposed for listing due to similarity of appearance to bull trout; both species primarily remain in riverine environments outside the proposed action area but may occur within coastal waters off Washington.
Eulachon (*Thaleichthys pacificus*)	Southern DPS: Threatened	Likely; occur primarily in coastal waters out to 984 ft (300 m) depths except for brief spawning runs into their natal streams.
Green sturgeon (*Acipenser medirostris*)	Southern DPS: Threatened	Likely; in portions of coastal marine waters from California to Washington, including in the lower Columbia River.
Sockeye Salmon (*Oncorhynchus nerka*)	Snake River ESU: Endangered	Likely; spawn in rivers of the PNW, including the Columbia River for the Snake River ESU. Juveniles and adults migrate to marine waters, although they migrate north after reaching marine waters and generally occur only north of 48 °N, outside of the proposed action area. Therefore, they would only be expected in the marine waters close to shore within the proposed action area.
	Ozette Lake ESU: Threatened	

Common Name (*Scientific Name*)	DPS and Listing Status	Likelihood of Occurrence Within the Proposed Action Area
Steelhead trout (*Oncorhynchus mykiss*)	Lower Columbia River DPS: Threatened	Likely; spawn in rivers of the PNW, including the Columbia River, and juveniles and adults migrate to marine waters and may occur throughout the proposed action area.
	Middle Columbia River DPS: Threatened	
	Northern California DPS: Threatened	
	California Central Valley DPS: Threatened	
	Central California Coast DPS: Threatened	
	Puget Sound DPS: Threatened	
	South-Central California Coast DPS: Threatened	
	Snake River Basin DPS: Threatened	
	Upper Columbia River DPS: Threatened	
	Upper Willamette River DPS: Threatened	

[1] For some of the fish evolutionarily significant units (ESUs), the spawning areas are outside of the proposed action area, but they are included due to their marine distribution, which does overlap with the proposed action area.

3.4.4.2 Environmental Consequences to Fish

Impacts to 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.

3.4.4.2.1 Fathometer Noise

The fathometer frequencies can range from 50–200 kHz, and the CPT-S (High Chirp) ranges from 170–230 kHz, which is the assumed operating frequency for the Proposed Action (Table 3-5). The hearing range of most fish is from 50 to 1,000 Hz, however some species of fish are capable of detecting high frequency sounds above 4 kHz (Popper 2008; Popper and Fay 2010). As discussed in Section 3.2.1.1, fathometer noise would be considered a *de minimis* acoustic source for most fish as they are not able to hear within the frequency range of the fathometer. Therefore, while most species of fish, including the ESA-listed species, would not detect fathometer noise, some species of clupeiformes (e.g., herrings, shads, sardines, anchovies) and gadiformes (e.g., cod, shad) could detect the fathometer. Noise from the fathometer would not be of sufficient intensity to cause physical harm or damage the hearing of fish. Accordingly, even for hearing specialists who may perceive the sound, potential impacts would be limited to masking or behavioral/physiological responses.

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, most biological sounds within the ocean environment are in the low frequency band of noise that would not overlap with the frequency range produced by the fathometer. Thus, masking of biological sounds by the fathometer is not expected to cause significant impact or harm to fish.

Fathometer noise could result in short-term behavioral or physiological responses (e.g., avoidance, stress, increased respiration rate) from hearing specialists. 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 fathometer noise 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 fathometer noise would be limited to short-term startle responses and temporary displacement from the location in which vessels are operating.

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. Encounters between hearing specialists and fathometer noise would be rare, further limiting potential impacts. No population-level impacts would be expected.

3.4.4.2.2 Vessel Noise

In general, large vessels, like the SPC-HWX II, would be expected to emit vessel noise with a frequency range of 20–300 Hz with a source level of no more than 190 dB re 1 µPa at 1 m (Table 3-5). While fish would be able to detect vessel noise based on these source levels, the intensity would be too low to cause physical injury or hearing damage. Potential effects to fish from vessel noise would be limited to masking and physiological or behavioral reactions.

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, masking would occur intermittently and only to those individual fish that may be close to the vessel as it travels through the vast proposed action area. Once the vessel moves out of the immediate area, individuals are expected to resume normal behavior after the vessel passes through the area.

Vessel noise could result in short-term behavioral or physiological responses (e.g., avoidance, stress, increased respiration rate) by 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 to vessels, vertically or horizontally in the water column, has been reported for cod and herring, and the behavior 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. Thus, effects from vessel noise would be limited to short-term startle responses and temporary displacement from the location in which vessels are operating. No population-level impacts would be expected.

3.4.4.2.3 Vessel Movement

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. 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 strikes would be rare given the operation of a maximum of four vessels in the large, proposed action area and given that most fish would be deeper than the draft of the vessel. No population-level impacts would be expected.

As a vessel approaches, a fish could have a detectable behavioral or physiological response (e.g., swimming away and increased heart rate). 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. 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). 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. As a result, any response is expected to be short-term and inconsequential.

3.4.4.2.4 Military Expended Materials

MEM associated with gunnery training would include inert small caliber projectiles (0.762 caliber [7.62 mm diameter, 51 mm length]) and any pieces of the foam buoys or other targets that cannot be recovered. As gunnery training would occur at least 10 mi (16 km) from shore and most MEM would be expected to sink quickly, MEM would only be expected to occur in offshore waters of the proposed action area. Therefore, impacts to fish would be limited to offshore species. Behavioral disturbances as MEM descends through the water column would be extremely minimal; thus, only the risk of ingestion is considered further.

Because practice munitions would immediately travel through the water column and settle on the seafloor, the potential for ingestion risk is present only for fish species that feed on the seafloor and in relatively deep waters where gunnery training would occur, limiting the potential for impacts. It is possible that settled projectiles would be directly ingested or be mistaken for food after they are colonized by seafloor organisms. 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.

In general, if a fish were to ingest a piece of MEM, injury or death could result. However, given the infrequent occurrence, limited geographic area for gunnery training associated with the Proposed Action, the very large, proposed action area, and the limited bottom feeding that would be expected from fish species in the offshore environment, ingestion or other adverse effects from MEM are highly unlikely to occur. No population-level impacts would be expected.

3.4.4.3 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, any potential impacts to fish would be limited to fathometer noise, vessel noise, vessel movement, and MEM. The Preferred Alternative would include the acquisition of up to six SPC-HWX II, four operational and two in Maintenance Relief Hull status. As detailed in the above analysis, potential impacts to individual fish would be minimal. The likelihood of lethal impacts to fish (e.g., vessel strike or ingestion of MEM) is very low, and the more likely impacts from the Proposed Action would be minor and transient behavioral or physiological reactions that would not significantly disrupt normal behavior patterns. No population-level impacts would be expected.

In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 1 would not result in significant adverse impacts to fish. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 1 would not result in significant harm to fish. In accordance with the ESA, fathometer noise, vessel noise, vessel movement, and MEM associated with Alternative 1 may affect, but are not likely to adversely affect the ESA-listed bull trout, Chinook salmon, chum salmon, coho salmon, Dolly Varden, eulachon, green sturgeon, sockeye salmon, or steelhead trout.

3.4.4.4 Impacts Under Alternative 2

Under Alternative 2, any potential impacts to fish would be similar to those discussed for activities under Alternative 1. The key difference under Alternative 2 would be that only four SPC-HWX II would be acquired; therefore, there would be no maintenance relief hulls available to replace an SPC-HWX II undergoing maintenance. Accordingly, the total vessel presence within the proposed action area would decrease under Alternative 2 compared to Alternative 1, resulting in an overall reduction (albeit minor) in potential impacts to fish.

In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 2 would not result in significant adverse impacts to fish. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 2 would not result in significant harm to fish. In accordance with ESA, fathometer noise, vessel noise, vessel movement, and MEM associated with Alternative 2 may affect, but are not likely to adversely affect, the ESA-listed bull trout, Chinook salmon, chum salmon, coho salmon, Dolly Varden, eulachon, green sturgeon, sockeye salmon, or steelhead trout.

3.4.4.5 Impacts Under the No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. No SPC-HWX II would be acquired, and the 47 MLBs would continue to support Coast Guard missions in the PNW. Therefore, baseline conditions of the existing environment would either remain unchanged. There would be no significant impact or harm to fish with implementation of the No Action Alternative.

3.4.5 Essential Fish Habitat

3.4.5.1 Affected Environment

The proposed action area is within the jurisdiction of the Pacific Fishery Management Council (PFMC), which manages fisheries for approximately 119 species off the coasts of Washington, Oregon, and California. Fishery Management Councils (FMCs) are required to identify EFH for each fishery covered under a fishery management plan (FMP). The PFMC does this with four FMPs: Salmon, Groundfish, Coastal Pelagic Species, and Highly Migratory Species. EFH may be designated within the water column, in benthic habitat, or both. Table 3-12 presents Management Units with EFH designations that overlap with the proposed action area and may be impacted by the Proposed Action.

In addition to EFH, the regional fisheries management councils may designate a subset of EFH as Habitat Areas of Particular Concern (HAPC). HAPCs have been identified under the Pacific Coast Groundfish FMP and the Pacific Coast Salmon FMP. PFMC elects not to spatially designate areas as HAPC. Rather, PFMC provides detailed text descriptions of what constitutes HAPC, which means that areas considered HAPC change and shift regularly. A detailed review of HAPC designated by PFMC can be found in Table 3-13.

Table 3-12. EFH Present Within the Proposed Action Area

Management Unit	Species Complex	Life Stages	Definition of EFH that may be Affected by the Proposed Action Area
Coastal Pelagic Species (CPS)	Finfish - Pacific sardine (*Sardinops sagax*), Pacific mackerel (*Scomber japonicus)*, northern anchovy (*Engraulis mordax*), market squid (Doryteuthis opalescens), Jack mackerel (*Trachurus symmetricus*)	All	The east-west geographic boundary of EFH for CPS finfish is defined as all marine and estuarine waters from the shoreline along the coasts of California, Oregon, and Washington offshore to the limits of the EEZ and above the thermocline where sea surface temperatures range between 10 ˚C (50 ˚F) and 26 ˚C (79 ˚F). The southern boundary of the geographic range of all CPS finfish is consistently south of the United States-Mexico border because sea surface temperatures are consistently below 26 ˚C (79 ˚F). Therefore, the southernmost extent of EFH is outside of the proposed action area. The northern boundary of the range of CPS finfish is more variable due to seasonal cooling of sea surface temperatures. Therefore, the northern EFH boundary is the position of the 10 ˚C (50 ˚F) isotherm, which varies seasonally and annually.
	Krill or euphausiids	All	EFH designation of krill extends the length of the West Coast from the shoreline to the 6,000 ft (1,829 m) isobath and to a depth of 1,312 ft (400 m). This designation of EFH is based on information based on two principal species, *Euphausia pacifica* and *Thysanoessa spinifera*.
Groundfish	Approximately 65 rockfish species, including flatfish, such as petrale sole (*Eopsetta jordani*) and Dover sole (*Microstomus pacificus*), and roundfish, such as sablefish (*Anoplopoma fimbria*) and Pacific whiting (*Merluccius productus*).	All	Groundfish EFH is designated within waters and substrates within the following areas: Depths less than or equal to 11,483 ft (3,500 m) to MHHW or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean-derived salts measure less than 0.5 parts per thousand during the period of average annual low flow. Within waters with seamounts in depths greater than 11,483 ft (3,500 m). Areas designated as HAPCs not already identified by the above criteria.

Management Unit	Species Complex	Life Stages	Definition of EFH that may be Affected by the Proposed Action Area
Salmon	Chinook Salmon (Oncorhynchus tshawytscha) and coho Salmon (O. kisutch)	All	PFMC designates freshwater EFH for Pacific salmon (Chinook and coho) within four major components: (1) spawning and incubation; (2) juvenile rearing; (3) juvenile migration corridors; and (4) adult migration corridors and holding habitat. Within the proposed action area, freshwater EFH only exists in the Columbia River. Freshwater EFH depends on lateral (e.g., floodplain, riparian), vertical (e.g., hyporheic) and longitudinal connectivity to create habitat conditions for spawning, rearing, and migration, including (1) water quality (e.g., dissolved oxygen, nutrients, temperature, etc.); (2) water quantity, depth, and velocity; (3) riparian-stream-marine energy exchanges; (4) channel gradient and stability; (5) prey availability; (6) cover and habitat complexity (e.g., logs, pools, aquatic and terrestrial vegetation, etc.); (7) space; (8) habitat connectivity from headwaters to the ocean (e.g., dispersal corridors); (9) groundwater-stream interactions; and (10) substrate composition. PFMC designates marine EFH for salmon using the following criteria: (1) estuarine rearing; (2) ocean rearing; and (3) juvenile and adult migration. Important features of this estuarine and marine habitat are (1) good water quality; (2) cool water temperatures; (3) abundant prey species and forage base (food); (4) connectivity with terrestrial ecosystems; and (5) adequate depth and habitat complexity including marine vegetation and algae in estuarine and near-shore habitats. Overall Chinook and coho salmon marine distribution is extensive, varies seasonally and interannually, and can be identified in general terms only. The geographic extent of marine EFH for Pacific salmon includes all marine waters within the U.S. EEZ north of Point Conception, CA.
Highly Migratory Species[1]	Common thresher shark (*Alopias vulpinus*)	Adults	Epipelagic, neritic, and oceanic waters off beaches and open coast bays, in near surface waters from the United States-Mexico EEZ border north seasonally to Cape Flattery, WA from the 240 ft (73 m) isobath westward to about 127 ˚ 30' W.
	Shortfin mako shark (*Isurus oxyrinchus*)	Neonate/early juveniles; Adults	**Neonate/early juveniles:** Oceanic and epipelagic waters from the United States-Mexico EEZ border north to 46 ˚ 30' N. **Adults:** Epipelagic oceanic waters from the United States-Mexico EEZ border to 46˚ 30' N extending from the 2,400 ft (732 m) isobath out to the U.S. EEZ boundary.
	Blue shark (Prionace glauca)	Late juveniles/subadults;	**Late juveniles/subadults:** Epipelagic, oceanic waters from the United States-Mexico border north to 37 ˚N from the 600 ft (183 m) isobath seaward to the

Management Unit	Species Complex	Life Stages	Definition of EFH that may be Affected by the Proposed Action Area
		Adults	outer boundary of the EEZ and beyond; and north to the United States-Canada border from the 6,000 ft (1,828 m) isobath seaward to the U.S. EEZ outer boundary. **Adults:** Epipelagic, oceanic waters from the United States-Canada border from the 6,000 ft (1,828 m) isobath seaward to the outer boundary of the U.S. EEZ.
	Albacore tuna (*Thunnus alalunga*)	Juveniles; Adults	Oceanic, epipelagic waters generally beyond the 600 ft (183 m) isobath from the United States-Mexico border north to United States-Canada border, and westward to the outer edge of the U.S. EEZ boundary.
	Pacific bluefin tuna (*Thunnus orientalis*)	Juveniles	Oceanic, epipelagic waters generally beyond the 600 ft (183 m) isobath from the United States-Mexico border north to United States-Canada border, and westward to the outer edge of the U.S. EEZ boundary.
	Broadbill swordfish (*Xiphias gladius*)[1]	Juveniles; Adults	**Juveniles:** Oceanic, epipelagic, and mesopelagic waters from the United States-Mexico border north to 41 ˚N latitude and to the 200 nm (370 km) U.S. West Coast EEZ. **Adults:** Oceanic, epipelagic, and mesopelagic waters from the United States-Mexico border to the United States-Canada border and to the 200 nm (370 km) U.S. West Coast EEZ.

[1]An eighth amendment to the Highly Migratory Species FMP was proposed to modify each species' EFH descriptions. The only change that resulted from this amendment that could affect the Coast Guard's analysis of EFH impacts is the inclusion of broadbill swordfish EFH within the proposed action area where this EFH does not currently overlap with the proposed action area. The Coast Guard has taken a conservative approach to impacts analysis here and has considered broadbill swordfish EFH as if Amendment 8 has been adopted.

Table 3-13. HAPC Designated by the PFMC

FMP	HAPC Type	Approximate Location in Proposed Action Area	Description of HAPC
Groundfish	Estuaries	Estuaries along the coast of Oregon and Washington, including the lower Columbia River	Protected nearshore areas, such as bays, sounds, inlets, and river mouths, influenced by ocean and freshwater inputs. Includes water column and substrate.
	Canopy Kelp	Shallow coastal areas off Oregon and Washington	Found in shallow water close to shore along the open coast. Kelp provides nurseries, feeding grounds, and shelter for groundfish species and their prey.
	Seagrass	Shallow coastal areas off Oregon and Washington	Includes water, substrate, and other biogenic features associated with eelgrass species (*Zostera spp.*), widgeongrass (*Ruppia maritima)*, or surfgrass (*Phyllospadix spp.*). Occurs in shallow water.
	Rocky Reefs	Nearshore or offshore coastal areas off Oregon and Washington	Includes those waters, substrates, and other biogenic features associated with hard substrate (e.g., bedrock, boulders, cobble, gravel) to mean higher high water (MHHW).
	Areas of Interest	Nearshore areas off Washington and offshore seamounts	Off Washington: All waters and sea bottom in state waters from the 3 nm (5.5 km) boundary of the territorial sea landward to MHHW. Encompasses a variety of habitats important to groundfish, including rocky reefs, estuaries, sandy substrates, and other sensitive nearshore coastal areas. Off Oregon: Daisy Bank/Nelson Island, Thompson Seamount, President Jackson Seamount. These locations support highly diverse biological communities due to their unique geology.
Salmon	Spawning Habitat	May occur in shallow waters of the proposed action area, particularly in the Columbia River	Low gradient stream reaches (less than three percent), containing clean gravel with low levels of fine sediment.
	Estuaries	Estuaries along the coast of Oregon and Washington, including the lower Columbia River	The high-water tidal level along the shoreline or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean-derived salts measure less than 0.5 parts per thousand during the period of average annual low flow.
	Marine and Estuarine Submerged Aquatic Vegetation	Shallow, coastal and nearshore areas off the coast of Oregon and Washington	Submerged aquatic vegetation, such as kelps and eelgrass.

3.4.5.2 Environmental Consequences to Essential Fish Habitat

Impacts to EFH would potentially result from fathometer 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. Helicopter noise, gunnery noise, and helicopter movement would have extremely limited impacts below the air-water interface and will not be considered further herein (Table 3-3).

Impacts to groundfish and salmon HAPC would be very similar to impacts to EFH. Impacts to HAPC would result from fathometer noise, vessel noise, and vessel movement. While spawning habitat HAPC occurs within the proposed action area (Columbia River), it does not occur in navigation channels, which is where the SPC-HWX II would occur. Therefore, there would be no impacts to spawning habitat HAPC.

3.4.5.2.1 Fathometer Noise

Fathometer noise could impact water column EFH due to the increase in ambient sound (Section 3.2.1.1) levels during transmission. However, most fish species would not be able to perceive fathometer noise, and only hearing specialists would be affected by fathometer noise. For those species that can perceive fathometer noise, potential reduction in the quality of the acoustic habitat would be localized and temporary due to the attenuation of the fathometer and movement of the vessels throughout the proposed action area (Section 3.4.4.2.1). The quality of the water column environment as EFH would be restored to normal levels immediately following the departure of vessels. There would be no impacts to benthic or biogenic EFH as a result of fathometer noise.

3.4.5.2.2 Vessel Noise

Vessel noise could impact water column EFH due to the increase in ambient sound (Section 3.2.1.2) levels 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 area. The quality of water column EFH would be restored to normal levels immediately following the departure of any vessels. There would be no impacts to benthic or biogenic EFH as a result of vessel noise.

3.4.5.2.3 Vessel Movement

Vessels could impact water column EFH as the vessel moves through the water. However, this potential reduction in the quality of the water column would be temporary and in the immediate area of the vessel. Due to the temporary movement of the vessels throughout the proposed action area, the quality of the EFH water column environment would be restored to normal levels immediately following the departure of the SPC-HWX II. In the open ocean, any impacts from vessel movement would be imperceptible as the vessel would alter a minimal portion of the large water column. Impacts would be more substantial within the Columbia River where an SPC-HWX II would occupy a larger portion of the navigable channel. However, while the vessel could temporarily reduce a small quantity of water column EFH during transit, it would not obstruct the river from fish passage at any point. Any reduction in quality or quantity of water column EFH from vessel movement associated with the Proposed Action would be minimal, localized, and temporary.

3.4.5.2.4 Military Expended Materials

MEM associated with gunnery training would include inert small caliber projectiles (0.762 caliber [7.62 mm diameter, 51 mm length]) and any pieces of the foam buoys or other targets that cannot be recovered. As gunnery training would occur at least 10 mi (16 km) from shore and most MEM would be expected to sink quickly, MEM would only be expected to occur in offshore waters of the proposed action area, not in coastal waters or the waters of the Columbia River. Therefore, impacts to EFH would be limited to offshore areas.

Small caliber practice munitions immediately travel through the water column and settle on the seafloor. Given that MEM would pass quickly through the water column, there would be no impacts on water column EFH. MEM impacts on soft-bottom habitats, which comprise most offshore areas, 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. Gunnery training would only be conducted in designated ranges, which would not be designated in areas of sensitive bottom habitats (e.g., HAPC, coral reefs). Due to the infrequent occurrence and the offshore location of gunnery trainings, the reduction in quantity of benthic EFH in the offshore area would be small in relation to the available EFH within the proposed action area.

3.4.5.3 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, any potential impacts to EFH would be limited to fathometer noise, vessel noise, vessel movement, and MEM. The Preferred Alternative would include the acquisition of up to six SPC-HWX II, four operational and two in Maintenance Relief Hull status. As detailed in the above analysis, the potential reduction in the quality and quantity of water column and benthic EFH could be minimally reduced as a result of the Proposed Action. However, impacts would be minor, temporary, and transient. No long-term reductions to EFH would be expected.

In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 1 would not result in significant adverse impacts to EFH. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 1 would not result in significant harm to EFH. In accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSA), Alternative 1 would not result in the reduction of the quality or quantity of EFH within the proposed action area. Alternative 1 would have no adverse effect on EFH; therefore, the Coast Guard did not consult under the MSA.

3.4.5.4 Impacts Under Alternatives 2

Under Alternative 2, any potential impacts to EFH would be similar to those discussed for activities under Alternative 1. The key difference under Alternative 2 versus Alternative 1 is that only four vessels would be acquired rather than six. This may result in minimal reduction in impacts because there would be no Maintenance Relief Hulls to operate while another vessel is undergoing maintenance. However, the difference would not result in substantive changes to the potential for, or types of, impacts to EFH.

In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 2 would not result in significant adverse impacts to EFH. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 2 would not result in significant harm to EFH. In accordance with the MSA, Alternative 2 would not result in the reduction of the quality or quantity of EFH within the proposed action area.

3.4.5.5 Impacts Under the No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. No SPC-HWX II would be acquired, and the 47 MLBs would continue to support Coast Guard missions in the PNW. Therefore, baseline conditions of the existing environment would remain unchanged. There would be no significant impact or harm to EFH with implementation of the No Action Alternative.

3.4.6 Sea Turtles

3.4.6.1 ESA-listed Sea Turtle Species

Since 1977, NMFS and the USFWS have shared jurisdiction over the recovery and conservation of sea turtles. Six species of sea turtles are found in U.S. waters, all of which are listed as endangered or threatened under the ESA, but only four would occur in the proposed action area (Table 3-14). ESA-listed sea turtle species are discussed in Appendix G. There are no sea turtle nesting areas in the proposed action area.

Table 3-14. ESA-Listed Sea Turte Species Present in the Proposed Action Area

Common Name (*Scientific Name*)	**DPS and Listing Status**	**Likelihood of Occurrence within the Proposed Action Area**
Green sea turtle (*Chelonia mydas*)	East Pacific DPS: Threatened (81 FR 20058; April 6, 2016)	Rare; would only occur within the proposed action area in summer; most common along the Pacific Coast in California and Mexico.
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered (35 FR 8491; June 2, 1970)	Likely; most common off California but may occur in waters off Oregon and Washington in summer.
Loggerhead sea turtle (*Caretta caretta*)	North Pacific Ocean DPS: Endangered (76 FR 58868; September 22, 2011)	Potential; found in the Pacific Ocean from Alaska to Chile, including throughout the proposed action area.
Olive Ridley sea turtle (*Lepidochelys olivacea*)	Mexico's Pacific coast breeding population: endangered All other populations: Threatened (43 FR 32800; July 28, 1978)	Rare; juveniles and adults migrate along the U.S. Pacific Coast, although there are extremely limited records of their occurrence off Washington or Oregon.

3.4.6.2 Environmental Consequences to Sea Turtles

Impacts to sea turtles 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.

3.4.6.2.1 Vessel Noise

As discussed in Appendix F, sea turtles hear best below 400 Hz. In general, large vessel (e.g., SPC-HWX II) noise would be expected to range from 20–300 Hz (Table 3-5); therefore, sea turtles may be able to detect vessel noise from the SPC-HWX II. Potential effects to sea turtles from vessel noise would be limited to masking and behavioral or physiological reactions.

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 sea turtles do use sound for navigation (as suggested by Lohmann and Lohmann (2019)), feeding, or other behaviors, then some auditory masking from vessel noise may occur. In the high energy environment of the PNW, vessel noise would only be loud enough to cause masking if over the ambient soundscape and when a sea turtle is in close proximity to the transiting vessel. Any effect of masking would be temporary and limited, individuals are expected to resume normal behavior after the vessel passes through the area.

When presented with acoustic stimuli at 430 Hz and 1.5 dB re 1 μPa, sea turtles placed in 50-gallon (0.19 cubic meters) 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 vessel noise in the open ocean may cause a startle response in sea turtles, any response is expected to be short term and temporary as the vessel moves through proposed action area. Similarly, a physiological response may occur in response to vessel noise, but it would be expected to last only a short time while the sea turtle is close enough to perceive the vessel noise. Overall, potential effects of vessel noise on sea turtles would be extremely limited given the operation of only up to four vessels throughout the large, proposed action area, and any responses would be so small that they cannot be meaningfully measured, detected, or evaluated. No population-level impacts would be expected.

3.4.6.2.2 Vessel Movement

Vessels have the potential to affect sea turtles by disturbing them in the water column or causing mortality or serious injury from vessel collisions. Sea turtles 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 (5–20 knots, cruising speed of 16 knots), a risk of a vessel collision with a sea turtle exists even if the sea turtle can see and hear the approaching vessel. 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). Additionally, most species would be rare within the proposed action area, making co-occurrence less likely. Coast Guard's SOPs (Appendix B) would minimize potential effects from vessel movement by maintaining lookouts for sea turtles to avoid collision; therefore, the likelihood of a collision with a sea turtle would be low.

The most likely response of a sea turtle to vessel movement would be a behavioral or physiological reaction, such as elevated heart rate, changes in general activity (e.g., from resting or feeding to active avoidance), or changes in speed and direction of movement. Short-term behavioral or physiological reactions to vessel movement are not expected to result in long-term effects to individuals, such as chronic stress. Avoidance of a vessel as it moves through the proposed action area is unlikely to cause abandonment or significant alteration of behavioral patterns, including breeding, feeding, or sheltering. Sea turtles would be expected to return to their normal behavior once the vessel has moved through the area. No population-level impacts would be expected.

3.4.6.2.3 Military Expended Materials

Inert small caliber (0.762 caliber [7.62 mm in diameter and 51 mm in length]) gun rounds, as well as unrecoverable target fragments, used in gunnery training may enter the water as MEM during the Proposed Action. The potential effect to sea turtles from MEM is ingestion, which may result in injury or death. MEM from targets is not expected to significantly affect sea turtle populations because of the small number targets used and the large distance that expended material would be dispersed throughout the large, proposed action area. Gunnery training would occur far from shore, so only sea turtles transiting through the offshore environment would be expected to encounter MEM and only if in the immediate gunnery training area. In addition, gunnery training would be infrequent and coordinated with NMFS to avoid sensitive locations (e.g., critical habitat) for all sea turtle species.

Green sea turtles forage on seagrasses and marine algae within coastal environments (Bjorndal and Bolten 1988; Bresette et al. 2006); thus, they are extremely unlikely to be affected by MEM associated with the Proposed Action. Olive ridley and loggerhead sea turtles forage offshore, both on the seafloor and in the water column; however, overlap with MEM associated with the Proposed Action would be unlikely due to their distribution, the intermittent occurrence of gunnery training, and because MEM would likely be covered by sediment and not available for ingestion shortly after descending. Leatherback sea turtles feed throughout the water column and may overlap with MEM at the surface (i.e., target fragments); however, the risk of ingestion would be so minimal as most MEM would sink quickly it is considered negligible.

Given the limited gunnery training associated with the Proposed Action, the very large, proposed action area, and the limited bottom feeding that would be expected from sea turtles in offshore waters, ingestion or other adverse effects from MEM are highly unlikely to occur. No population-level impacts would be expected.

3.4.6.3 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, any potential impacts to sea turtles would be limited to vessel noise, vessel movement, and MEM. The Preferred Alternative would include the acquisition of up to six SPC-HWX II, four operational and two in Maintenance Relief Hull status. As detailed in the above analysis, potential impacts to individual sea turtles would be minimal. The likelihood of lethal impacts to sea turtles (e.g., vessel strike or ingestion of MEM) is very low, and the more likely impacts from the Proposed Action would be minor and transient behavioral or physiological reactions that would not significantly disrupt normal behavior patterns, such as migration, breeding, or feeding. No population-level impacts would be expected.

In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 1 would not result in significant adverse impacts to sea turtles. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 1 would not result in significant harm to sea turtles. In accordance with the ESA, vessel noise, vessel movement, and MEM associated with Alternative 1 may affect, but is not likely to adversely affect, the ESA listed green sea turtle, leatherback sea turtle, loggerhead sea turtle, or olive ridley sea turtle.

3.4.6.4 Impacts Under Alternative 2

Under Alternatives 2, any potential impacts to sea turtles would be similar to those discussed for activities under Alternative 1. The key difference under Alternative 2 would be that only four SPC-HWX II would be acquired; therefore, there would be no maintenance relief hulls available to replace an SPC-HWX II undergoing maintenance. Accordingly, the total vessel presence within the proposed action area would decrease under Alternative 2 compared to Alternative 1, resulting in an overall reduction (albeit minor) in potential impacts to sea turtles.

In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 2 would not result in significant adverse impacts to sea turtles. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 2 would not result in significant harm to sea turtles. In accordance with the ESA, vessel noise, vessel movement, and MEM associated with Alternative 2 may affect, but is not likely to adversely affect, the ESA listed green sea turtle, leatherback sea turtle, loggerhead sea turtle, or olive ridley sea turtle.

3.4.6.5 Impacts Under the No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. No SPC-HWX II would be acquired, and the 47 MLBs would continue to support Coast Guard missions in the PNW. Therefore, baseline conditions of the existing environment would either remain unchanged. There would be no significant impact or harm to sea turtles with implementation of the No Action Alternative.

3.4.7 Marine Mammals

3.4.7.1 Affected Environment

Table 3-15 lists the marine mammals that would be expected to occur within the proposed action area along with distribution information, ESA-listing status, and which stock(s) may occur within the proposed action area. General information on marine mammal hearing and vocalization is discussed in Appendix F. ESA-Listed marine mammal species are discussed in Appendix G.

Table 3-15. Marine Mammals that May Occur within the Proposed Action Area

Common Name (*Scientific Name*)	MMPA Stock or DPS: ESA-Listing Status	Likelihood of Occurrence within the Proposed Action Area
Cetaceans- Mysticetes		
Blue whale (*Balaenoptera musculus*)	Eastern North Pacific: Endangered	Likely; regularly (seasonally) present off the outer Washington Coast and in offshore Oregon waters; migrate between northern summer feeding locations and wintering areas off Western Mexico and Central America.
Fin whale (*Balaenoptera physalus velifera*)	CA/OR/WA: Endangered	Likely; occur regularly off the coasts of Oregon and Washington; fewer expected in the winter months.
Gray whale (*Eschrichtius robustus*)	Western North Pacific DPS: Endangered	Rare; primarily found in Sakhalin Island, Russia; after foraging in summer in the western North Pacific, some migrate across southern Bering Sea to PNW through the proposed action area, then to Mexico for winter before returning to Russia following the same general route in the spring.
	Eastern North Pacific DPS: Not listed	Likely – seasonal; would be expected to occur in the proposed action area in summer and fall; winters off Mexico.
Humpback whale (*Megaptera novaeangliae*)	Central America DPS: Endangered	Likely – seasonal; winter off Mexico and Central America; would be expected to occur in the proposed action area in summer (often from July to September).
	Mexico DPS: Threatened	
Minke whale (*Balaenoptera acutorostrata*)	CA/OR/WA: Not listed	Likely; commonly distributed over the continental shelves from California to Washington year-round.
North Pacific right whale (*Eubalaena japonica*)	Eastern North Pacific: Endangered	Very Rare; the eastern population primarily resides in the eastern Bering Sea and Gulf of Alaska; a few sightings of individual animals have been observed in Washington and California.
Sei whales (*Balaenoptera borealis*)	Eastern North Pacific: Endangered	Rare; most individuals are migratory between higher latitudes in summer and lower latitudes in winter; primarily found in deep water and offshore.

Common Name (*Scientific Name*)	MMPA Stock or DPS: ESA-Listing Status	Likelihood of Occurrence within the Proposed Action Area
Cetaceans- Odontocetes		
Baird's beaked whale (*Berardius bairdii*)	CA/OR/WA: Not listed	Likely; distributed throughout the Pacific Ocean in deep waters and continental slopes from late spring to early fall.
Common bottlenose dolphin (*Tursiops truncates*)	CA/OR/WA: Not listed	Rare; mostly found in Southern California but may range into Oregon and Washington waters during warm-water periods.
Cuvier's beaked whale (*Ziphius cavirostris*)	CA/OR/WA: Not listed	Likely; most common beaked whale off the U.S. West Coast; prefer deep pelagic waters of the continental slope and edge.
Dall's porpoise (*Phocoenoides dalli*)	CA/OR/WA: Not listed	Likely; common in shelf, slope, and offshore waters off the coast of California, Oregon, and Washington.
Dwarf sperm whale (*Kogia sima*)	CA/OR/WA: Not listed	Rare; present in deep waters along the continental slope of the North Pacific, but records are rare; available data are insufficient to predict seasonal distribution.
Harbor porpoise (*Phocoena phocoena*)	Northern Oregon-Washington Coast: Not listed	Likely; found in coastal waters off Washington and Oregon year-round; distribution may shift to deeper offshore waters during late winter.
	Northern California-Southern Oregon: Not listed	Likely; found in coastal waters off southern Oregon as far north as 45 °N.
Hubbs' beaked whale (*Mesoplodon carlhubbsi*)	Mesoplodont Beaked Whales CA/OR/WA: Not listed	Rare; distributed throughout deep waters and along continental slopes of the North Pacific Ocean from Southern California to Washington; insufficient sighting records off the west coast exist to determine any seasonal patterns of distribution.
Killer whale (*Orcinus orca*)	Southern Resident DPS: Endangered	Likely - seasonal (winter); primarily reside within the Salish Sea (outside of the proposed action area), but in winter have been observed as far south as Monterey Bay, California and as far north as southeastern Alaska.
	West Coast Transient: Not listed	Likely; distributed from California through Southeast Alaska.

Common Name (*Scientific Name*)	MMPA Stock or DPS: ESA-Listing Status	Likelihood of Occurrence within the Proposed Action Area
	Eastern North Pacific Offshore: Not listed	Likely; distributed along the outer coasts of Washington and Oregon year-round.
	Eastern North Pacific Resident: Not listed	Likely; distributed along the continental shelf of Washington and Oregon year-round.
Northern right whale dolphin (*Lissodelphis borealis*)	CA/OR/WA: Not listed	Likely; found primarily off shelf and slope waters of the U.S. West Coast; seasonal north-south movements with most found off Oregon and Washington as water temperatures increase in late spring and summer.
Pacific white-sided dolphin (*Lagenorhynchus obliquidens*)	CA/OR/WA: Not listed	Likely; primarily found in shelf and slope waters off the U.S. West Coast; surveys suggest seasonal north-south movements, with animals found primarily off Oregon and Washington as water temperatures increase in late spring and summer.
Pygmy sperm whale (*Kogia breviceps*)	CA/OR/WA: Not listed	Rare; distributed in deep waters of the North Pacific Ocean; sightings off the west coast of Oregon and Washington are rare; available data are insufficient to predict any seasonal distribution.
Risso's dolphin (*Grampus griseus*)	CA/OR/WA: Not listed	Likely; commonly seen on the shelf and slope waters off Washington and Oregon; most common in these northern waters as water temperatures increase in the spring and summer.
Short-beaked common dolphin (*Delphinus delphis*)	CA/OR/WA: Not listed	Rare; widely distributed from the coast to 300 nm offshore, but more common off California than Oregon and Washington.
Short-finned pilot whale (*Globicephalus marohynchus*)	CA/OR/WA: Not listed	Rare; sightings are rare and primarily occur during warm-water years.
Sperm whale (*Physeter macrocephalus*)	CA/OR/WA: Endangered	Likely; widely distributed throughout the North Pacific Ocean; regularly present in deeper waters off Oregon and the outer Washington Coast, in all seasons except winter.
Stejneger's beaked whale (*Mesoplodon stejnegeri*)	Mesoplodont Beaked Whales CA/OR/WA: Not listed	Rare; distributed throughout the cold, temperate, and subarctic waters of the North Pacific Ocean; generally found in deep, offshore waters between 2,500 and 5,000 ft (m) on or beyond the continental slope.

Common Name (*Scientific Name*)	**MMPA Stock or DPS: ESA-Listing Status**	**Likelihood of Occurrence within the Proposed Action Area**
Striped dolphin (*Stenella coeruleoalba*)	CA/OR/WA: Not Listed	Rare; commonly encountered in warm offshore waters off California, but a few sightings have been made off Oregon.
Pinnipeds- Otariids		
California sea lion (*Zalophus californianus*)	U.S.: Not listed	Likely; found in coastal habitats from Vancouver Island, British Columbia, to the southern tip of Baja California in Mexico.
Guadalupe fur seal (*Arctocephalus townsendi*)	Mexico: Threatened	Rare; live in waters off southern California and Pacific Coast of Mexico; considered nonmigratory, but immature animals have been increasing in Washington and Oregon.
Northern fur seal (*Callorhinus ursinus*)	California: Not listed Eastern Pacific: Not listed	Likely; adult females and pups migrate from the Bering Sea into waters off Oregon and Washington; adult females spend about seven to eight months (November to June) at sea; adult males would not be expected within the proposed action area.
Steller sea lion (*Eumetopias jubatus*)	Eastern DPS: Not listed	Likely; breed and pup on rookeries in Oregon and Washington coast from late May to July.
Pinnipeds- Phocids		
Harbor seal (*Phoca vitulina*)	Oregon-Washington Coastal: Not listed	Likely; inhabits coastal and estuarine areas off the coast of Oregon and Washington; generally non-migratory but will move locally based on seasons.
Northern elephant seal (*Mirounga angustirostris*)	California Breeding stock: Not listed	Rare; females feed in the offshore waters of Washington and Oregon in the fall.

Common Name (*Scientific Name*)	MMPA Stock or DPS: ESA-Listing Status	Likelihood of Occurrence within the Proposed Action Area
Carnivores- Mustelids		
Northern sea otter (*Enhydra lutris kenyoni*)	Washington: Not listed (listed as threatened by the state of Washington)	Likely; found in nearshore waters off Washington and Oregon.

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), helicopter noise (Section 3.4.7.2.3), gunnery noise (3.4.7.2.4), vessel movement (3.4.7.2.5), helicopter movement (Section 3.4.7.2.6), and MEM (Section 3.4.7.2.7) associated with the Proposed Action.

3.4.7.2.1 Fathometer Noise

The frequency range of the fathometer is expected to range from 50 to 200 kHz, the CPT-S (High Chirp) ranges from 170–230 kHz (Table 3-5) and is considered a *de minimis* acoustic source. As a result, the received sound levels are expected to be much lower than the criteria for onset of TTS and PTS as provided in Table C-1. Given the low operational level, fathometer noise would not be expected to cause any injury or hearing loss to any marine mammal. Therefore, any potential effects to marine mammals as a result of fathometer noise would be limited to masking or behavioral responses.

Although there is a lack of audiometry data for baleen whale species (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). Therefore, mysticetes are unlikely to detect or react to fathometer noise (50 to 200 kHz). Similarly, sea lions, fur seals, and sea otters hear best between 60 Hz to 39 kHz (Kastak and Schusterman 1998; Moore and Schusterman 1987; Schusterman et al. 1972; Southall 2005), and they are unlikely to detect fathometer noise.

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 fathometer's frequency and the phocid best hearing range is limited to 50 and 86 kHz, which would be at the fathometer's lower operational frequencies. Any masking or behavioral response, although unlikely, is expected to be short-term and temporary. Any individual that may respond would be expected to return to its normal behavior after the vessel departs the area.

Fathometer noise could potentially impact odontocetes, as their range of best hearing is from 150 Hz to 160 kHz, which could overlap with low- and medium-frequency fathometer signals. In the unlikely event that an odontocete is within the proposed action area and close enough to an SPC-HXW II to detect the fathometer, the animal would be expected to exhibit no more than a short-term response to the fathometer given the device's *de minimis* characteristics. ESA-listed SRKWs and sperm whales may be present in the proposed action area and based on their hearing ranges, these species may be able to detect the fathometer.

For SRKWs, the Fisheries and Oceans Canada has issued voluntary actions, such as turning off fathometer (i.e., the fathometer) when not in use, to try and reduce the noise in their habitat. In the U.S., the SRKW task force identified a fathometer as one of the key sources of concern (Southern Resident Orca Task Force 2019). Noise from fathometer 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 the National Oceanic and Atmospheric Administration (NOAA) suggest SRKWs 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 a whale's ability to locate and hunt for prey. Many modern fathometers are dual frequency at 50 and 200 kHz, and the latter frequency does not overlap with the SRKWs' hearing range. Modern fathometers can manipulate which frequency is used, so 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 SRKWs 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 fathometer, the whale would be expected to exhibit no more than a short-term response to the sound given the system's characteristics (e.g., narrow, downward-directed beam), which is focused directly beneath the vessel. Any effect would be short-term until the whale and vessel move sufficiently far apart for the whale to no longer perceive the sound.

Some studies have noted 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 a fathometer (emitting about 1 pulse per second at 6–13 kHz); however, sperm whales did not show a prolonged reaction to continuous pulsing from fathometers (Watkins and Schevill 1975). Goold (1999) reported that six sperm whales were driven through a narrow channel using ship noise, fathometer, and fishfinder emissions from a flotilla of 10 vessels. SPC-HWX IIs would operate mainly in open ocean areas, not confined channels, and they would generally not operate as part of a large fleet. In the unlikely event that a sperm whale is in close enough proximity to an SPC-HWX II to detect the fathometer, it would be expected to exhibit no more than a short-term response given the device's *de minimis* characteristics.

In addition, Coast Guard SOPs (Appendix B) would initiate adaptive mitigation responses to marine mammal presence to minimize the effect of fathometer 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.

3.4.7.2.2 Vessel Noise

In general, large vessel (e.g., SPC-HWX II) noise would be expected to range from 20–300 Hz (Table 3-5); therefore, marine mammals from all hearing groups may be able to detect vessel noise. However, the received levels from vessel noise from the Proposed Action are expected to be below the onset of hearing threshold shifts for physical injury (Table C-1) for all marine mammal groups. Potential effects of vessel noise to marine mammals would be limited to masking and behavioral or physiological responses.

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 effects 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). In the high energy environment of the PNW, vessel noise would only be loud enough to cause masking over the ambient soundscape and when a marine mammal is in close proximity to the transiting vessel. Any effect of masking would be temporary and limited, individuals are expected to resume normal behavior after the vessel passes 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 μPa ^{2}/Hz from 100 to 1,000 Hz), but also at high frequencies (5–13 dB from 10,000 to 96,000 Hz). 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). 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 (e.g., Columbia River or homeports), the noise they radiate may affect coastal marine life. However, effects would be temporary and intermittent since SPC-HWX IIs would only operate within these areas for a short amount of time.

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, 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 that may increase energetic costs (Constantine et al. 2003; Constantine et al. 2004). Marine mammals are frequently exposed to vessels due to research, ecotourism, commercial and private vessel traffic, and government activities, so some individuals may become acclimated to vessel presence over time.

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. Sperm whales have 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). Although vessels could cause some short-term changes in behavior, any disturbance is expected to be temporary, and any exposed whale is expected to return to its normal behavior after the vessel moves through the area.

Studies on behavioral responses of pinnipeds to shipping noise have been undertaken globally at a range of spatial scales and different species (Anderwald et al. 2013; Burgess et al. 1998; Fletcher et al. 1996; Mikkelsen et al. 2019). 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 the 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).

Sound frequencies produced by vessels would fall within the hearing range of sea otters (estimated by proxy with California sea lions [*Zalophus californianus*] at 60 Hz to 38 kHz with best sensitivity between 1.3 and 27 kHz) (Ghoul and Reichmuth 2014). 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). 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.

Overall, masking effects would be similar to what is currently present in the proposed action area, because the proposed action activities are not expected to change the current ambient noise levels. Coast Guard would follow SOPs (Appendix B) to minimize the effect of vessel noise by monitoring the presence of marine mammals and maintaining or increasing distance between the vessel and a marine mammal.

3.4.7.2.3 Helicopter Noise

Potential effects to species from helicopters could involve acoustic and non-acoustic effects, and it is unclear if reactions are due to sound or the physical presence of the helicopter flying overhead. The noise associated with helicopters needs to be considered in multiple ways: in-air, on the sea surface, and underwater. Cetaceans may be exposed to in-air helicopter noise only when they have their heads above the water's surface. They may be exposed to underwater and sea surface sound any time they are within the narrow cone beneath a helicopter where noise would expect to radiate into the water. 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. Therefore, even with low-flying helicopters, noise from the helicopter would not reach a sufficient level to cause injury or hearing threshold shift to any marine mammal (Table C-1). Masking from helicopter noise would be unlikely due to the low level of underwater noise in a small area and the elevated ambient noise within the proposed action area. Thus, any potential marine mammal responses from helicopter noise associated with the Proposed Action would be limited to behavioral or physiological reactions.

The reactions of cetaceans to helicopter 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 helicopter overflights, such as diving underwater, slapping the water's surface with their flukes or flippers, or swimming away from the helicopter track (Richardson et al. 1995).

Gray whale reactions to aircrafts are variable, 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 from helicopter noise, and Payne et al. (1983) saw rare reactions to a circling helicopter 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). Any behavioral or physiological reactions of cetaceans to helicopter 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.

Pinnipeds, otariids, and sea otters, 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.

There would be no pinniped haul out locations close enough to helicopter training to perceive helicopter noise; therefore, exposure to helicopter noise would be limited to if an individual were present in the water within the narrow cone beneath a helicopter where noise would be perceived. Given the infrequency of helicopter training, and the small area below each helicopter where a pinniped may perceive noise, potential effects would be extremely unlikely to occur. Most studies on the effects of aircraft noise on pinnipeds have focused on hauled out individuals. However, 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). Overall, no more than an infrequent, minor behavioral reaction would be expected from the limited encounters with helicopter noise associated with the Proposed Action. 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.

3.4.7.2.4 Gunnery Noise

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) (Table 3-5) (Hood et al. 2012; Luz 1983; Ylikoski et al. 1995).

Gunnery training would occur sufficiently far from the water's surface that it would not be expected to cause physical injury from acoustic sources to any marine mammal species. The mitigation zone established as part of the Coast Guard SOPs (Appendix B) would extend beyond the distance to which species would likely experience PTS or TTS from weapons firing; therefore, mitigation would help reduce or avoid the potential for exposure to these impacts. Between the establishment of a mitigation zone during gunnery training, the limited amount of training that would occur in the large proposed action area, and the fact that species would primarily have their heads below the water's surface and would only be exposed to dampened sound after it crosses the air-water interface, neither PTS nor TTS would be expected to occur.

Due to the large size of the proposed action area, minimal gunnery training involved in the Proposed Action, use of a mitigation zone during training, and the limited time that any species spends at the surface or with its head above the surface, reactions to gunnery noise would be extremely unlikely to occur. Any species that is close enough to perceive gunnery noise would, at most, exhibit a temporary behavioral or physiological response. Any disturbance would be brief and temporary and limited to the duration of gunnery training and only to those individuals at the water's surface, if in the vicinity of the training area.

3.4.7.2.5 Vessel Movement

Vessels have the potential to affect marine mammals by disturbing them in the water column or causing mortality or serious injury from vessel collisions. There have been occasional sightings of marine mammals (e.g., gray whale, killer whale) within the Columbia River, even as far upriver as Portland, but generally, marine mammals would only be expected to occur within the estuarine and marine portions of the proposed action area. Potential co-occurrence between an SPC-HWX II and a marine mammal would be extremely rare in the Columbia River but would be more likely in the coastal and offshore waters of the proposed action area.

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, but possible options include the sound of water being displaced by the vessels, the sound of engines, or a combination of environmental cues vessels produce while they transit. 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.

Vessel collisions are a well-known source of mortality in marine mammals, and collisions 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. 2012; 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). An 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 5–20 knots with a cruising speed of 16 knots. Coast Guard's SOPs (Appendix B) would minimize potential effects from vessel movement by maintaining lookouts for marine mammals to avoid collision.

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 improved 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.

Large whales appear to be more susceptible to vessel collisions than any other marine mammal species (Barcenas-De la Cruz et al. 2018). In a study by Laist et al. (2001), strikes on right, humpback, and sperm whales were relatively common when compared to the other whales examined. In observing humpback whale surfacing behavior around large cruise ships in Alaska, Helm et al. (2023) found a high probability that whales remain near the surface after observation, increasing the risk of strike for this species, although the authors noted that this behavior makes the whale less likely to avoid the vessel but does give an alert vessel more time to avoid the whale due to the increased chance of observation.

Large delphinids (e.g., killer whales) have reactions to vessels ranging from avoidance to bow riding. Boat traffic has been shown to affect the behavior of the SRKW population around San Juan Island, Washington (outside the proposed action area) (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). Sperm whales are severely affected by ship strikes in certain areas, like the Canary Islands (Arregui et al. 2019); however, most sperm whales in the proposed action area would be expected to react to vessels by changing course and diving to more shallow depths (Gaskin 1964; Reeves et al. 2002).

Pinnipeds do not appear to be as susceptible to vessel collisions as large whales, though the risk of a collision still exists for these species. Barcenas-De La Cruz et al. (2018) compiled data on marine mammal strandings along the California coast between 2003 and 2015. Of the 76 stranded Guadalupe fur seals, none showed evidence of vessel strike. 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. Given the presence of lookouts, the small size of the SPC-HWX IIs, and the presence of a maximum of only four SPC-HWX IIs operating within the vast proposed action area, the likelihood of strike would be 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 most sea otters would occur, SPC-HWX IIs presence would be intermittent and temporary.

Overall, the most likely response of a marine mammal to vessel movement would be a behavioral or physiological reaction. Short-term behavioral reactions to vessel movement are not expected to result in long-term effects to individuals, such as chronic stress. Marine mammals would be expected to return to their normal behavior once the vessel has moved through the area.

3.4.7.2.6 Helicopter Movement

Given that helicopters would hover above the water's surface with minimal impacts below the surface, helicopter movement would not be expected to affect any species that is fully below the surface, including marine mammals. In the extremely unlikely event that a marine mammal was to have its head at the water's surface when the helicopter is present during a training event, that individual may exhibit a behavioral or physiological response. The most likely response of a marine mammal to helicopter movement would be a behavioral or physiological reaction, such as elevated heart rate, changes in general activity (e.g., from resting or feeding to active avoidance), or changes in speed and direction of movement. Short-term behavioral or physiological reactions to helicopter movement are not expected to result in long-term effects to individuals, such as chronic stress. Avoidance of a helicopter as it moves through the proposed action area is unlikely to cause abandonment or significant alteration of behavioral patterns. Marine mammals would be expected to return to their normal behavior once the helicopter has moved through the area. Behavioral and physiological reactions to helicopter movement would be minor and temporary.

3.4.7.2.7 Military Expended Materials

Inert small caliber (0.762 caliber [7.62 mm diameter, 51 mm length]) gun rounds as well as unrecoverable target fragments, used in gunnery training may enter the water as MEM during the Proposed Action. The potential effect to marine mammals from MEM is ingestion, which may result in injury or death. MEM from targets would not present a significant threat to marine mammal populations because of the small numbers of these targets used and the large distance that expended material would be dispersed throughout the vast proposed action area. Gunnery training would occur far from shore. Therefore, marine mammals that inhabit waters greater than 10 mi (16 km) offshore are most likely to overlap with the presence of MEM from gunnery training.

Most marine mammals feed either at the surface or in the water column. Of the mysticetes, gray whales regularly feed at the seafloor, but they do so in relatively shallow, soft-bottom areas where MEM is not likely to occur. 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), although this would be rare in the deeper, offshore waters where gunnery training would occur. 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). 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 found on the seafloor. Additionally, any MEM that sinks to the seafloor is likely to be covered due to shifting sediment in the sandy, offshore environment shortly after reaching the seafloor, limiting its availability to be ingested.

While incidental ingestion of foreign objects has led to sperm whale mortality in some cases, 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 (1989) provided data on the stomach contents from of 16 species of odontocetes with evidence of debris ingestion. Of the odontocete species occurring in the proposed action area, only sperm whales have been documented to have ingested items (likely incidentally) that do not float and, thus, are indicative of foraging at the seafloor, leading to the possibility that they could ingest MEM. However, the likelihood that sperm whales would ingest MEM found on the seafloor is very low both because of the low concentration of MEM that would be associated with the Proposed Action and the likelihood that MEM would quickly be buried by shifting sands upon reaching the seafloor.

Most pinniped species feed within the water column and on the seafloor. Laist (1997) recorded ingestion of a Styrofoam cup (an object that floats) by a Steller sea lion. As pinnipeds mainly feed at or below the water's surface in the water column, and not on the seafloor, expended practice munitions and target fragments are not likely to be encountered or ingested by pinnipeds. Sea otters exploit specific prey resources on the seafloor; however, gunnery training would likely occur farther offshore than where most sea otters occur, reducing the potential for exposure or risk of MEM ingestion. Therefore, pinnipeds and sea otters would not be expected to ingest MEM associated with the Proposed Action.

Overall, if a marine mammal were to ingest a piece of MEM, injury or death could result. However, given the limited gunnery training associated with the Proposed Action, the vast proposed action area, and the limited bottom feeding that would be expected from marine mammals, ingestion or other adverse effects from MEM are highly unlikely to occur.

3.4.7.3 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, any potential impacts to marine mammals would be limited to the fathometer noise, vessel noise, helicopter noise, gunnery noise, vessel movement, helicopter movement, and MEM. The Preferred Alternative would include the acquisition of up to six SPC-HWX II, four operational and two in Maintenance Relief Hull status. As detailed in the above analysis, potential impacts to individual marine mammals would be minimal. The likelihood of lethal impacts to marine mammals (e.g., vessel strike or ingestion of MEM) is very low, and the more likely impacts from the Proposed Action would be minor and transient behavioral or physiological reactions that would not significantly disrupt normal behavior patterns, such as migration, breeding, feeding, or sheltering. No population-level impacts would be expected.

In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 1 would not result in significant adverse impacts to marine mammals. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 1 would not result in significant harm to marine mammals. In accordance with the ESA, all stressors associated with Alternative 1 may affect, but are not likely to adversely affect the ESA-listed blue whale, fin whale, gray whale, Guadalupe fur seal, humpback whale, SRKW, North Pacific right whale, sei whale, or sperm whale. In accordance with the MMPA, all stressors associated with Alternative 1 would not result in reasonably foreseeable takes of marine mammals.

3.4.7.4 Impacts Under Alternative 2

Under Alternative 2, any potential impacts to marine mammals would be similar to those discussed for activities under Alternative 1. The key difference under Alternative 2 would be that only four SPC-HWX II would be acquired; therefore, there would be no maintenance relief hulls available to replace an SPC-HWX II undergoing maintenance. Accordingly, the total vessel presence within the proposed action area would decrease under Alternative 2 compared to Alternative 1, resulting in an overall reduction (albeit minor) in potential impacts to marine mammals.

In accordance with NEPA (baseline out 12 nm [22 km]), Alternative 2 would not result in significant adverse impacts to marine mammals. In accordance with E.O. 12114 (beyond 12 nm [22 km]), Alternative 2 would not result in significant harm to marine mammals In accordance with the ESA, all stressors associated with Alternative 2 may affect but are not likely to adversely affect the ESA-listed blue whale, fin whale, gray whale, Guadalupe fur seal, humpback whale, SRKW, North Pacific right whale, sei whale, or sperm whale. In accordance with the MMPA, all stressors associated with Alternative 2 would not result in reasonably foreseeable takes of marine mammals.

3.4.7.5 Impacts Under the No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. No SPC-HWX II would be acquired, and the 47 MLBs would continue to support Coast Guard missions in the PNW. Therefore, baseline conditions of the existing environment would either remain unchanged. There would be no significant impact or harm to marine mammals with implementation of the No Action Alternative.

3.5 Socioeconomic and Cultural Resources

This section discusses cultural resources (e.g., subsistence hunting and fishing and other activities of cultural significance) and socioeconomic resources (e.g., population demographics, economic activity, and other data providing key insights into socioeconomic conditions) that might be affected by the Proposed Action. Table 3-1 provides rationale for those resources that were not further analyzed.

3.5.1 Affected Environment

Socioeconomics describes the basic attributes and resources associated with the human environment, particularly with regard to population and economic activity. The counties of Oregon and Washington adjacent to the proposed action area, inclusive of those along the lower Columbia River, are home to nearly 2,400,000 people (U.S. Census Bureau 2023, 2024).

Because the Proposed Action does not include any land-based activity, the impacts on socioeconomic resources would be limited, and unaffected resources (e.g., schools, housing, tax revenue) will not be considered further herein. Instead, the socioeconomic analysis focuses on those sectors typically considered part of the marine economy, as defined by the NOAA Office of Coastal Management's Economics: National Ocean Watch (ENOW) Program, which includes the following categories: living resources, marine construction, ship and boat building, marine transportation, offshore mineral resources, and tourism and recreation (Table 3-16). For the purposes of this analysis, living resources are assessed as commercial fishing and aquaculture. Per ENOW, recreational fishing is discussed in the tourism and recreation section. Additional categories such as subsistence fishing and marine scientific research are considered in addition to those used by ENOW.

Like socioeconomic resources, cultural resources tend to be concentrated on land. The areas adjacent to the proposed action area include tribal lands that are the current and ancestral homes of the region's Indigenous peoples. Many of these tribes engage in important socioeconomic and cultural activities in and adjacent to the proposed action area, including treaty-protected commercial, subsistence, and ceremonial hunting and fishing. Furthermore, in-water areas may hold special cultural significance or house archaeological artifacts or sites, including both tribal and non-tribal resources. As a result, this section focuses on cultural resources and uses of the waters within the proposed action area, rather than the adjacent terrestrial shorelines and coasts. In some cases, like tribal subsistence fishing, activities and resources may hold both substantial socioeconomic and cultural significance; however, these are discussed in only one section for the purpose of brevity.

Table 3-16. Employment and GDP Contributions of Marine Economy Sectors in the Proposed Action Area in 2021

Location		Sector												Total[1]	
		Living Resources		*Marine Construction*		*Ship and Boat Building*		*Marine Transportation*		*Offshore Mineral Resources*		*Tourism and Recreation*			
		Jobs	*GDP (million USD[1])*	*Jobs*	*GDP (million USD)*	*Jobs*	*GDP (million USD)*	*Jobs*	*GDP (million USD)*	*Jobs*	*GDP (million USD)*	*Jobs*	*GDP (million USD)*	*Jobs*	*GDP (million USD)*
Oregon (Statewide)		2,377	288	508	68	1,617	211	11,391	1,100	542	91	23,810	1,600	40,248	3,400
USCG: Coos Bay	***Coos County***	217	18	n/a[2]	n/a	n/a	n/a	35	3	0	0	2,613	179	3,252	246
USCG: Yaquina Bay	***Lincoln County***	339	39	10	1	n/a	n/a	n/a	n/a	n/a	n/a	4,121	291	4,574	337
Washington (Statewide)		8,905	1,600	2,607	492	18,727	4,700	23,685	2,900	1,080	260	67,117	5,100	122,123	15,000
USCG: Grays Harbor	***Grays Harbor County***	587	57	n/a	n/a	n/a	n/a	n/a	n/a	0	0	1,753	118	2,651	220
USCG: Cape Disappoint-ment	***Pacific County***	219	21	0	0	n/a	n/a	n/a	n/a	n/a	n/a	883	61	1,520	115

[1]Totals may not equal the sums of individual values due to rounding and suppression of some values for confidentiality reasons. [2] Values labelled "n/a" represent suppressed values that are not publicly reported by NOAA to maintain confidentiality of one or more businesses. Note: GDP=gross domestic product; USD=U.S. Dollars; USCG=U.S. Coast Guard. Sector descriptors are from the NOAA Economics: National Ocean Watch (ENOW) Explorer. Living Resources includes the commercial seafood industry; however, recreational fishing is included in Tourism and Recreation. Source: NOAA Office for Coastal Management (2024)

3.5.1.1 Subsistence Fishing and Hunting

Subsistence fishing and hunting, including gathering (e.g., shellfish), may occur in and near the proposed action area. The definition of subsistence fishing can vary, and many forms of subsistence fishing are often categorized as types of recreational fishing. For example, those individuals who may fish from private or hired boats for both enjoyment and nutrition are typically categorized as recreational fishers, even if they keep their catch to feed themselves or others (Nieman et al. 2021). As a result, some information included in Section 3.5.1.3 on recreational fishing can be instructive to better understand the entirety of subsistence fishing in the proposed action area. That said, this present section discusses subsistence fishing and hunting that is carried out primarily for nutritional or ceremonial purposes, largely by the Indigenous peoples of Oregon and Washington. These forms of subsistence fishing and hunting are often formalized in regulation and practice.

In the PNW, 24 tribes have treaty-reserved fishing rights in western Washington and the Columbia River basin for commercial, ceremonial, and subsistence fishing (Northwest Indian Fisheries Commission 2016; Pacific Fishery Management Council 2024). These tribes have rights to fish in their U&A fishing areas, and a portion of fisheries catches are allocated to them through management processes, which are co-managed between the tribes and state and federal partners. In the proposed action area, the Makah, Quileute, Hoh, and Quinault tribes hold treaty rights to ocean fisheries, including salmon, halibut, and other species. The Quinault tribe’s U&A fishing area extends into Grays Harbor, where an SPC-HWX II would be homeported. In the Columbia River Basin, the Yakama, Warm Springs, Umatilla, and Nez Perce tribes hold treaty fishing rights, and their U&A fishing grounds include portions of the Columbia River. These grounds, however, do not extend downriver of Portland and, therefore, fall outside the proposed action area (Columbia River Inter-Tribal Fish Commission 2021b), although anadromous fish caught upriver transit through the proposed action area.

In all cases of treaty-reserved fishing in U&A fishing grounds, harvest for subsistence and ceremonial purposes may occur. The Makah, for instance, reserved their right to whaling in the Treaty of Neah Bay, and they engage in a whale hunt for gray whales in the northeastern portion of the proposed action area (Makah Tribe 2024). The whale hunt holds substantial spiritual and ceremonial meaning for the Makah, while also providing subsistence value to the tribe. Subsistence hunting and fishing for other species (e.g., salmon) hold cultural significance for many tribes, as well as providing subsistence and commercial value.

3.5.1.2 Commercial Fishing and Aquaculture

Commercial fishing is a significant industry in the PNW. Fisheries are conducted for a variety of species, including salmonids, groundfish, and crustaceans, and fishing is typically carried out by both native tribes and non-native entities. Table 3-17 describes the recent overall landings of commercial fisheries in Oregon and Washington, and Table 3-18 outlines the largest fisheries in and around the proposed action area. Commercial fishing provides value beyond the price of landings. The seafood industry is a large sector composed of harvesters, processers, dealers, distributors, and other entities throughout the supply chain. Commercial fisheries provide nutritional and other benefits to consumers. Consequently, the total socioeconomic impacts of commercial fisheries are larger than simple landings. In 2021, the Oregon seafood industry comprised 17,839 jobs and added $778,808,000 to the economy; the Washington seafood industry comprised 67,427 jobs and added $4,380,404,000 to the economy (NOAA Fisheries 2024a).

Marine aquaculture occurs along the coast and within the bays of Washington and Oregon, including in the proposed action area. In 2018, Oregon and Washington generated $23,668,000 and $207,685,000, respectively, in aquaculture sales (U.S. Department of Agriculture 2018). The majority of farmed product is shellfish, largely oysters and clams. Aquaculture farms and farmed acreage are concentrated nearshore, including intertidal areas where SPC-HWX II would not operate. Washington is the leading producer of farmed shellfish in the United States.

Table 3-17. Commercial Fisheries Landings in Oregon and Washington (2018-2022)

State Landed	2018		2019		2020		2021		2022	
	Lbs (thousand)	*USD (thousand)*	*Lbs (thousand)*	*USD (thousand)*	*Lbs (thousand)*	*USD (thousand)*	*Lbs (thousand)*	*USD (thousand)*	*Lbs (thousand)*	*USD (thousand)*
Oregon	312,864	174,722	334,983	165,046	344,540	154,954	317,723	208,155	286,179	132,592
Washington	203,840	331,156	183,954	292,960	159,432	232,149	187,402	290,479	159,941	325,600

Note: Lbs=pounds; USD=U.S. dollars; Source: NOAA Fisheries (2024b)

Table 3-18. Top Ten Commercially Landed Species in Oregon and Washington (2022)

Rank	Oregon				Washington			
	Top ten species landed in 2022 in terms of weight		*Top ten species landed in 2022 in terms of value*		*Top ten species landed in 2022 in terms of weight*		*Top ten species landed in 2022 in terms of value*	
	Species	*Lbs (thousand)*	*Species*	*USD (thousand)*	*Species*	*Lbs (thousand)*	*Species*	*USD (thousand)*
1	Pacific Hake (Whiting)	170,337	Dungeness Crab	31,442	Ocean Shrimp	65,323	Dungeness Crab	108,820
2	Ocean Shrimp	41,218	Pacific Hake (Whiting)	18,913	Dungeness Crab	24,320	Geoduck Clam	71,361
3	Widow Rockfish	21,168	Ocean Shrimp	18,789	Albacore Tuna	19,917	Pacific Oyster	34,852
4	Sablefish	6,666	Albacore Tuna	14,347	Chum Salmon	9,092	Clams (Species Group)	23,679
5	Dover Sole	6,403	Sablefish	10,846	Pacific Oyster	6,336	Albacore Tuna	19,049
6	Albacore Tuna	6,267	Chinook Salmon	6,489	Widow Rockfish	3,857	Ocean Shrimp	11,655
7	California Market Squid	5,521	Widow Rockfish	5,993	Chinook Salmon	3,567	Chum Salmon	10,442
8	Dungeness Crab	4,925	Petrale Sole	5,180	Sablefish	2,836	Chinook Salmon	8,650

Rank	Oregon				Washington			
	Top ten species landed in 2022 in terms of weight		***Top ten species landed in 2022 in terms of value***		***Top ten species landed in 2022 in terms of weight***		***Top ten species landed in 2022 in terms of value***	
	Species	***Lbs (thousand)***	***Species***	***USD (thousand)***	***Species***	***Lbs (thousand)***	***Species***	***USD (thousand)***
9	Yellowtail Rockfish	4,455	California Market Squid	3,377	Coho Salmon	2,332	Spot Shrimp	5,784
10	Petrale Sole	4,320	Dover Sole	2,661	Sockeye Salmon	2,051	Sablefish	5,073

Note: Lbs=pounds; USD=U.S. dollars. Landings for some species are confidential and not reported in NOAA Fisheries public statistics. A large portion of Washington landings by weight are withheld for confidentiality (65,322,767 lbs; $5,384,468). Source: NOAA Fisheries (2024b)

3.5.1.3 Recreation and Tourism

Recreation and tourism include a variety of activities, such as recreational fishing, whale watching, paddling, boating, swimming, commercial cruise travel, and other uses of the marine and riverine environment in the proposed action area.

Beach activities, such as ocean swimming, are considered one of the largest categories of outdoor recreation in both states by expenditure and participant days. While most beach activities take place along the shoreline, outside the proposed action area, some beach activities may extend into its waters. Other activities that partly or entirely take place in marine waters, including powerboating, sailing, diving, surfing, kiteboarding, and paddling are similarly important, resulting in close to $1,000,000 of annual expenditures in Oregon and well over that amount in Washington (Mojica et al. 2021; Mojica and Fletcher 2020). These activities are particularly important to the local economies of the proposed SPC-HWX II homeport counties. In Coos and Lincoln counties, Oregon, outdoor recreation (including marine and inland activities) resulted in $1,270,000,000 and $2,080,000,000 of expenditures, respectively, in 2019 (Mojica et al. 2021). In Grays Harbor and Pacific counties, Washington, outdoor recreation (including marine and inland activities) resulted in $257,044,000 and $246,450,00 of expenditures, respectively, in 2019 (Mojica and Fletcher 2020). Altogether, ocean-based tourism and recreation comprise the largest marine economic sectors in the four proposed SPC-HWX II homeport counties, representing the majority of gross domestic product (GDP) and employment generated within the local marine economies (Table 3-16).

Additionally, as of 2009, Washington is home to 127 MPAs, while Oregon waters currently include five MPAs (Oregon Department of Fish and Wildlife 2024b; Van Cleve et al. 2009). Although many of Washington's MPAs are within Puget Sound outside of the proposed action area, some of its largest, including the Olympic Coast National Marine Sanctuary, overlap with the proposed action area. All five Oregon MPAs are along the coast within the proposed action area. Where allowed, these MPAs provide for water-based recreational activities including, but not limited to, wildlife viewing and boating. They are important elements of the states' coastal resources, drawing a significant number of tourists to coastal counties and waters.

Recreational fishing is a common activity along the coasts of Oregon and Washington, as well as in the Columbia River. Saltwater recreational fishing typically takes place in state waters, and anglers catch a variety of species, including tunas, salmon, and invertebrates. Anglers similarly engage in recreational fishing in a variety of ways, from shore fishing to private or for-hire boats. According to the Washington Department of Fish and Wildlife, over 675,000 salmon were caught by recreational anglers during 2021-2022 in Washington, including 255,000 in marine waters and over 20,000 in the Columbia River below the Bonneville Dam, which is largely part of the proposed action area (Craig and Scalici 2023). Trip data were not available in Willapa Bay and Grays Harbor (an SPC-HWC II homeport), signaling that these statistics are an underestimate of recreational participation and catch. In 2021, the Oregon saltwater recreational fishing sector generated 704 jobs and $73,732,000; the Washington saltwater recreational fishing sector generated 1,230 jobs and $174,066,000 (NOAA Fisheries 2024a). A state-level analysis conducted for the Oregon Department of Fish and Wildlife showed that there were approximately 968,000 recreational fishing trips in the state's coastal areas in 2021, generating an estimated $150,000,000 in income to the state, equivalent to 2,150 jobs (The Research Group LLC 2024). The difference between the federal and state economic figures is due to the difficulties in accounting for recreational fisheries participation; the federal statistics are limited only to the trip impacts of the for-hire and private boat sectors, while state data include survey and other information derived from all forms of recreational fishing.

3.5.1.4 Other Socioeconomic Resources

Other socioeconomic resources that may be affected by the Proposed Action include transportation and shipping, marine construction, scientific research, and mineral extraction.

Transportation and shipping are a significant sector of the Oregon and Washington marine economies, contributing a combined 33,616 jobs and approximately $4,000,000 to the states in 2021. Oregon and Washington are home to three of the eleven largest fishing ports in the United States (NOAA Fisheries 2024b) and seven of the fifty largest overall ports by tonnage (Bureau of Transportation Statistics 2023). Shipping traffic in both the marine and riverine waters of the proposed action area is significant and can be substantial in certain places, such as Cape Disappointment, the mouths of other major rivers, or near the entrance to the Strait of Juan de Fuca.

Marine and riverine construction includes a variety of activities, such as beach nourishment and harbor dredging. Many marine construction activities occur near or along the shoreline, while riverine construction activities may occur throughout the Columbia River. For instance, the Army Corps of Engineers, in collaboration with ports and other partners, conducts maintenance dredging throughout the lower Columbia River to maintain the river channel for sea-going ships and other vessels (U.S. Army Corp of Engineers Portland District 2024). Throughout Oregon and Washington, the marine construction sector contributed 3,115 jobs and approximately $560,000,000 to the state economies in 2021 (Table 3-16).

Biological, oceanographic, and other research occurs throughout the proposed action area. This includes, but is not limited to, remote, ship-based, and experimental research carried out by academic, public, and private researchers (e.g., NOAA Fisheries 2024g; Oregon Department of Fish and Wildlife 2024a; Washington Department of Ecology 2024b). The states, federal agencies, and many universities conduct long-term monitoring programs along the Washington and Oregon coasts (NANOOS 2024). Offshore research may involve species surveys for marine mammals or oceanographic surveys for marine productivity and conditions. Research is also conducted along the lower Columbia River to monitor species abundances (especially migrating salmon), species fitness, and riverine conditions (e.g., Columbia River Inter-Tribal Fish Commission 2024).

Mineral extraction is limited in the proposed action area. Oil and gas extraction is banned offshore Oregon. While oil and gas extraction are permitted offshore Washington, no operations currently exist. Consequently, mineral extraction in the proposed action area is limited primarily to sand and gravel mining, which contributed 1,622 jobs and approximately $351,000,000 to the economies of Oregon and Washington in 2021 (Table 3-16).

3.5.2 Environmental Consequences to Socioeconomic and Cultural Resources

Overall, acoustic stressors would not be expected to have direct effects on any socioeconomic or cultural resources. The noise impacts would be minimal and would not rise to the level of distracting or discouraging any human activities. None of the physical stressors (vessel movement, helicopter movement, or MEM) would be expected to affect benthic resources, such as potential archaeological resources or aquaculture operations on the seafloor, because the SPC-HWX II and helicopters would not contact the seafloor. Additionally, MEM would only be expected to occur in designated ranges where gunnery training could take place, away from sensitive socioeconomic or cultural resources.

The predominant impact of the Proposed Action to all socioeconomic and cultural resources would potentially result from an increase in Coast Guard presence in the proposed action area. Replacement of the retired SPC-HWX fleet with SPC-HWX II would supplement the support from the 47 MLBs and facilitate the Coast Guard’s capabilities to support missions offshore in the hazardous waters of the

PNW. Coast Guard missions that would benefit other uses of these waters include marine safety (providing general, ongoing safety checks and enhancements) and SAR (saving lives and property in an emergency). Although emergency response is not covered under the Proposed Action, the training that is part of the Proposed Action would be vital to ensuring emergency support is available. 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 other human uses of the proposed action area (Appendix B). As a result, there would be no more than a minor displacement of other uses (e.g., away from designated ranges for gunnery training), but no displacement would be expected to inhibit other uses of the PNW.

Potential negative impacts to socioeconomic and cultural resources due to vessel movement are possible, but unlikely, given that a maximum of four vessels would be operating under the Proposed Action. Interactions would be most likely in the bays, harbors, and estuaries of the proposed action area, including near homeport locations and within the Columbia River. These locations typically have a higher relative density of socioeconomic and cultural resources (e.g., aquaculture farms, transportation and shipping, or recreational boating and paddling). However, even in these areas, any vessel traffic due to SPC-HWX IIs would constitute a negligible change above overall baseline vessel traffic, and SPC-HWX IIs would follow standard navigational procedures when operating in these areas and near known resources. Consequently, vessel movement would have limited to no negative impacts on socioeconomic and cultural resources in the proposed action area, including in bays, harbors, estuaries, or the Columbia River.

Potential negative impacts to commercial, recreational and sustenance fishing and hunting would be indirect impacts to targeted species from the Proposed Action, as described in Sections 3.4.4 and 3.4.7, above. However, these impacts would be extremely small and limited to fish or marine mammals near an SPC-HWX II. Given that a maximum of four vessels would be operating at any given time in the very large, proposed action area, any effect to fishing or hunting would be imperceptible.

3.5.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, any potential impacts to socioeconomic and cultural resources would be extremely minimal, although they may be associated with fathometer noise, vessel noise, helicopter noise, gunnery noise, vessel movement, helicopter movement, or MEM. The Preferred Alternative would include the acquisition of up to six SPC-HWX II, four operational and two in Maintenance Relief Hull status. As detailed in the above analysis, potential direct impacts would be minor and primarily beneficial, and direct impacts (i.e., adverse effects to fishing targets) would be imperceptibly small.

In accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 1 would not result in significant adverse impacts to socioeconomic and cultural resources.

3.5.2.2 Impacts Under Alternative 2

Under Alternative 2, any potential impacts to socioeconomic and cultural resources would be similar to those discussed for activities under Alternative 1. The key difference under Alternative 2 versus Alternative 1 is that only four vessels would be acquired rather than six. This may result in minimal reduction in effects because there would be no Maintenance Relief Hulls to operate while another vessel is undergoing maintenance. However, the difference would not result in substantive changes to the potential for, or types of, impacts to socioeconomic and cultural resources. Therefore, in accordance with NEPA (baseline out to 12 nm [22 km]), Alternative 2 would not result in significant adverse impacts to socioeconomic and cultural resources.

3.5.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. No SPC-HWX II would be acquired, and the 47 MLB would continue to support Coast Guard missions in the PNW. Therefore, baseline conditions of the existing environment would remain unchanged. There would be no significant impact to socioeconomic and cultural resources with implementation of the No Action Alternative.

CHAPTER 4 Cumulative Effects

This section (1) describes past, present, and reasonably foreseeable actions relevant to cumulative effects; (2) analyzes the incremental interaction the Proposed Action may have with other actions; and (3) evaluates cumulative effects potentially resulting from these interactions.

4.1 Scope of Cumulative Effects Analysis

The scope of the cumulative effects analysis involves both the geographic extent of the effects and the time frame in which the effects could be expected to occur. For this EA/OEA, the proposed action area (Section 2.2) delimits the geographic extent of the cumulative effects analysis. Furthermore, because vessel operations are necessarily limited to navigable waters, the geographic extent of the cumulative effects analysis is also limited primarily to those waters and excludes shallow non-navigable waters. The Proposed Action would not have any effects beyond the proposed action area, and therefore, effects from the Proposed Action would not aggregate with effects from actions outside this area. The time frame for cumulative effects primarily focuses on current and reasonably foreseeable actions as these may co-occur with the Proposed Action, but any action preceding will be considered if that action's effects would linger. In general, this section considers actions from January 2010 to August 2024. Where specific actions supplemented preceding actions, information prior to January 2010 is included.

4.2 Past, Present, and Reasonably Foreseeable Actions

A variety of activities occur in the waters of the proposed action area, including, but not limited to, the following: fishing (commercial, recreational, subsistence), shipping, recreation and tourism, and scientific research. The proposed action area is also home to a number of physical and biological resources, including marine mammals, sea turtles, fishes, invertebrates, and vegetation. Of particular importance are those actions occurring near the four SPC-HWX II homeports, as vessel traffic from the Proposed Action would be expected to be heaviest in those waters.

Generally, past, present, and reasonably foreseeable actions fall within one of three categories: (1) land-based infrastructure changes, which occur outside the proposed action area and would not be expected to have cumulative impacts with the Proposed Action; (2) human activities occurring within the proposed action area (e.g., fishing, shipping), which could have cumulative impacts with the Proposed Action.

Table 4-1. Past, Present, and Reasonably Foreseeable Actions

Action Project	State	Location[1]	Description	Federal Agency	Analysis
Fisheries and Marine Resource Management					
Rationalization of the Pacific Coast Groundfish Limited Entry Trawl Fishery Amendment 20 Implementation Washington, Oregon, and California	OR, WA	Coastal, offshore	The PFMC changed groundfish management to a limited access privilege program intended to increase economic efficiency and reduce bycatch in the trawl fishery.	NOAA	EIS, 2010
Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Fishery Management Plan Federal Waters off the Coast of Washington, Oregon, and California	OR, WA	Coastal, offshore	The PFMC established the Pacific Coast Groundfish Fishery Management Plan (Groundfish FMP) to target optimum yield in the fishery. The Groundfish FMP included a variety of objectives and management measures to consider harvest, fishing communities, stock rebuilding, and interactions with the marine ecosystem.	NOAA	EIS, 2012
Harvest Specifications and Management Measures for 2015-2016 and Biennial Periods Thereafter	WA	Coastal, offshore	The PFMC determined new and revised harvest specifications, groundfish stock complexes and ecosystem component species, and default harvest control rules to improve decision making and management processes for the Groundfish FMP.	NMFS	EIS, 2015
Analyze Impacts of NOAA's National Marine Fisheries Service joining as a signatory to a new U.S. v. Oregon Management Agreement for the Years 2018-2027	OR, WA	Coastal, offshore	NMFS and the USFWS proposed implementing new and revised salmon and steelhead fishery policies for the Columbia River Basin. The action considered review and approval of a framework management plan, the implementation of annual plans, and consideration of alternative ways to balance the obligations and objectives of framework plan.	NMFS	EIS, 2017

Action Project	State	Location[1]	Description	Federal Agency	Analysis
Changes to Pacific Coast Groundfish Essential Fish Habitat Conservation Areas and Boundaries of the Trawl Gear Rockfish Conservation Area Final Environmental Impact Statement, Magnuson-Stevens Act Analysis, Regulatory Impact Review, and Regulatory Flexibility Analysis	Various; OR, WA included	Coastal, offshore	The PFMC recommended changes to EFH and other benthic habitats by closing some coastal areas to bottom trawling or other gears, while re-opening other historically productive fishing grounds to bottom trawl gear.	NMFS	EIS, 2019
Amendment 6 to the FMP for West Coast Highly Migratory Species Fisheries: Authorization of Deep-set Buoy Gear	Various; OR included	Coastal, offshore	The Proposed Action was to identify deep-set buoy gear as a legal commercial fishing gear for the West Coast Highly Migratory Species FMP to support the development of a local and domestic swordfish fishery with minimal bycatch.	NOAA	EIS, 2023
Consideration of Exempted Fishing Permits for Testing Fishing Practices to Target Swordfish and Other Marketable Highly Migratory Species in the United States West Coast Exclusive Economic Zone	Various; OR included	Coastal, offshore	The Proposed Action would allow for exemptions to existing regulations to test longline-type gears targeting HMS. This would provide more information to improve future fishing practices and management.	NMFS	DEIS, 2024
Protected Species Management					
Double-crested Cormorant Management Plan to Reduce Predation of Juvenile Salmonids in the Columbia River Estuary	OR	Terrestrial, inland waters	East Sand Island in the Columbia River Estuary hosts one of the largest colonies of double-crested cormorants in the world. The U.S. Army Corps of Engineers (USACE) is responsible for managing the birds, in part because they are responsible for significant predation-related losses of protected juvenile salmonids in the estuary. The EIS was used to evaluate the impacts of management alternatives to reduce the cormorant colony size and associated salmonid predation.	USACE	EIS, 2015

Action Project	State	Location[1]	Description	Federal Agency	Analysis
The Makah Tribe Request to Hunt Gray Whales	WA	Coastal, offshore	This EIS evaluated the Makah Tribe's proposal to resume hunting gray whales in their usual and accustomed fishing grounds pursuant the Treaty of Neah, which reserved whale hunting rights. The EIS examined resources, impacts, and alternatives to inform decision making on the Tribe's request, and the preferred alternative allows taking a maximum of 25 whales over ten years.	NMFS	EIS, 2023
Coastal Management					
Incorporation of the Revised Washington Shoreline Management Act Guidelines into the Federally Approved Washington Coastal Management Program Amendment No. 4 Approval Coastal Counties in Washington (Programmatic)	WA	Terrestrial, inshore, coastal	The Washington Department of Ecology proposed revisions to its Coastal Management Plan, including, but not limited to, allowing the use of federal grants awarded to the Department to support local governments in revising their Shoreline Master Programs to meet new revised Plan guidelines. This programmatic EIS involved NOAA's approval of the revised guidelines.	NOAA	EIS, 2010
Major Rehabilitation of the Jetty System at the Mouth of the Columbia River in Pacific County, Washington and Clatsop County, Oregon	OR, WA	Terrestrial, inland waters	The USACE proposed to repair and rehabilitate all three jetties in the system at the mouth of the Columbia River over the course of 20 years. This action was composed of four categories applicable to each jetty: (1) engineered designs elements and features of the physical structures; (2) construction measure and implementation activities; (3) proposed ESA Section 7(a)(1) habitat improvement measures and wetland fill, and (4) proposed establishment of and coordination with an Adaptive Management Team composed of representatives from the USACE and appropriate federal and state agencies. This EA evaluates the environmental effects for major rehabilitation and repairs of all three jetties.	USACE	EA, 2011

Action Project	State	Location[1]	Description	Federal Agency	Analysis
FY 2013 through 2020 Point Chehalis Revetment Maintenance Project Westport, Grays Harbor County, Washington	WA	Terrestrial, inshore	The USACE proposed to conduct repair and maintenance of the armor rock at the Westport Marina in Westport, Grays Harbor County, over the course of eight years. The revetment and a system of groins stabilizes Point Chehalis and protects important portions of Grays Harbor, affecting use, navigation, and local resources.	USACE	EA, 2013
Habitat Restoration Activities Implemented throughout the Coastal United States (Programmatic)	Various; OR, WA included	Terrestrial, inshore, coastal	NOAA's Office of Habitat Conservation Restoration Center carries out hundreds of projects throughout the United States related to restoration, such as fish passage, shellfish restoration, coral recovery, marsh and shoreline restoration, or other topics. Approximately 100 of these projects are in the PNW. This programmatic EIS analyzes restoration activities and promotes an efficient NEPA compliance process for these projects.	NOAA	EIS, 2015
Columbia Estuary Ecosystem Restoration Program	OR, WA	Terrestrial, inland waters, inshore, coastal	The Columbia Estuary Ecosystem Restoration Program, implemented by Bonneville Power Administration and USACE, involves activities and projects to restore estuary habitat along the Columbia River for fish and wildlife. To implement the estuary restoration program, the Bonneville Power Administration and USACE consider specific management actions identified in NMFS' 2011 CRE Module. These management actions provide specific project categories which contribute to the overall restoration objective. Those projects which apply to federal agencies and their partners/sponsors implementing restoration actions in the estuary are listed in Table 1 of the Columbia Estuary Ecosystem Restoration Program EA. This programmatic EA evaluated the typical environmental effects and identified mitigation measures for estuary improvement actions or projects a part of the Columbia River Estuary Ecosystem Restoration Program.	USACE	EA, 2016

Action Project	State	Location[1]	Description	Federal Agency	Analysis
Shoalwater Bay Shoreline Erosion Repair Project in Willapa Bay	WA	Terrestrial, inshore	The USACE conducted emergency barrier dune repairs and flood fight measures in Willapa Bay in and adjacent to the Shoalwater Reservation. The action included the construction of dunes and a haul road, among other efforts, as well as the use of a borrow site in Willapa Bay for dredged materials. The 2022 SEA analyzed the effects of these emergency actions and followed earlier NEPA analyses on actions to restore and maintain the Shoalwater Bay shoreline.	USACE	EA, 2009; SEA, 2013, 2018, 2022
Department of Defense Activities					
Overseas Environmental Assessment for the Integrated Fish Census and Broadband Acoustic Clutter Experiment in the PNW during Summer 2012	OR, WA	Offshore	The Office of Naval Research funded a research project that used underwater acoustic sources to conduct an integrated fish census and evaluate how different fish species aggregations created acoustic clutter fields. The results would be used to improve forecasting capabilities regarding the impact of bio-clutter on Navy systems. The work used primarily low- and mid-frequency sources.	USN	OEA, 2012
Northwest Training and Testing	Various; OR, WA included	Coastal, offshore	The Navy conducts training and testing activities at sea and in associated airspace to support military readiness requirements. This includes, but is not limited to, the use of active sonar, explosives, and a variety of vessels and aircraft to simulate real-world situations and test all equipment and systems.	USN	EIS/OEIS, 2015; SEIS/SOEIS, 2020
Surveillance Towed Array Sensor System (SURTASS LFA) Sonar	Various; OR, WA included	Offshore	The Navy conducts training and testing for long range surveillance throughout the Pacific Ocean using low-frequency active sonar. The purpose of this action is to improve submarine detection capabilities.	USN	EIS, 2001; SEIS, 2007, 2012, 2015, 2017, 2019
Navigation and Construction					
Grays Harbor Navigation Improvement Project	WA	Inshore	The USACE maintains the navigation channel within Grays Harbor by dredging and other associated activities. The most recent action of the 2014 SEIS was to deepen approximately 14.5 miles (23.3 km) of the channel to its legislatively authorized depth of –38 ft (–11.6 m) mean lower low water level.	USACE	EIS, 1982; SEIS, 1989, 2014

Action Project	State	Location[1]	Description	Federal Agency	Analysis
Lower Columbia River Channel Maintenance Plan and Associated Actions	OR, WA	Inland waters	The USACE maintains the dredged channel of the Lower Columbia River (and associated rivers and tributaries, as needed) for shipping and navigation, generally from the river mouth to Vancouver, Washington. The main channel is maintained at approximately 600 ft (183 m) wide and 43 ft (13 m) deep. The collection of actions involves maintenance of the channel, including, but not limited to dredging, buoys, pike dike structures, and wildlife mitigation, as well as associated management of dredged materials. The current DEIS provides guidance for channel maintenance for the next twenty years.		Main channel: EIS, 2003; DEIS, 2024; Associated actions: EA, 2015, 2019; SEA, 2019
General Actions					
Subsistence Fishing	OR, WA	Terrestrial, inland waters, inshore, coastal, offshore	Subsistence fishing is fishing primarily for food and nutrition. It can be conducted from shore or vessel, and gear varies depending on target species and location. This activity is expected to increase in the reasonably foreseeable future.	N/A	N/A
Recreational Fishing	OR, WA	Terrestrial, inland waters, inshore, coastal, offshore	Recreational fishing is fishing primarily for enjoyment. It can be conducted from the shoreline or vessel, and hook and line is most common gear used, though this may vary based on target species and location (e.g., rake or hand for shellfish). This activity is expected to increase in the reasonably foreseeable future.	N/A	N/A
Commercial Fishing	OR, WA	Terrestrial, inland waters, inshore, coastal, offshore	Commercial fishing is fishing for commercial purposes. It is typically conducted by vessel, and gear varies depending on target species and location. This activity is expected to increase in the reasonably foreseeable future.	N/A	N/A
Marine Aquaculture	OR, WA	Inshore	Marine aquaculture is the cultivation of seafood largely for commercial purposes. The primary taxa grown in the proposed action area are oyster and clam species. This activity is expected to increase in the reasonably foreseeable future.	N/A	N/A

Action Project	State	Location[1]	Description	Federal Agency	Analysis
Population Growth and Development	OR, WA	Terrestrial	Human population in the region adjacent to the proposed action area is expected to grow in the reasonably foreseeable, particularly in urban areas such as Portland, Oregon. Associated coastal development, especially inshore or portside in the Columbia River, may increase in turn. The expected increase in human population is directly associated with the expected increases in other activities, such as fishing and shipping.	N/A	N/A
Transportation and Shipping	OR, WA	Inland waters, inshore, coastal, offshore	Vessel transit to and from ports and for other purposes, including up the Columbia River, is expected to increase in the reasonably foreseeable future.	N/A	N/A
Construction	OR, WA	Terrestrial, inland waters, inshore	In-water construction activities including, but not limited to, beach nourishment and dredging, is expected to increase in the reasonably foreseeable future.	N/A	N/A
Mineral Extraction	OR, WA	Coastal, offshore	In-water mineral extraction, limited primarily to sand and gravel mining, is expected to increase in the reasonably foreseeable future.	N/A	N/A
Tourism	OR, WA	Terrestrial, inland waters, inshore, coastal	Visitation to areas in and adjacent to the proposed action area, including associated recreational activities, is expected to increase in the reasonably foreseeable future.	N/A	N/A
On-water Recreation	OR, WA	Inland waters, inshore, coastal, offshore	Recreational activities including, but not limited to, boating, paddling, surfing, windsurfing, and kite surfing, is expected to increase in the reasonably foreseeable future.	N/A	N/A
Resource Management and Conservation	OR, WA	Terrestrial, inland waters, inshore, coastal, offshore	Resource management and conservation activities Including, but not limited to, local, tribal, state, and federal management programs and planning processes (e.g., fisheries, habitat, or coastal management), are expected to remain at levels similar to the present or increase in the reasonably foreseeable future. These activities may increase due to growth in other activities, such as fishing or shipping, which would necessitate further management. Accordingly, resource management and conservation activities ameliorate some negative impacts of other activities now and in the future.	N/A	N/A

Action Project	State	Location[1]	Description	Federal Agency	Analysis
Scientific Research	OR, WA	Terrestrial, inland waters, inshore, coastal, offshore	Scientific research Including, but not limited to, field-based, vessel-based, and remote sensing research in and adjacent to the proposed action area, is expected to continue at levels similar to the present or increase in the reasonably foreseeable future. This activity contributes to ameliorating some negative impacts of other activities now and in the future.	N/A	N/A

Definitions: BOEM = Bureau of Offshore Energy Management; DEA = Draft Environmental Assessment; DEIS = Draft Environmental Impact Statement; EA = Environmental Assessment; EIS = Environmental Impact Statement; FMP = Fishery Management Plan; HMS = Highly Migratory Species; NMFS = National Marine Fisheries Service; NOAA = National Oceanic and Atmospheric Administration; OEA = Overseas Environmental Assessment; OEIS = Overseas Environmental Impact Statement; OR = Oregon; PFMC = Pacific Fishery Management Council; SEA = Supplemental Environmental Assessment; SEIS = Supplemental Environmental Impact Statement; SOEIS = Supplemental Overseas Environmental Impact Statement; USACE = U.S. Army Corps of Engineers; USFWS = U.S. Fish and Wildlife Service; USN = U.S. Navy; WA = Washington

[1]Location definitions: Terrestrial = land-based; Inland Waters = rivers, lakes, and ponds; Inshore = bays, harbors, and estuaries; Coastal = 0-12 nm offshore; Offshore = beyond 12 nm offshore

4.3 Cumulative Effects Analysis

Quantifiable data related to past, present, and reasonably foreseeable actions within the proposed action area are geographically and temporally diverse with limited usefulness to a discussion of cumulative effects relevant to the Proposed Action. Accordingly, a qualitative analysis was undertaken. The analytical methodology presented in Chapter 3, which was used to determine potential impacts to the various resources analyzed in this document, was also used to determine cumulative impacts.

4.3.1 Physical Resources

Physical resources that may be impacted by the Proposed Action include ambient sound and bottom habitat and sediments. Overall, vessel movement, helicopter movement, MEM, and noise associated with the Proposed Action would have at most, minor impacts on physical resources. Further, because the Proposed Action would occur primarily at and near the surface of the water off the coasts of Washington and Oregon and within the lower Columbia River, it would have minimal impacts on the seafloor and associated physical resources. As noted in Section 3.3.2, impacts of the Proposed Action on the seafloor are limited to designated anchorages and ranges. As such, the potential for cumulative impacts would be limited to other uses of these locations, which are selected to avoid impacts to sensitive habitats. Therefore, cumulative impacts to bottom habitat and sediments would not be expected to be significant and are not considered further.

A variety of activities take place within the proposed action area, and several past, current, and reasonably foreseeable actions can affect physical resources in the proposed action area. Most present and reasonably foreseeable actions are ongoing uses rather than discrete projects (e.g., fishing, shipping, recreation). Growth of these activities in the future is likely, but any growth would be relatively limited.

Shipping and transportation, as well as vessel use from fishing, contribute to ambient sound in the ocean throughout the proposed action area. As discussed in Section 3.3.1, vessel noise is the primary anthropogenic contributor to underwater noise. Given the level of vessel traffic and the presence of numerous ports within and near the proposed action area, the impacts of underwater noise on ambient sound can be significant. This is particularly the case in busy coastal areas, including the bays and harbors near the four proposed SPC-HWX II homeports, and along the heavily trafficked Columbia River to Portland, Oregon. However, it is unlikely the Proposed Action would contribute substantially or in a synergistic way with existing underwater noise. Although it would constitute additional sound in the water, the level of noise produced by the four SPC-HWX II vessels would not significantly change existing ambient sound conditions, and therefore, cumulative impacts on ambient sound are unlikely.

The Proposed Action would have few to no synergistic impacts on physical resources with other activities. Therefore, the overall cumulative effects on physical resources would be insignificant.

4.3.2 Biological Resources

Biological resources that may be impacted by the Proposed Action include vegetation, invertebrates, birds, fish, EFH, sea turtles, and marine mammals. Overall, vessel movement, helicopter movement, MEM, vessel noise, and helicopter noise associated with the Proposed Action would have at most, minor impacts on biological resources as detailed in Section 3.4.

A variety of activities take place within the proposed action area, and several past, current, and reasonably foreseeable actions can affect biological resources in the proposed action area. Most present and reasonably foreseeable actions are ongoing uses rather than discrete projects (e.g., fishing, shipping, recreation). Growth of these activities in the future is likely, but any growth would be relatively limited.

In contrast to the Proposed Action, other present and reasonably foreseeable actions may have significant impacts on biological resources. For example, commercial fishing can affect the populations of targeted fish species and non-targeted bycatch species. Construction or mineral extraction can affect benthic species, invertebrates, fish, and others via direct disturbance and acoustic effects from extensive drilling and construction noise.

Although some present and reasonably foreseeable actions may have significant impacts on biological resources in the proposed action area, it is unlikely that the Proposed Action would appreciably increase any of those impacts. The stressors associated with the Proposed Action are minor, intermittent, and localized near the vessels and helicopters involved in the Proposed Action. They would have no synergistic effects with other activities, which would be spread wide throughout the proposed action area. In some cases, such as for fish populations, the presence of four additional Coast Guard vessels to patrol the waters of the proposed action area could have some benefits, offsetting adverse effects from illegal fishing via fisheries enforcement. However, overall, the Proposed Action would not substantially alter the impacts on biological resources from past, present, or reasonably foreseeable actions.

Consequently, the addition of up to six SPC-HWX IIs constitutes an insignificant change in overall activity and stressors within the proposed action area, and the Proposed Action would have few to no synergistic impacts on biological resources with other activities. Therefore, the overall cumulative effects on biological resources would be insignificant.

4.3.3 Socioeconomic and Cultural Resources

Socioeconomic and cultural resources that may be impacted by the Proposed Action include subsistence fishing and hunting, commercial fishing and aquaculture, recreation and tourism, cultural resources (e.g., archaeological sites or artifacts), and other resources, such as shipping, mineral extraction, construction, and scientific research. While a variety of socioeconomic and cultural resources occur within the proposed action area, the impacts of the Proposed Action itself would be minimal, primarily limited to minimal displacement of other uses and potential indirect impacts of likely imperceptible behavioral reactions in target species for fisheries. In some cases, the Proposed Action could provide benefits to socioeconomic and cultural resources (e.g., emergency response, safety, and enforcement).

The past, present, and reasonably foreseeable actions anticipated within or adjacent to the proposed action area could have a range of effects on socioeconomic resources. In some cases, such as offshore energy development, the addition and expansion of wind farms could result in significant changes to portions of the proposed action area, such as requiring vessels to alter than fishing patterns. However, these changes would occur over the course of years or decades, with concomitant environmental and other planning processes. It is unlikely that the addition or expansion of new activities would have particularly large or important synergistic effects with the Proposed Action. In some cases, the Proposed Action may provide benefits, representing increased safety operations on the water. In most cases, however, vessel traffic or other impacts of the Proposed Action would have little or no synergistic impacts on reasonably foreseeable activities, be they larger-scale (e.g., wind energy development) or not (e.g., expected growth in shipping or fishing). Therefore, effects on socioeconomic resources from past, present, and reasonably foreseeable actions would not appreciably contribute to effects of the Proposed Action. In fact, the only cumulative impact may the beneficial synergistic impacts of having more safety and enforcement vessels and personnel on the water.

The addition of up to six SPC-HWX IIs constitutes a nearly insignificant change in overall vessel traffic throughout the proposed action area, and the Proposed Action would have few to no synergistic impacts on socioeconomic and cultural resources with other activities. Therefore, the overall cumulative effects on socioeconomic and cultural resources would be insignificant.

CHAPTER 5 Agencies Consulted

NEPA regulations require that federal, state, and local agencies with jurisdiction or special expertise regarding environmental impacts be consulted and involved in the NEPA process. The agencies listed in Table 5-1 were contacted during the preparation of this EA/OEA.

Table 5-1 List of Agencies Consulted

Agency	Region	Mailing Address
National Marine Fisheries Service (NMFS)	West Coast Region	1201 Northeast Lloyd Boulevard, Suite 1100 Portland, OR 97232
U.S. Fish and Wildlife Service (USFWS)	Pacific Region 1	2127 SE Marine Science Drive Newport, OR 97365
Washington Department of Ecology	Southwest Region	300 Desmond Drive SE Lacey, WA 98503
Oregon Department of Land Conservation and Development	N/A	635 Capitol Street NE Suite 150 Salem, OR 97301

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CHAPTER 7 References

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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 EA/OEA. 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. Except for NEPA and E.O. 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. The Coast Guard has prepared this EA/OEA to evaluate the potential for significant harm from the Proposed Action, inform the public of the Proposed Action, and to allow the opportunity for public review and comment.

A.2. Executive Order 12114

E.O. 12114, Environmental Effects Abroad of Major Federal Actions (44 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[7]. The Coast Guard analyzes environmental effects and actions within 12 nm under NEPA (an EA) and those effects occurring beyond 12 nm under the provisions of E.O. 12114 (an OEA). The purpose of E.O. 12114 is to ensure that environmental factors are weighted equally when compared to other factors in the decision-making process. The EA and OEA have been combined into one document, as permitted under NEPA and E.O. 12114, to reduce duplication. This EA/OEA evaluates the potential for significant harm from the Proposed Action.

A.3. Bald and Golden Eagle Protection Act

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668 *et seq.*). This act prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald eagles, including their parts, nests, or eggs. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.” Because the PNW region of the United States is a prime habitat for bald eagles given the diverse landscapes, abundant water sources and thriving fishing populations. Bald eagles are often found near rivers, lakes and coastal areas, where they can prey on their primary food source, fish. Because of their nesting and foraging habitat preferences, bald eagles could overlap in the proposed action area (Table 3-8), and taking of a bald eagle could occur. Golden eagles do not occur within the proposed action area. Any impacts on bald eagles would be

[7] 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.

similar to those on other bird species considered in this EA/OEA. Therefore, this EA/OEA 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 Clean Air Act (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. 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 state implementation plan (SIP) for achieving and maintaining the NAAQS for criteria pollutants and their precursors. In accordance with the CAA, applicable regulations, this EA/OEA 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 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. This EA/OEA evaluates the likelihood that the Proposed Action would impact air quality. Table 3-3 evaluates stressors that could impact air quality and provides the rational for eliminating them from further analysis.

A.5. Clean Water Act

The Clean Water Act (CWA33 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 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. The Oil Pollution Act 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. In accordance with the CWA, applicable regulations, and Coast Guard instructions, this EA/OEA evaluates the potential for significant impact or harm from the Proposed Action to water quality. The discharge of gray water is the only stressor that could have a significant impact or harm to water quality, as evaluated in Section 3.3. Other stressors are evaluated in Table 3-3, which provides the rationale for eliminating them from further analysis.

A.6. Coastal Zone Management Act

The CZMA established national policy to preserve, protect, develop, restore, or enhance resources in the coastal zone. This Act encourages coastal states to properly manage use of their coasts and coastal resources, prepare and implement coastal management programs, and provide for public and governmental participation in decisions affecting the coastal zone. To this end, the CZMA imparts an obligation upon federal agencies whose actions or activities affect any land or water use or natural resource of the coastal zone to be carried out in a manner consistent to the maximum extent practicable with the enforceable policies of federally approved state coastal management programs. Section 307 requires federal agencies having effects outside of federal property to determine whether their proposed actions would affect a state's coastal zone. A Coastal Consistency Determination under the CZMA was submitted to the Oregon Department of Land Conservation and Development and the Washington State Department of Ecology. The Coast Guard received concurrence from the state of Washington, pursuant to Section 307(c)(3) of the CZMA as amended, concurring with the Coast Guard's determination that the proposed action is consistent with Washington's CZMP. No response was received from the Oregon Department of Land Conservation and Development within 60 days of submission of the Coastal Consistency Determination, so the Coast Guard presumed concurrence pursuant to 15 CFR § 930.41.

A.7. 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 letter of concurrence that determines whether the federal agency action will jeopardize listed species or adversely modify or destroy critical habitat. The Coast Guard has consulted with the USFWS and NMFS regarding compliance with the ESA. On December 4, 2024, the USFWS Oregon Office sent a letter concurring with the Coast Guard that the proposed action may affect, but is not likely to adversely affect, ESA listed species under their jurisdiction. The Coast Guard is actively pursuing informal consultation with the NMFS; however, a letter of concurrence has not yet been received. The Coast Guard is committed to working with NMFS to minimize impacts as required under Section 7 of the ESA to avoid jeopardy of species and adverse modification or destruction of critical habitat.

A.8. Executive Order 13089 (U.S. Coral Reef Ecosystem)

E.O. 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 E.O. 13089, applicable regulations, and Coast Guard instructions, this EA/OEA evaluates the potential for significant impact or harm from the Proposed Action.

A.9. Executive Order 13158 (Marine Protected Areas)

E.O. 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 MPAs. The purpose of the order is to (1) strengthen the management, protection, and conservation of existing MPAs and establish new or expanded MPAs; (2) develop a scientifically-based, comprehensive national system of MPAs representing diverse U.S. marine ecosystems and the nation's natural and cultural resources; and (3) avoid causing harm to MPAs through federally conducted, approved, or funded activities. In accordance with E.O. 13158, applicable regulations, and Coast Guard instructions, this EA/OEA evaluates the potential for significant impact or harm from the Proposed Action.

A.10. Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA; 16 U.S.C. §§ 1801 *et seq.*) provides for the conservation and management of U.S. fisheries. Under the MSFCMA, EFH consists of the waters and substrate needed by fish to spawn, breed, feed, or grow to maturity. Any activities that would reduce the quality and/or quantity of EFH would require consultation with NMFS. To protect fisheries resources, NMFS works with regional fishery management councils to identify the essential habitat for every life stage of each federally managed species, based on the best available scientific information. EFH includes all types of aquatic habitat, including wetlands, coral reefs, seagrasses, and rivers; all locations where fish spawn, breed, feed, or grow to maturity. EFH is included in FMPs. NMFS is responsible for approving and implementing FMPs under the MSFCMA. HAPC are a subset of EFH. Fishery management councils are encouraged to designate HAPC under the MSFCMA. There are Groundfish and Salmon HAPC in the proposed action area. However, the Proposed Action would not adversely affect the quality or quantity of EFH or HAPC in the proposed action area. In accordance with the MSFCMA, applicable regulations, and Coast Guard instructions, this EA/OEA evaluates the potential for significant impact or harm from the Proposed Action.

A.11. Marine Mammal Protection Act

All marine mammals are protected under the provisions of the MMPA (16 U.S.C. §§ 1361 *et seq.*). The MMPA prohibits any person or vessel from "taking" marine mammals in the United States or the high seas without authorization. The MMPA defines "take" to mean "to harass, hunt, capture, or kill or attempt to harass, hunt, capture, or kill any marine mammal" (16 U.S.C. § 1362(13)). "Harassment" was further defined in the 1994 amendments to the MMPA, which provided two levels of harassment: Level A (potential injury) and Level B (potential behavioral disturbance). Level A harassment "has the potential to injure a marine mammal or marine mammal stock in the wild," and Level B harassment "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" (16 U.S.C. § 1362(18)(A)). The Coast Guard has determined that the Proposed Action activities do not rise to the level of take as defined under the MMPA. Therefore, there is no accompanying MMPA authorization requested for this Proposed Action.

A.12. Migratory Bird Treaty Act and Executive Order 13186

The MBTA (16 U.S.C. §§ 703 *et seq.*) prohibits the taking, killing, or possessing of any migratory bird or any part, nests, or eggs of such birds, unless permitted by regulation was enacted to ensure the protection of shared migratory bird resources. The MBTA prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase or barter, any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit. The MBTA protects a total of 1,026 bird species; the list of species protected by the MBTA appears in 50 CFR § 10 and 21 (November 1, 2013).

E.O. 13186 (Migratory Bird Conservation), titled Responsibilities of Federal Agencies to Protect Migratory Birds, directs federal agencies to take certain actions to further implement the MBTA and to conserve migratory birds. The order prohibits the take of migratory birds or their eggs, feathers, or nests. Many waterfowl, songbirds, raptors, and other species are migratory and are protected under the MBTA. The Coast Guard has entered into a Memorandum of Understanding with the USFWS pursuant to E.O. 13186 (66 FR 3853; January 10, 2001) to strengthen migratory bird conservation through enhanced collaboration between the Coast Guard and the USFWS. Under this regulation, the Coast Guard must consider the potential environmental effects of its actions and assess the adverse effects of activities on migratory birds. If the Coast Guard determines that the Proposed Action may result in a significant adverse effect on a population of migratory bird species, the Coast Guard shall consult with the USFWS to develop and implement appropriate conservation measures to minimize or mitigate these effects. Conservation measures, as defined in 50 CFR § 21.3, include project designs or mitigation activities that are reasonable from a scientific, technological, and economic standpoint and are necessary to avoid, minimize, or mitigate the take of migratory birds or other potentially adverse effects. A significant adverse effect on population is defined in 50 CFR § 21.3 as an effect that could, within a reasonable period of time, diminish the capacity of a population of a migratory bird species to sustain itself at a biologically viable level. The Coast Guard determined that the Proposed Action would not result in a significant adverse effect on a population of migratory bird species and is not required to consult under the MBTA.

A.13. 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 EA/OEA.

Documented archaeological sites exist in the coastal portions of the proposed action area, including within Yaquina Bay and Coos Bay, Oregon, and within Grays Harbor and around Cape Disappointment, in Washington (Northwest Area Committee 2004, 2005; Washington Department of Ecology 2015, 2024a). The Olympic Coast National Marine Sanctuary, which includes coastal waters from the Strait of Juan de Fuca south to Grays Harbor County, Washington, contains approximately 200 shipwrecks (NOAA Office of National Marine Sanctuaries 2024). Additional archaeological sites and artifacts, including both tribal and non-tribal cultural resources, exist throughout and along the Lower Columbia River in the proposed action area (Columbia River Inter-Tribal Fish Commission 2021a; Washington Department of Ecology 2015).The physical stressors associated with the Proposed Action(vessel movement, helicopter movement, or MEM) would not be expected to affect cultural recourses. Anchoring, excluding an emergency, would only occur in designated anchorages. Designated anchorages would not be expected to contain any cultural resources Therefore, any potential impact or harm to cultural resources under the NHPA would be from vessel movement in very shallow water, which is extremely unlikely.

A.14. 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 NOAA's 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 Coast Guard instructions, this EA/OEA evaluates the potential for significant impact or harm from the Proposed Action.

A.15. 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.

E.O. 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, E.O. 13007 (Indian Sacred Sites; 61 FR 26771; May 29, 1996), 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 Coast Guard instructions, this EA/OEA evaluates the potential for significant impact or harm from the Proposed Action.

APPENDIX B STANDARD OPERATING PROCEDURES

B.1. General SOPs Applicable to All Activities Addressed in this Document

1. In accordance with Chapter 11 of the Coast Guard Vessel Environmental Manual (COMDTINST M16455.1A), Coast Guard vessels shall not deliberately disturb any ESA-listed species. Commanding Officers and Officers in Charge shall plan and act to avoid take or harassment of non-ESA-listed marine mammals and ESA-listed species during operations and planning. Planning should be conducted to the maximum extent practical to select navigation and flight routes that avoid designated critical habitat and areas where ESA-listed species are known to congregate.

2. Coast Guard D13 has guidance for protection of species specific to their region within its Protected Living Marine Resources Program (CG13INST 16214.2). ESA-listed species avoidance measures are prescribed (see Vessel Operations (2) below), including requiring that vessel crew be especially alert for activity, and proceed with caution, in areas of known migration routes, rafting marbled murrelets, or high animal density, including areas with concentrations of floating vegetation where animals may be feeding, and that vessels do not approach ESA-listed species or any marine mammals, head-on during non-emergency maneuvering, when navigationally safe to do so.

B.2. Vessel Operations

1. Vessel operators would use caution, be alert, maintain a vigilant lookout and reduce speeds, as appropriate, to avoid collisions with ESA-listed species or any marine mammals and to avoid collisions with benthic habitats during the course of normal operations.

2. During non-emergency vessel operations, including law enforcement activities, when ESA-listed species or any marine mammals 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 (3) below).

    b. Posting additional dedicated lookouts to assist in monitoring the location of seabirds, sea turtles and/or marine mammals.

    c. Avoiding sudden changes in speed and direction, or if a swimming seabird, 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.

    f. When sea turtles are sighted, attempt to maintain a distance of 50 yd (46 m) or greater between the animal and the vessel wherever possible.

3. Coast Guard would reduce vessel speed to 10 knots or less when a whale is sighted within 5 nm of the intended vessel track to the maximum extent practicable without impacting human health and safety operational needs. 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 helicopter'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 helicopter would plan its passage to avoid any known sanctuaries, feeding grounds, or other biologically important areas in accordance with Coast Guard Air Operations Manual (COMDTINST M3710.1I). Specifically, to the maximum extent practicable, while also addressing human health and safety operational needs, for training operations the SPC-HWX II vessels will avoid traveling through or conducting training activities in the seasonal core biological important areas (BIAs) within the proposed action area. These include the humpback whale BIAs that are established for March through November and the fin whale BIA established for June through November (Figure B-1).

    a. If avoiding BIAs is not feasible, vessels would reduce speed to 10 knots or less while transiting through seasonal BIAs, and minimize training activities within the BIAs, to the maximum extent practicable during applicable months.

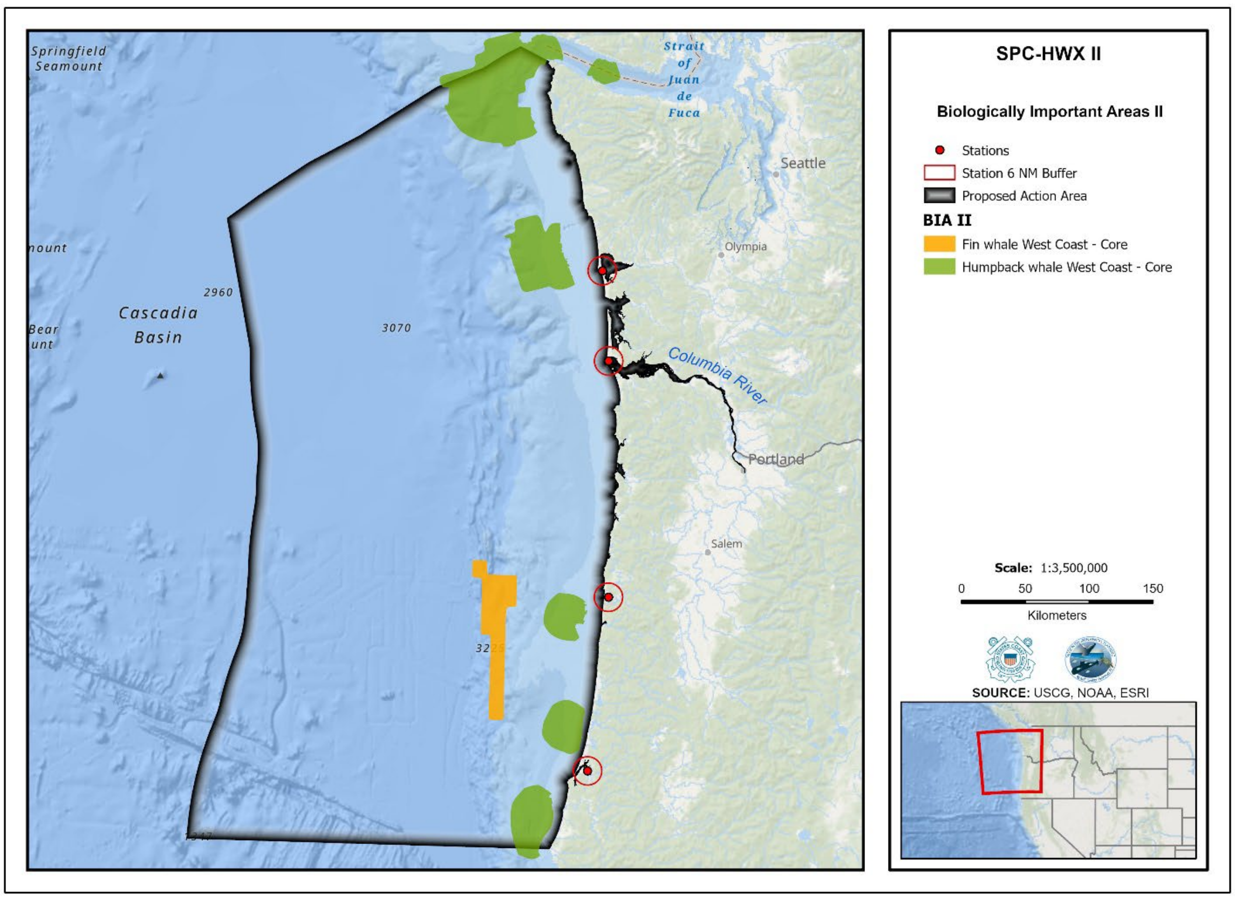

Figure B-1. Biological Important Areas (BIAs) within the Proposed Action Area

B.3. Helicopter 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 or the water's surface 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. Helicopters would not operate at an altitude lower than 1,500 ft (457 m) within 0.5 mi (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 (0.805 km) of such areas. When weather conditions do not allow a 1,500 ft (457 m) flying altitude, such as during severe storms or when cloud cover is low, helicopters may be operated below the 1,500 ft (457 m) altitude. However, when helicopters are operated at an altitude below 1,500 ft (457 m) because of weather conditions, the operator would attempt to avoid areas of known marbled murrelet and marine mammal concentrations and would take precautions to avoid flying directly over or within 0.5 mi (0.805 km) of these areas.

B.4. Vessel Observers

1. Crewmembers would be trained in ESA-listed species and marine mammal 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 ESA-listed seabirds, marine mammals, and sea turtles (as part of general lookout duties) during all vessel operations and associated with the activities described in this EA/OEA, including helicopter operations. If an ESA-listed seabird, 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.

B.5. ESA-Listed Documentation, Reporting, and Planning

1. The Coast Guard would document sightings of ESA-listed seabird, marine mammals, and sea turtles during vessel transit whenever course changes or other measures are taken to avoid or minimize interactions with the animals. Interactions with ESA-listed species or non-ESA-listed marine mammals is reported through real-time notification to the Sector or Station, as appropriate. Information would include the following, 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 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 marine mammals within 200 yd (183 m). sea turtles within 50 yd (46 m), and ESA-listed seabirds in the immediate vicinity of a vessel during vessel operations, including towing and escort, fueling underway, gunnery training, and SAR training. Information would include the following, 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; geographic coordinates for the observed animals; information regarding sea state, weather conditions, visibility, and lighting conditions; activity in which vessel is engaged; and any actions taken to avoid or minimize interactions with the animals. Additional information, including photographs, would be collected as needed. Sightings 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 an ESA-listed seabird, 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) following the Protected Living Marine Resources Program requirements.

B.6. Discharging Waste

1. SPC-HWX IIs would not discharge any plastic waste overboard. Plastic waste would be retained onboard until return to homeport in accordance with the M16455.1A Vessel Environmental Manual.

2. The Coast Guard would coordinate with NMFS, USFWS, and local sources in the proposed action area to learn of confirmed haul out locations and communicate them to all SPC-HWX II crew 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.

B.7. 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 SPC-HWX II are preferred. If ports that do not have docking facilities for the SPC-HWX II are used, then anchorage areas that do not contain benthic habitats that support ESA-listed species’ feeding, refuge, and reproduction are preferred.

B.8. 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 ESA-listed species and any non-ESA listed marine mammal along the transit route used for towing to minimize potential collisions with animals

and the SPC-HWX II and/or the vessel being towed. The lookout would inform the coxswain immediately upon a sighting l in order for the coxswain to determine whether changes to vessel speed are required.

3. For vessels being towed to a pier or other mooring, the SPC-HWX II would bring the vessel as close as is safe such that lines can be passed to crew where the vessel would moor from the SCP-HWX II 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.

B.9. 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 seabird, 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. Foam or 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 present an ingestion risk for marine mammals or other animals, potentially leading to health consequences. 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).

B.10. Vessel Lighting

1. SPC-HWX IIs 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 C CONCEPTUAL FRAMEWORK FOR ASSESSING POTENTIAL IMPACTS TO BIOLOGICAL RESOURCES FROM ACOUSTIC STRESSORS

This conceptual framework describes the potential effects from exposure to activities and the potential accompanying short-term response by species (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 following are the categories of potential acoustic effects:

- Injury: Injury to organs or tissues of an animal (Section C.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 C.2).
- Masking: When the perception of a biologically important sound (i.e., signal) is interfered with by a second sound (i.e., noise) (Section C.3).
- Physiological stress: An adaptive process that helps an animal cope with changing conditions, although too much stress can result in physiological problems (Section C.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 C.5).
- Long-term consequences: Depending on the severity of the behavioral reaction and how often the activity is repeated, an animal may be displaced from its normal habitat and/or resume use of the habitat but in a different manner (Section C.6).

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 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 sediment 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.

The ambient noise within an environment also is a factor in determining responses to a sound. If a sound does not exceed the ambient noise levels of the surrounding area, the animal will not perceive or respond to the sound. Ambient noise within the ocean is produced through many natural sources (e.g., earthquakes, rainfall, waves, animal vocalization) as well as existing anthropogenic sounds (e.g., existing vessel traffic) (National Marine Fisheries Service 2020). Ambient noise within the proposed action area is discussed in detail in Section 3.3.1.1.

C.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 (e.g., hemorrhaging of small blood vessels, rupture of gas-containing tissues like a swim bladder or lung). 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 are not expected.

Auditory damage (physical) includes 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 damage 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. Given that acoustic sources associated with the Proposed Action are low level sources (fathometer, vessel noise, helicopter noise, gunnery noise), no acoustics would be expected to rise to the level to cause injury in any species.

C.2. Hearing Loss-Hearing Threshold Shift

Exposure to high intensity sound may result in hearing loss in part or all of an individual's hearing range. PTS[8] 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 to 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.

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[8] See Appendix D for more information on hearing, including the use of term PTS and corresponding thresholds for this analysis and why recent updates to AINJ and corresponding updated thresholds were not used for analyses in this document.

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 (i.e., 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 (Finneran et al. 2005; Nachtigall et al. 2004). However, the recovery time is related to the exposure duration, sound exposure level (SEL), 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 PTS.

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). However, PTS has not been identified in fish.

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 in bird species (Dooling and Therrien 2012). Physical damage to birds' ears occurs with short duration but very loud sounds (>140 dBA re 20 µPa for a single blast or 125 dBA re 20 µPa for multiple blasts) (Dooling et al. 2006).

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. Sea turtles are likely only susceptible to auditory effects when exposed to very high levels of sound within their limited hearing range.

In 2016, 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. 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-frequency (LF) cetaceans, mid-frequency (MF) cetaceans, high-frequency (HF) cetaceans, otariid and non-phocid marine carnivores (OW), and phocids (PW). 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 consultation but serves as a tool to help evaluate the effects of the Proposed Action on marine mammals and to make findings required by NEPA and other environmental laws. Table C-1 provides the resultant TTS and PTS onset auditory acoustic thresholds for non-impulsive sounds from NMFS' technical guidance (National Marine Fisheries Service 2016, 2018a). Since no impulsive sources would be produced by the Proposed Action, only non-impulsive sound sources are considered herein.

Table C-1. 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
MF Cetaceans	Most delphinids, beaked whales, medium and large toothed whales	178 dB SEL_{cum}	198 dB SEL
HF Cetaceans	Porpoises, river dolphins, *Cephalornychus* spp., some *Lagenorhynchus* spp., *Kogia* spp.	153 dB SEL_{cum}	173 dB SEL_{cum}
PW (in water)	All phocids	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

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, 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 noise, vessel noise, helicopter noise, or gunnery noise) should reach PTS or TTS thresholds for any species expected to occur within the proposed action area.

C.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 effects from auditory masking (a sound that interferes with the audibility of another sound) is missing biologically relevant sounds (e.g., vocalizations or sounds of prey or predators) on which organisms rely, as well as eliciting behavioral responses (NRC 2005; Williams et al. 2015), which are discussed in Section C.5.

The effects 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) (National Research Council 2003); however, in the high energy environment of the PNW, ambient noise levels would be elevated. 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 what is already caused by ambient noise levels (National Research Council 2003, 2005).

C.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 (e.g., larva, juvenile, sexually mature adult) and the primary activity in which it is engaged (e.g., mating, feeding, 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 C.1) or hearing loss (Section C.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).

Effects from 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 C.6) that can reduce lifetime reproductive success. Due to the large geographic range and intermittent frequency of SPC-HWX II 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.

C.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, distance from the sound source, and whether the sound is perceived as approaching or moving away also can 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 responses 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. Generally, the louder the sound source, the more intense the behavioral response, but 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, Southall et al. (2007) 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.

C.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 leave the area and 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 the speed and completeness of recovery. Animals that recover quickly and completely are unlikely to suffer reductions in their health or reproductive success or to change their 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, change how they use the environment, or 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 frequency of SPC-HWX II 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.

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. 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).

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. Helicopters 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 1,500 ft (457 m). The sound values in-air and in-water are not directly comparable due to the reference units used, and they must be converted.[9] 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 (32 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 + 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.

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[9] 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 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 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.

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.

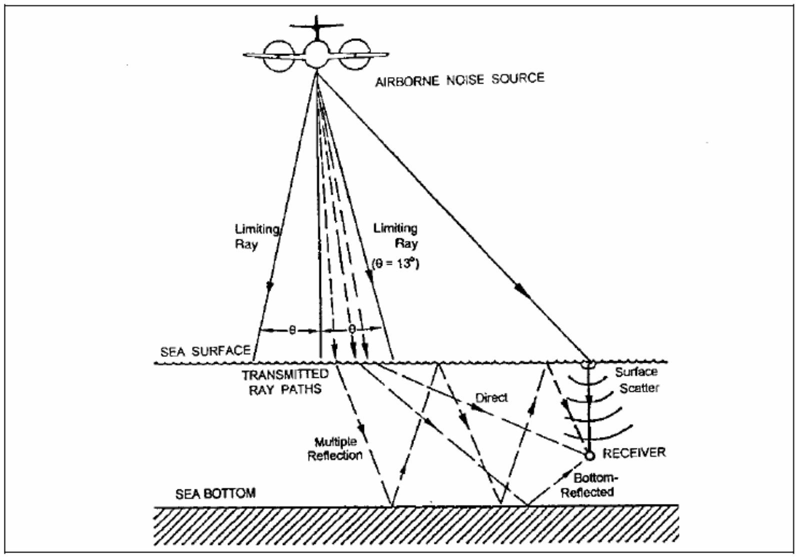

Figure D-1. Characteristics of Sound Transmission through the Air-Water Interface

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 1,500 ft (457 m). The sound values in air and in water are not directly comparable due to the reference units used and must be converted, as described above (Section D.1).

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, similar to the process explained above (Section D.1). However, the above 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 3,600 times (10 log 3,600 = 36) 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 dB + 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 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 two methods: (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 helicopter noise would radiate outward, the noise in water would be transient.

D.4. Permanent Threshold Shift (PTS) and Auditory Injury (AINJ)

The Coast Guard acknowledges that Southall et al. (2019) proposed revised noise criteria to predict the onset of auditory effects in marine mammals, which modifies terminology and corresponding criteria, including PTS. However, NMFS has not yet officially released guidance on these revisions or corresponding thresholds. The Coast Guard also recognizes that the Navy's Atlantic Fleet Training and Testing Supplemental Environmental Impact Statement (anticipated in fall 2024) and Navy (2024), will be the first of the Navy's At-Sea Program's documentation to categorize impacts as mortality, non-auditory injury, auditory injury (AINJ[10]; including PTS and auditory neural injury), temporary hearing loss (TTS), other physiological response (including stress), masking (occurs when a noise interferes with the detection, discrimination, or recognition of other sounds), and behavioral responses. While the Coast Guard often adopts the Navy's terminology and analytical methodology from their At-Sea Program documentation in their impact analyses, particularly since both conduct similar military testing and training activities and at times conduct training events together, the Atlantic Fleet Training and Testing document is not yet finalized.

Since NMFS has not yet released updated thresholds and there have not been any final Navy at-sea documents where these updates are included, the Coast Guard proposes to continue to use PTS and associated hearing thresholds that have been previously used in other impact analyses conducted by both the Navy and the Coast Guard to evaluate potential impacts associated with the Proposed Action. The Coast Guard does not anticipate that the updates suggested in Southall et al. (2019) would change the results of the impact analyses conducted herein for the identified stressors associated with the Proposed Action (U.S. Navy 2024), especially as PTS (or AINJ) is not anticipated. Therefore, the Coast Guard used PTS and the associated thresholds to evaluate potential impacts associated with the Proposed Action.

[10] Noise-induced hearing loss can be temporary (i.e., temporary threshold shift, or TTS) or permanent (i.e., PTS), and higher-level sound exposures are more likely to cause PTS or other AINJ. For marine mammals, AINJ is considered to be possible when sound exposures are sufficient to produce 40 dB of TTS measured approximately four minutes after exposure (U.S. Navy 2024).

APPENDIX E CRITICAL HABITAT

Designated critical habitat areas for those species under the jurisdiction of NMFS and USFWS that would overlap with the proposed action area are displayed in Figure E-1 (coastal) and Figure E-2 (Columbia River). In 2016, NMFS and USFWS implemented changes to the designation of critical habitat, including adopting new language describing essential "physical and biological features" (PBFs) (81 FR 7414, February 11, 2016). Critical habitat designations prior to the 2016 rulemaking may refer to such features as "primary constituent elements" (PCEs). Depending on the date that the critical habitat was designated, NMFS and USFWS details either PCEs or PBFs in the designation. This section details critical habitat designated within the proposed action area and describes the PCEs or PBFs essential to the conservation of the applicable species.

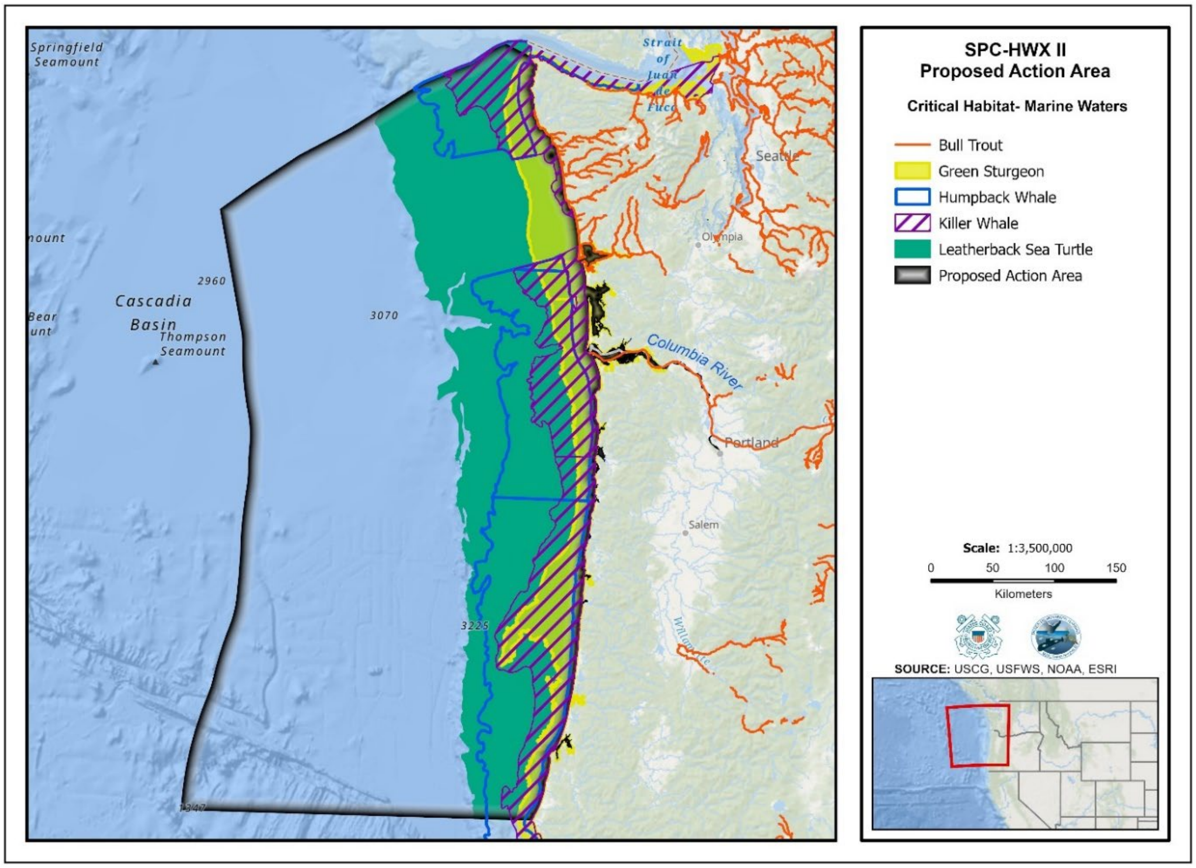

Figure E-1. Critical Habitat Designated within the Coastal Waters of the Proposed Action Area

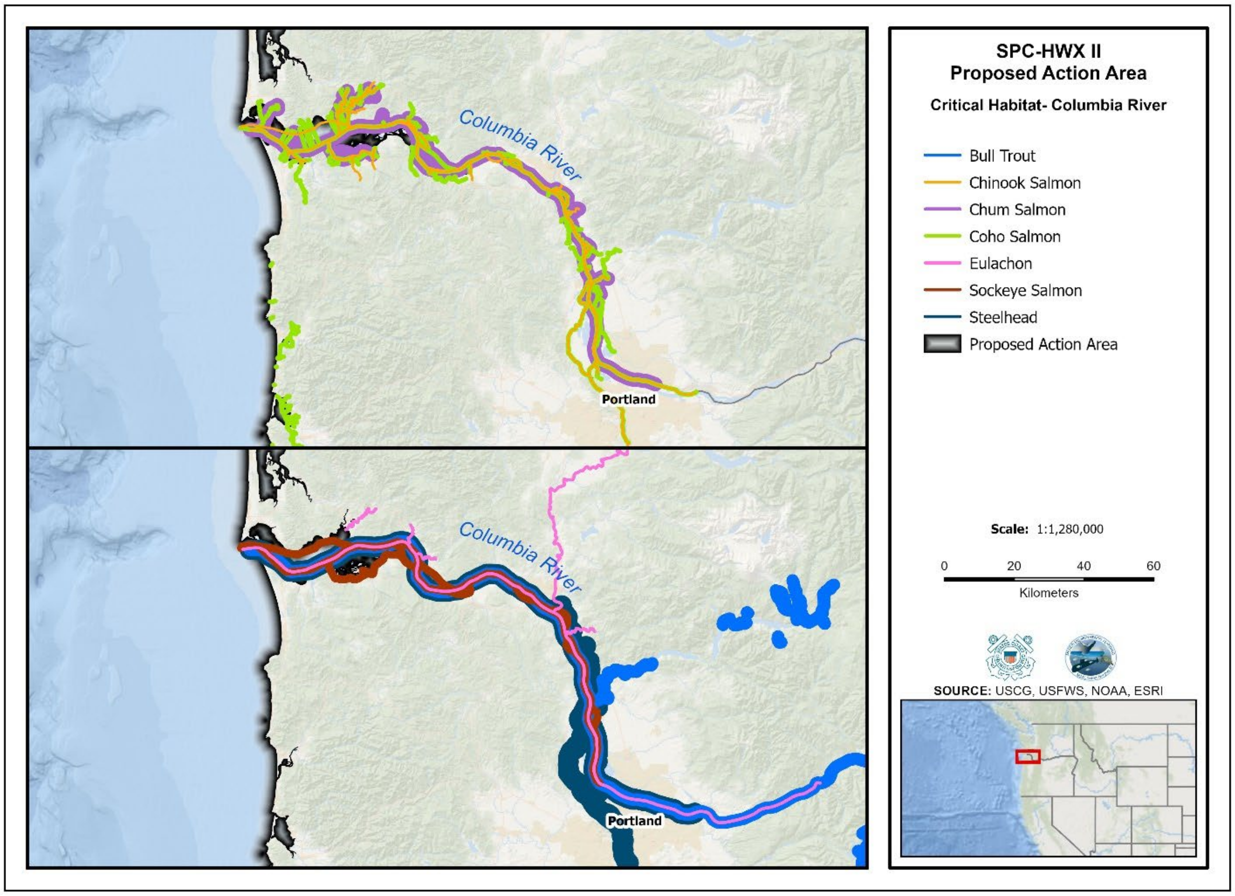

Figure E-2. Critical Habitat Designated within the Columbia River portion of the Proposed Action Area

E.1. Bull Trout

Federally designated critical habitat for the bull trout is within freshwater areas of the Columbia River (Figure E-2) and coastal marine waters of Washington (Figure E-1). PCEs of bull trout critical habitat include habitat components that are essential for the primary biological need of foraging, reproducing, rearing of young, dispersal, genetic exchange, or sheltering. These habitats should be absent of barriers and contain an abundant food base, ideal range of temperature conditions and sediment sizes, and low populations of invasive predators. The critical habitat does not include manmade structures (75 FR 63898; October 18, 2010).

Critical habitat for bull trout overlaps with the proposed action area within the Columbia River and along the Washington Coast. These regions serve as foraging, migratory, and overwintering habitats for bull trout. However, the Proposed Action is not expected to impact the PCEs crucial for the conservation of any bull trout population.

E.2. Chinook Salmon

In the proposed action area, critical habitat is designated within the Columbia River and adjacent estuarine and marine waters (Figure E-2) for the following ESUs of Chinook salmon:

- Lower Columbia River;

- Snake River fall-run;
- Upper Columbia River spring-run; and
- Upper Willamette River.

NMFS identified six PCEs essential for the conservation of the Lower Columbia River, Upper Columbia River spring-run, and Upper Willamette River ESUs:

1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development;
2. Freshwater rearing sites with:
    a. Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility;
    b. Water quality and forage supporting juvenile development; and
    c. Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
3. Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival;
4. Estuarine areas free of obstruction and excessive predation with:
    a. Water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater;
    b. Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and
    c. Juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.
5. Nearshore marine areas free of obstruction and excessive predation with:
    a. Water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and
    b. Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.
6. Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation. (70 FR 52630; September 2, 2005)

Specific PCEs were not identified for the designation of critical habitat for the Snake River fall-run ESU (58 FR 68542; December 28, 1993). The keys to essential features of Chinook salmon designated critical habitat within the proposed action area are water quantity and quality sufficient for spawning, growth, and transit between freshwater and marine habitats, none of which would be affected by the Proposed Action.

E.3. Chum Salmon

Within the proposed action area, critical habitat is designated within the Columbia River and the adjacent estuarine and marine waters (Figure E-2) for the Columbia River ESU of chum salmon (70 FR

52630; September 2, 2005). The same PCEs that apply to Chinook salmon critical habitat apply for chum salmon as well (Section E.2).

E.4. Coho Salmon

Within the proposed action area, critical habitat is designated in the Columbia River and coastal estuarine areas (Figure E-2) for the following ESUs of coho salmon:

- Southern Oregon/Northern California Coasts;
- Lower Columbia River; and
- Oregon Coast.

For the Southern Oregon/Northern California Coasts ESU, critical habitat is designated for "all river reaches accessible to listed coho salmon between Cape Blanco, Oregon, and Punta Gorda, California," including water, substrate, and adjacent riparian zone of estuarine and riverine reaches (64 FR 24049; May 5, 1999).NMFS identified five essential habitat types: (1) juvenile summer and winter rearing areas; (2) juvenile migration corridors; (3) areas for growth and development to adulthood; (4) adult migration corridors; and (5) spawning areas, and they noted that it was essential for these habitats to have adequate (1) substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food, (8) riparian vegetation, (9) space, and (10) safe passage conditions (64 FR 24049; May 5, 1999).

The critical habitat designation for the Lower Columbia River ESU includes approximately 2,300 mi (3,701 km) of freshwater and estuarine habitat in Oregon and Washington, including the Columbia River and adjacent estuarine portions of the proposed action area (81 FR 9251; February 24, 2016). The critical habitat designation for the Oregon Coast ESU includes coastal riverine habitat and its adjacent estuarine habitat along the Oregon Coast (73 FR 7816; February 11, 2008). The PCEs identified for these two ESUs are the same as those identified for other Pacific salmon (Section E.2).

As for other Pacific salmon, these essential features relate to water quantity and quality sufficient for spawning, growth, and transit between freshwater and marine habitats, none of which would be affected by the Proposed Action.

E.5. Eulachon

Within the proposed action area, critical habitat is designated for the Southern DPS of eulachon in the Columbia River and estuaries associated with specific freshwater creeks along the Washington and Oregon Coasts (76 FR 65324; October 20, 2011) (Figure E-2). The PBFs for eulachon critical habitat include:

- Freshwater spawning and incubation sites with water flow, quality and temperature conditions and substrate supporting spawning and incubation, and with migratory access for adults and juveniles. These features are essential to conservation because without them the species cannot successfully spawn and produce offspring.
- Freshwater and estuarine migration corridors associated with spawning and incubation sites that are free of obstruction and with water flow, quality and temperature conditions supporting larval and adult mobility, and with abundant prey items supporting larval feeding after the yolk sac is depleted. These features are essential to conservation because they allow adult fish to swim upstream to reach spawning areas and they allow larval fish to proceed downstream and reach the ocean.

- Nearshore and offshore marine foraging habitat with water quality and available prey, supporting juveniles and adult survival. (76 FR 65324; October 20, 2011)

As for critical habitat for Eulachon, these essential features relate to water quantity and quality sufficient for spawning, growth, and transit between freshwater and marine habitats, none of which would be affected by the Proposed Action.

E.6. Green Sturgeon

Critical habitat is designated for the Southern DPS of green sturgeon within coastal waters throughout the proposed action area from the coast to 60 fathoms depth, the lower Columbia River and its adjacent estuary, and certain coastal bays and estuaries in Oregon (Coos Bay, Winchester Bay, Yaquina Bay, and Nehalem Bay) and Washington (Willapa Bay and Grays Harbor) (74 FR 52300; October 9, 2009) (Figure E-1).

The PBFs for green sturgeon critical habitat in freshwater riverine systems (limited to the lower Columbia River within the proposed action area) include the following:

- Food resources. Abundant prey items for larval, juvenile, subadult, and adult life stages.
- Substrate type or size (i.e., structural features of substrates). Substrates suitable for egg deposition and development (e.g., bedrock sills and shelves, cobble and gravel, or hard clean sand, with interstices or irregular surfaces to “collect” eggs and provide protection from predators, and free of excessive silt and debris that could smother eggs during incubation), larval development (e.g., substrates with interstices or voids providing refuge from predators and from high flow conditions), and subadults and adults (e.g., substrates for holding and spawning).
- Water flow. A flow regime (i.e., the magnitude, frequency, duration, seasonality, and rate-of-change of freshwater discharge over time) necessary for normal behavior, growth, and survival of all life stages.
- Water quality. Water quality, including temperature, salinity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages.
- Migratory corridor. A migratory pathway necessary for the safe and timely passage of Southern DPS fish within riverine habitats and between riverine and estuarine habitats (e.g., an unobstructed river or dammed river that still allows for safe and timely passage).
- Depth. Deep (≥5 m) holding pools for both upstream and downstream holding of adult or subadult fish, with adequate water quality and flow to maintain the physiological needs of the holding adult or subadult fish.
- Sediment quality. Sediment quality (i.e., chemical characteristics) necessary for normal behavior, growth, and viability of all life stages. (74 FR 52300; October 9, 2009)

PBFs in estuarine areas include the following:

- Food resources. Abundant prey items within estuarine habitats and substrates for juvenile, subadult, and adult life stages.
- Water flow. Within bays and estuaries adjacent to the Sacramento River (i.e., the Sacramento-San Joaquin Delta and the Suisun, San Pablo, and San Francisco bays), sufficient flow into the bay and estuary to allow adults to successfully orient to the incoming flow and migrate upstream to spawning grounds.
- Water quality. Water quality, including temperature, salinity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages.

- Migratory corridor. A migratory pathway necessary for the safe and timely passage of Southern DPS fish within estuarine habitats and between estuarine and riverine or marine habitats.
- Depth. A diversity of depths necessary for shelter, foraging, and migration of juvenile, subadult, and adult life stages.
- Sediment quality. Sediment quality (i.e., chemical characteristics) necessary for normal behavior, growth, and viability of all life stages. (74 FR 52300; October 9, 2009)

PBFs for nearshore coastal marine waters include the following:

- Migratory corridor. A migratory pathway necessary for the safe and timely passage of Southern DPS fish within marine and between estuarine and marine habitats.
- Water quality. Nearshore marine waters with adequate dissolved oxygen levels and acceptably low levels of contaminants (e.g., pesticides, organochlorines, elevated levels of heavy metals) that may disrupt the normal behavior, growth, and viability of subadult and adult green sturgeon.
- Food resources. Abundant prey items for subadults and adults, which may include benthic invertebrates and fishes. (74 FR 52300; October 9, 2009)

Although more extensive and detailed than the PBFs for other fish of the PNW, these essential features relate to water quantity and quality sufficient for spawning, growth, and transit between freshwater and marine habitats, none of which would be affected by the Proposed Action.

E.7. Sockeye Salmon

Within the proposed action area, critical habitat has been designated for the Snake River and Ozette Lake ESUs of sockeye salmon, including estuarine and marine waters (both ESUs) and within the Columbia River (Snake River ESU) (Figure E-2). The designated habitat for Snake River sockeye salmon consists of river reaches of the Columbia River (as well as other rivers and lakes outside of the proposed action area) and the adjacent estuarine and marine waters (58 FR 68542; December 28, 1993). The majority of critical habitat designated for the Ozette Lake ESU occurs outside of the proposed action area, but estuarine and marine habitat adjacent to the Ozette River is included and would overlap with the proposed action area (70 FR 52630; September 2, 2005).

PCEs for critical habitat for the Ozette Lake ESU are the same as for other Pacific salmonids (Section E.2). Specific PCEs were not identified for the designation of critical habitat for the Snake River ESU (58 FR 68542; December 28, 1993). The keys to essential features of sockeye salmon designated critical habitat within the proposed action area are water quantity and quality sufficient for spawning, growth, and transit between freshwater and marine habitats, none of which would be affected by the Proposed Action.

E.8. Steelhead Trout

In the proposed action area, critical habitat is designated within the Columbia River and adjacent estuarine and marine waters (Figure E-2) for the following DPSs of steelhead trout:

- Lower Columbia River;
- Middle Columbia River;
- Snake River Basin;
- Upper Columbia River; and
- Upper Willamette River.

PCEs for critical habitat for all DPSs are the same as for other Pacific salmonids (Section E.2) (70 FR 52630; September 2, 2005). As for other Pacific salmonids, the keys to essential features of steelhead trout designated critical habitat within the proposed action area are water quantity and quality sufficient for spawning, growth, and transit between freshwater and marine habitats, none of which would be affected by the Proposed Action.

E.9. Leatherback Sea Turtle

Within the proposed action area, critical habitat is designated for the leatherback sea turtle over approximately 25,004 square miles (67,760 square kilometers) stretching from Cape Flattery, Washington to Cape Blanco, Oregon east of the 6,562 ft (2,000 m) depth contour (77 FR 4170; January 26, 2012) (Figure E-1).

The PCE for leatherback sea turtle critical habitat includes the occurrence of prey species, primarily scyphomedusae of the order Semaeostomeae (e.g., Chrysaora, Aurelia, Phacellophora, and Cyanea), of sufficient condition, distribution, diversity, abundance, and density necessary to support individual as well as population growth, reproduction, and development of leatherbacks (77 FR 4170; January 26, 2012).

E.10. Humpback Whale

Within the proposed action area, critical habitat has been designated in marine habitat off the coasts of Washington and Oregon for the Central America and Mexico DPSs of humpback whales (86 FR 21082; April 21, 2021) (Figure E-1). Critical habitat for the Central America DPS of humpback whales contains approximately 48,521 square nautical miles of marine habitat in the North Pacific Ocean within the portions of the California Current Ecosystem off the coasts of Washington, Oregon, and California. Critical habitat for the Mexico DPS of humpback whales contains approximately 116,098 square nautical miles of marine habitat in the North Pacific Ocean, including areas within portions of the eastern Bering Sea, Gulf of Alaska, and California Current Ecosystem.

The PBFs for humpback whale critical habitat include the following:

- Central America DPS: Prey species, primarily euphausiids (*Thysanoessa*, *Euphausia*, *Nyctiphanes*, and *Nematoscelis*) and small pelagic schooling fishes, such as Pacific sardine (*Sardinops sagax*), northern anchovy (*Engraulis mordax*), and Pacific herring (*Clupea pallasii*), of sufficient quality, abundance, and accessibility within humpback whale feeding areas to support feeding and population growth.

Mexico DPS: Prey species, primarily euphausiids (*Thysanoessa*, *Euphausia*, *Nyctiphanes*, and *Nematoscelis*) and small pelagic schooling fishes, such as Pacific sardine, northern anchovy, Pacific herring, capelin, juvenile walleye pollock, and Pacific sand lance of sufficient quality, abundance, and accessibility within humpback whale feeding areas to support feeding and population growth (86 FR 21082; April 21, 2021).

E.11. Southern Resident Killer Whale

Critical habitat for the SRKW was originally designated in three specific areas in the U.S. PNW (71 FR 69054; December 29, 2006). In 2021, NMFS added six coastal critical habitat areas along the U.S. West Coast (86 FR 41668; August 2, 2021). Critical habitat for the SRKW is currently designated along the entire Washington and Oregon coastline, except for portions owned or controlled by the Department of Defense, which are excluded (Figure E-1).

PBFs identified as essential to the conservation of the SRKW include the following:

- 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; and
- Passage conditions to allow for migration, resting, and foraging (86 FR 41668; August 2, 2021).

APPENDIX F SPECIES-SPECIFIC HEARING CAPABILITIES

The acoustic stressors associated with the Proposed Action are fathometer noise, vessel noise, helicopter 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.

F.1. Invertebrate Hearing

Hearing capabilities of invertebrates are poorly understood (Lovell et al. 2005; Popper and Schilt 2008). Although 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. 2015; 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. 2015; Edmonds et al. 2016; Roberts and Breithaupt 2016). PTS, TTS, and masking studies have not been conducted for invertebrates.

F.2. 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. 2015). Additionally, a study of marbled murrelets showed best in air hearing between 1.5 and 3 kHz (Smith et al. 2023). 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 they do not hear at frequencies greater than 15 kHz.

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).

F.3. 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). The inner ear generally detects relatively higher-frequency sounds, while the lateral line detects water motion at low frequencies (Lindley et al. 2008).

Although hearing capability data only exist for fewer than 100 of the more than 32,000 fish species, current data suggest that most species of fish detect sounds from 50 to 1,000 Hz. It is believed that most fish have their best hearing sensitivity from 100 to 400 Hz (Popper et al. 2003; Popper et al. 2014). Some fish species, such as clupeiformes (herrings, shads, sardines, anchovies), possess anatomical specializations that may enhance their sensitivity to pressure changes, and thus have the ability to sense higher frequencies and lower intensities, including sounds above 4 kHz (Popper 2008; Popper and Fay 2010).

Bony fish can produce sounds in a number of ways and use them for a number of behavioral functions (Ladich 2008). Over 30 families of fish are known to use vocalizations in aggressive interactions, and over 20 families are known to use vocalizations in mating (Ladich 2008). Sound generated by fish as a means of communication is generally below 500 Hz (Slabbekoorn et al. 2010). Although fish can produce sounds in a number of ways, typically the air in the swim bladder is vibrated by the sound-producing structures (often muscles that are integral to the swim bladder wall) and radiates sound into the water (Zelick et al. 1999). Sprague and Luczkovich (2004) calculated that silver perch can produce drumming sounds ranging from 128 to 135 dB re 1 µPa root mean square. Female midshipman fish apparently use the auditory sense to detect and locate vocalizing males during the breeding season (Sisneros and Bass 2003).

The ESA-listed sturgeon species are not thought to have hearing specializations. Popper (2005) reviewed various studies and determined that species from the genus *Acipenser* may be able to detect sounds between 100 and 1,000 Hz, but he acknowledged that more research is needed to refine this preliminary range. Lake sturgeon (*Acipenser fulvescens*) have been determined to hear sounds ranging between 200 and 500 Hz (Lovell et al. 2005). Lake sturgeon also have low sensitivity to sound pressure (Lovell et al. 2005). Pallid (*Scaphirhynchus albus*) and shovelnose sturgeon (*S. platorynchus*) are known to produce both low-frequency sounds (90 to 400 Hz) as well as high-frequency squeaks and chirps (1,000 to 2,000 Hz); however, only the low-frequency sounds are believed to be audible to sturgeon species (Lovell et al. 2005) with the high-frequency chirps being incidental to other vocalization.

In general, salmonid species are not hearing specialists, and they are able to detect sounds from below 30 to over 600 Hz (Halvorsen et al. 2009). There have been extensive studies on sound production in Pacific salmon. Murchy et al. (2023) examined sound production among Chinook, pink (*Oncorhynchus gorbuscha*), and coho salmon. They noted seven different types of air movement sounds from Chinook salmon with recorded frequencies between 162 Hz ±10 Hz and 8,243 Hz ±1,814 Hz (combined records of pink and Chinook salmon had a highest recorded sound frequency of 11,298 Hz ±1,495 Hz). Coho salmon sounds had recorded frequencies between 243 Hz ±39 Hz and 4,050 Hz ±504 Hz. In studying rainbow trout[11] (*Oncorhynchus mykiss*) from New England waters, Roundtree et al. (2018) observed peak frequencies of sound production ranging from 2,409 Hz to 4,199 Hz. While salmonids are known to be able to hear above 600 Hz, it is unclear if they can perceive these significantly higher frequencies they produce or if those noises are produced incidentally during sound production.

F.4. 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. 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 (Dow Piniak et al. 2012; Harms et al. 2014). Marine et al. (2012) examined the auditory capabilities of an adult loggerhead sea turtle and found hearing ranges similar to 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.5. 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.

[11] Rainbow trout and steelhead trout are the same species. Fish that remain in freshwater are commonly referred to as rainbow trout, while fish that migrate into mariner environments are commonly referred to as steelhead trout.

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 2018, NMFS made modifications as part of their technical guidance to account for these hearing groups (National Marine Fisheries Service 2018a) (Table F-1). Southall et al. (2019) have suggested updated terminology and definitions for these hearing groups. However, since those changes have not yet been broadly accepted and acoustic impacts associated with this Proposed Action are minimal and would not be affected by these changes, the Coast Guard has not incorporated the updated hearing classifications for this consultation.

Table F-1. Marine Mammal Hearing Groups and Associated Generalized Underwater Hearing Ranges

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
PW underwater (true seals)	50 Hz to 86 kHz
OW underwater (sea lions, fur seals, sea otters)*	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
NMFS (2018a) included all available datasets from in-water groups, including sirenian datasets (Gerstein et al. 1999; Mann et al. 2009).
*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.5.1. 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 alone 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.5.2. Odontocetes

Odontocetes use high-frequency biosonar signals to sense their environment. They are divided into two hearing groups: MF cetaceans and HF cetaceans. The majority of odontocetes in the proposed action area would belong to the MF cetacean hearing group, but the Dall's porpoise, harbor porpoise, and dwarf and pygmy sperm whales are part of the HF cetacean hearing group.

Species in the MF cetacean hearing group have a broad hearing range extending to 200 kHz, but the frequency of best hearing range is 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. Research is more limited for the HF cetacean hearing group, but based on behavioral and auditory evoked potential audiograms, the estimated hearing range of 200 Hz to 180 kHz has been established with peak sensitivity at 275 Hz to 160 kHz (Southall et al. 2007).

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).

F.5.3. 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, they would be expected to adapt to hearing in water and in air. Phocid species (true seals) have consistently demonstrated an extended frequency range of hearing compared to otariids and other carnivores, especially in the higher frequency range (Hemila et al. 2006; Kastelein 2009; Reichmuth et al. 2013). Therefore, they have been placed in their own hearing group, separate from other carnivores. 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). Their best hearing is 50 Hz to 86 kHz in water.

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 area. 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.

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.

APPENDIX G ESA-LISTED SPECIES

G.1. ESA-Listed Birds

G.1.1. Hawaiian Petrel

The Hawaiian petrel (*Pterodroma sandwichensis*) is present throughout the offshore waters of the Hawaiian Islands during the breeding season (March to October)(Ainley et al. 1997; BirdLife International 2016). During the non-breeding season, Hawaiian petrels primarily occur in equatorial waters of the eastern tropical Pacific, generally between 20 degrees North latitude (°N) and 10 degrees South latitude (°S) (U.S. Fish and Wildlife Service 2005a). However, they have been sighted off the coasts of Oregon and Washington, with only seven documented sightings in Oregon and two in Washington (Toochin 2023). Accordingly, they would be rare within the proposed action area. Hawaiian petrels forage mostly on squid (50 to 75 percent of their diet), fish, and crustaceans (BirdLife International 2016).

G.1.2. Marbled Murrelet

Marbled murrelets are distributed along the Pacific Coast from southern Alaska to southern California, spending most of their lives in the marine environment. They are small, robin-sized diving seabirds that forage in marine waters (including within the proposed action area) and nest in forests within 50 mi (80 km) from the coast (outside of the proposed action area) (Felis et al. 2023). Although they nest from April to September, marbled murrelets remain near breeding sites year-round in most regions (Washington Fish and Wildlife Office 2012). During the summer breeding season, marbled murrelets are more commonly found inland, but still make daily trips to the ocean to gather food (U.S. Fish and Wildlife Service 2005b).

When not nesting, marbled murrelets live at sea, feeding close to shore during the day and moving several miles offshore at night. After breeding season, they undergo a molt that leaves them flightless for several weeks (between August and November). During this time, they choose molting areas with sufficient prey within swimming distance (Carter and Stein 1995). Consequently, marbled murrelets may be found year-round in the proposed action area, primarily outside the breeding and nesting season (September through April), in coastal waters by day and offshore waters by night.

Marbled murrelets forage on small fish (e.g., sand lance, anchovy, herring, capelin, smelt) and invertebrates (U.S. Fish and Wildlife Service 1997, 2005b). 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).

G.1.3. Short-tailed Albatross

Short-tailed albatross move seasonally around the North Pacific Ocean, ranging from the Bering Strait to northern California within U.S. waters (U.S. Fish and Wildlife Service 2005c). Short-tailed albatross sightings have been reported off Cape Flattery and Aberdeen Washington, the mouth of the Columbia River, and Coos Bay, Oregon, with most sightings associated with the continental shelf/slope break (U.S. Fish & Wildlife Service 2020).

During the breeding season (October to May), short-tailed albatross prefer to nest on isolated, windswept, offshore islands protected from human access (U.S. Fish and Wildlife Service 2000). Almost all of these birds nest on two uninhabited islands in the western Pacific Ocean, outside of the proposed action area (U.S. Fish & Wildlife Service 2020). Short-tailed albatross are surface feeders and scavengers, foraging diurnally and possibly nocturnally on shrimp, squid, and fish (U.S. Fish and Wildlife Service 2005c).

G.1.4. Streaked Horned Lark

Streaked horned larks occur exclusively in lower elevation sites, west of the Cascade Mountains, in Washington and Oregon. The lark is limited to areas with open grasslands and sparse vegetation, including sandy islands, coastal spits, man-made fields, and airports (Stinson 2016). In Washington, the streaked horned lark is known to breed on the outer coast on sandy islands and on banks of the lower Columbia River (Stinson 2016). An additional 11 breeding sites are known along the Columbia River in Oregon (Stinson 2016). Thus, they may be found nesting adjacent to and flying over the Columbia River portions of the proposed action area. Streaked horned larks forage on land mainly consuming seeds, grass, and insects, and would not forage in the proposed action area (Stinson 2016).

G.1.5. Western Snowy Plover

Western snowy plovers are a partial-migrant species, consisting of a mix of permanent resident and migratory birds (Brindock and Colwell 2011). Plovers typically winter and breed in the same habitats, which consist of mostly sandy, ocean-fronting beaches. Their breeding season typically begins in early March and continues into September (Lafferty 2001). Migratory plovers will travel from Oregon to Washington (Pearson et al. 2009) and from California to Oregon for nesting (Lauten et al. 2021). Thus, they may be found flying over the proposed action area during migration. Western snowy plovers feed along the shoreline in waters too shallow to overlap with the SPC-HWX II.

G.2. ESA-Listed Fish

G.2.1. Bull Trout

The bull trout (*Salvelinus confluentus*) is listed as threatened under the ESA throughout its range (64 FR 58910; November 1, 1999), except where it is listed as an experimental population (76 FR 35979, June 21, 2011). No fish from an experimental population would be expected to occur within the proposed action area. The USFWS designated critical habitat for the bull trout (75 FR 63898; October 18, 2010) and is discussed in Appendix E.

Bull trout can be found throughout the rivers of the PNW and western Canada. Bull trout were once found widely throughout the Columbia River basin, but today, they occur in less than half of their historic range, with scattered populations in portions of Oregon, Washington, Nevada, Idaho, and Montana (Reiman et al. 1997; U.S. Fish and Wildlife Service 2008). Bull trout have specific habitat requirements influencing their distribution and abundance: cold water (typically temperatures <59 to 64 degrees Fahrenheit [°F; 15 to 18 degrees Celsius (°C)]), stable stream channels, clean spawning and rearing gravel, complex and diverse cover, and unblocked migratory corridors. Within the proposed action area bull trout can be found in the Columbia River and along the Washington Coast.

Resident and juvenile bull trout prey on invertebrates and small fish. Adult migratory bull trout primarily eat fish as they increase in size, but they may also consume invertebrates (McPhail and Baxter 1996).

G.2.2. Chinook Salmon

Fish from nine evolutionarily significant units (ESUs) of Chinook salmon may occur within the proposed action area. Two ESUs are listed as endangered under the ESA: Sacramento River winter-run ESU (59 FR 440; January 4, 1994) and Upper Columbia River spring-run (64 FR 14308; March 24, 1999). The remaining seven ESUs are listed as threatened: California Coastal, Snake River fall-run, lower Columbia River, upper Willamette River, Puget Sound, Central Valley spring-run, and Snake River spring/summer-run (64 FR 14308; March 24, 1999; 46 FR 50394; September 16, 1999; 79 FR 20802; April 14, 2014). Critical habitat is designated within the proposed action area and will be discussed in Appendix E.

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 may reside in fresh water for 12 to 16 months, but some migrate to the ocean as young-of-the year in the winter or spring months within eight months of hatching (Navy and NOAA Fisheries 2020). Some Chinook salmon, including the Upper Columbia River spring-run and the lower Columbia River ESUs, spawn within the Columbia River and its tributaries, so a SPC-HWX II transiting within the lower Columbia River may encounter earlier life stages of Chinook salmon. The Central Valley spring-run Chinook has a relatively broad ocean distribution from central California to Cape Falcon, Oregon and could be encountered during SPC-HWX II transit. Juvenile Chinook prefer coastal areas (less than 34 mi [55 km] from the shore) from California to Alaska (Pacific Fishery Management Council 2000), including coastal areas in the proposed action area.

Within the proposed action area, Chinook salmon from all ESUs included in Table 3-11 may occur throughout Washington and Oregon estuarine and marine waters out to the 656 ft (200 m) depth contour (National Marine Fisheries Service 2020). Adults of certain ESUs (Upper Columbia River spring-run, Snake River fall-run, Snake River spring/summer-run, Upper Willamette River) have been determined to occur as far as 138 mi (222 km) offshore (National Marine Fisheries Service 2020).

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

G.2.3. Chum Salmon

Two ESUs of chum salmon are listed as threatened under the ESA—the Columbia River ESU and the Hood Canal summer-run ESU (70 FR 37160; June 28, 2005). Only the Columbia River ESU would be expected within the proposed action area as the Hood Canal summer-run ESU is outside of the proposed action area. Critical habitat is designated within the proposed action area and will be discussed in Appendix E.

The chum salmon has the largest range of natural geographic and spawning distribution of all the Pacific salmon species (Pauley et al. 1988), historically ranging from California to Alaska. Present spawning populations are now found only as far south as Tillamook Bay on the northern Oregon Coast (National Oceanic and Atmospheric Administration 2023; Salo 1991). Individuals of the Columbia River ESU spawn in the Columbia River and its tributaries, so all life stages of chum salmon occur within the Columbia River.

Chum salmon typically spawn in the lower reaches of rivers. Juveniles out-migrate to seawater almost immediately after emerging from the gravel covered redds (North Pacific Fishery Management Council 1990; Salo 1991). Chum salmon generally migrate north once reaching marine waters, and they primarily occur north of 48 °N (National Marine Fisheries Service 2020), outside of the proposed action area. Therefore, they would only occur within the marine waters of the proposed action area while migrating between their natal rivers and their preferred marine habitat. They would be more common within the proposed action area in coastal and estuarine areas and within the Columbia River.

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; National Marine Fisheries Service 2013). As adults, they feed on copepods, fish, mollusks, squid, and tunicates (National Oceanic and Atmospheric Administration 2023).

G.2.4. Coho Salmon

NMFS has listed four ESUs of coho salmon under the ESA that may occur within the proposed action area. Three ESUs (Lower Columbia River, Oregon Coast, and Southern Oregon & Northern California Coasts) are listed as threatened, and one (Central California Coast) is listed as endangered (79 FR 20802; April 14, 2014). Fish from all these ESUs would be expected in the proposed action area. Critical habitat is designated within the proposed action area and will be discussed in Appendix E.

The coho salmon is an anadromous species. They spawn in freshwater drainages (including the Columbia River) from California northwards along the Pacific Coast to Alaska (National Marine Fisheries Service 2014). Adults typically begin their freshwater spawning migration in the late summer and fall, spawn by mid-winter, and then die, although the run and spawning times vary between and within populations. After entering the ocean, immature salmon initially remain in the nearshore waters close to their natal stream (Navy and NOAA Fisheries 2020). In marine environments, coho salmon typically stay within 50 ft (15 m) of the surface (Washington Department of Fish and Wildlife 2024d). Coho salmon may occur within the proposed action area in offshore waters of Oregon (all ESUs) and Washington (Oregon Coast and Lower Columbia River ESUs) out to the 656-ft (200-m) depth contour (National Marine Fisheries Service 2020).

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 Wildlife 2016; Miller and Simenstad 1997; National Marine Fisheries Service 2014; Sandercock 1991).

G.2.5. Dolly Varden

The Dolly Varden (*Salvelinus malma*) is proposed for listing as threatened under the ESA under the similarity of appearance provision, section 4e of the ESA (88 FR 41580; June 27, 2023). Critical habitat has not been designated. Although the Dolly Varden is found throughout the PNW and Alaska (Alaska Department of Fish and Game 2022), the proposed listing would be restricted to the coastal areas of the PNW where the Dolly Varden's range overlaps with the bull trout (Section G.2.1). Species listed under a similarity of appearance are not biologically threatened and are not subject to section 7 consultation under the ESA. However, since the Dolly Varden inhabits similar environments and has similar life history characteristics to the bull trout (Donald and Alger 1993; Guy et al. 2011), any analysis for the bull trout would be applicable to the Dolly Varden. For this reason, the Dolly Varden is not discussed further.

G.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 may occur within the proposed action area. Critical habitat is designated within the proposed action area and will be discussed in Appendix E.

Eulachon are endemic to the eastern Pacific Ocean, ranging from northern California to southern Alaska and into the southeastern Bering Sea. In the continental U.S., most eulachon originate in the Columbia River Basin, and they would be expected to occur in both Washington and Oregon marine waters. Eulachon occur in nearshore ocean waters and in waters up to 984 ft (300 m) in depth, except for the brief spawning runs into their natal streams (National Marine Fisheries Service 2020). Eulachon typically spend three to five years in estuarine and marine waters before returning to freshwater to spawn from late winter through mid-spring. Juvenile eulachon move from shallow nearshore areas to deeper water and may be observed in depths up to 2,000 ft (610 m), but they typically remain between 80 and 500 ft (24 to 152 m) depths (Allen and Smith 1988).

Eulachon are plankton-feeding fish that eat crustaceans, fish eggs, and insect larvae while at sea. Juveniles primarily eat planktonic crustaceans, and adults eat krill, crustaceans, and copepods (NOAA Fisheries 2022a).

G.2.7. Green Sturgeon

The southern DPS of green sturgeon (*Acipenser medirostris*) is listed as threatened under the ESA (71 FR 17757; April 7, 2006) and may occur within the proposed action area. Critical habitat is designated within the proposed action area and will be discussed in Appendix E.

In the Pacific Ocean, green sturgeon occur from Mexico to Alaska (National Marine Fisheries Service 2018b). They are broadly distributed, wide-ranging, and the most marine-oriented species of the sturgeon family. Green sturgeons are anadromous and spend the majority of their lives in nearshore oceanic waters, bays, and estuaries. Green sturgeon may occur at depths up to 656 ft (200 m), but they are most commonly found in marine waters at depths of 66 to 197 ft (20 to 60 m) (National Marine Fisheries Service 2020). During summer and fall, green sturgeon congregate in coastal bays and estuaries of Washington, Oregon, and California (Lindley et al. 2008). Juvenile green sturgeons may spend days to months in fresh and estuarine ecosystems before they migrate to marine waters (National Marine Fisheries Service 2018b). Adults migrate to freshwater habitats only to spawn when they are about 15 years of age (NOAA Fisheries 2024c). They spawn in deep pools in large, turbulent, freshwater rivers (Moyle et al. 1992) once every two to five 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).

Green sturgeon forage on benthic invertebrates, such as shrimp, mollusks, and amphipods. They also occasionally prey upon small fish (Moyle et al. 1992).

G.2.8. Sockeye Salmon

Two ESUs of sockeye salmon (*Oncorhynchus nerka*) are listed under the ESA: Ozette Lake (threatened) and Snake River (endangered) (70 FR 37160; August 29, 2005). Fish from both ESUs may occur within the proposed action area. Critical habitat is designated within the proposed action area and will be discussed in Appendix E.

Sockeye salmon inhabit marine, riverine, and lake environments from the Klamath River and its tributaries in southern Oregon to northwest Alaska. Sockeye salmon are primarily anadromous, spawning in lakes and rivers with juveniles and adults migrating to the ocean. Spawning is temperature-dependent and varies by location, generally occurring from August to December and peaking in October (Emmett et al. 1991). Sockeye salmon generally migrate north once reaching marine waters, and they primarily occur north of 48 °N (National Marine Fisheries Service 2020), outside of the proposed action area. Therefore, they would only occur within the marine waters of the proposed action area while migrating between their natal rivers and their preferred marine habitat. Sockeye salmon would be more common within the proposed action area in coastal and estuarine areas (both ESUs) as well as within the Columbia River (Snake River ESU).

The diet of juvenile sockeye salmon includes insects and large zooplankton. Larger fish become more piscivorous, consuming fish such as sand lance and walleye pollock as well as squid (Farley et al. 2007).

G.2.9. Steelhead trout

There are ten DPSs of steelhead trout (*Oncorhynchus mykiss*) that are listed under the ESA and may occur within the proposed action area, all of which are listed as threatened: Lower Columbia River, Middle Columbia River, Northern California, California Central Valley, Central California Coast, Puget Sound, South-Central California Coast, Snake River Basin, Upper Columbia River, and Upper Willamette River (71 FR 834; January 5, 2006; 72 FR 26722; May 11, 2007). Critical habitat is designated within the proposed action area and will be discussed in Appendix E.

In the United States, distribution of steelhead trout extends from Alaska to California (Good et al. 2005). Steelhead trout are known to occur in marine waters off both Washington and Oregon (National Marine Fisheries Service 2020). The species tends to spend more time in riverine habitats than other salmonid species, making it rare in oceanic waters. Some individuals and populations spend their entire lives in freshwater (National Marine Fisheries Service 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 (NOAA Fisheries 2023c).

G.3. ESA-Listed Sea Turtles

G.3.1. Green Sea Turtles

Green sea turtles are distributed worldwide primarily in subtropical and temperate regions of the Atlantic, Pacific, and Indian Oceans, and in the Mediterranean Sea. They are primarily a coastal species, but oceanic areas are used by oceanic-stage juveniles, migrating adults, and, on some occasions, by green sea turtles that reside in the oceanic zone for foraging (NOAA Fisheries and U.S. Fish & Wildlife Service 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).

Sea turtle sighting records indicate that the green sea turtle is the most commonly observed hard-shelled sea turtle on the U.S. Pacific Coast, but most sightings are south of the proposed action area. East Pacific green sea turtles are found during the summer months in waters off the coast of Oregon (NOAA Fisheries 2024d), but they would only be seasonally present within the proposed action area.

G.3.2. Leatherback Sea Turtles

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). Adult leatherback sea 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; National Marine Fisheries Service and United States Fish and Wildlife Service 1992).

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. In the fall, the leatherback sea turtles move further offshore and begin their migration south for the winter (Payne and Selzer 1986). In general, leatherback sea turtles spend most of their time out at sea, but they are occasionally found in shallow coastal waters (Defenders of Wildlife 2021). Leatherbacks are strong swimmers and can dive to depths of approximately 4,000 ft (1,219 m), deeper than any other turtle (NOAA Fisheries 2024e). They 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. 2005; Salmon et al. 2004).

G.3.3. Loggerhead Sea Turtle

Loggerhead sea turtles occur in U.S. waters in habitats ranging from coastal estuaries to far beyond the continental shelf (Dodd Jr. 1988). 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. Pacific Ocean loggerheads appear to use the entire North Pacific Ocean during development. They have 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). Most records along the U.S. West Coast are of juveniles along the coast of California (outside the proposed action area), with very few sightings off Washington and Oregon (NOAA Fisheries 2024e).

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 mostly bottom dwelling invertebrates such as whelks, other mollusks, horseshoe crabs, and other crabs (NOAA Fisheries 2024e).

G.3.4. Olive Ridley Sea Turtle

Olive ridley sea turtles are mainly pelagic and have a circumtropical distribution in the Atlantic, Pacific, and Indian Oceans (National Marine Fisheries Service and U.S. Fish and Wildlife Service 2014; NOAA Fisheries n.d.), but the number of olive ridley sea turtles occurring in U.S. territorial waters is believed to be small (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1998, 2014). Washington has only a single record, a ridley sea turtle found dead in Grays Harbor County and Oregon has had occasional strandings over the last few years. Accordingly, they would be extremely rare within the proposed action area.

Olive ridley sea turtles are omnivorous, feeding on a variety of foods including algae, lobster, crabs, tunicates, and mollusks. Olive ridleys can dive to depths of 500 ft (150 m) to forage on benthic invertebrates (NOAA Fisheries 2022b).

G.4. ESA-Listed Marine Mammals

G.4.1. 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. There is no critical habitat designated for the blue whale.

Blue whales occur worldwide in all major oceans, except the Arctic. In general, blue whales are found in the open ocean, but they do come closer to shore to feed and possibly to mate and breed. Only the Eastern North Pacific stock of blue whale may occur in the offshore portion of the proposed action area. Most of this stock is believed to migrate south to spend the winter and spring in high productivity areas off Mexico and Costa Rica (Calambokidis et al. 2009), and in the summer, they feed off the U.S. West Coast, including the PNW (NOAA Fisheries 2023a). 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 feed primarily on various species of krill (euphausiids).

G.4.2. Fin Whale

The fin whale (*Balaenoptera physalus*) 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 fin whale was listed as endangered throughout its range. It is also designated as depleted and classified as a strategic stock under the MMPA. North Pacific fin whales are a genetically separate subspecies: *Balaenoptera physalus velifera* (Archer et al. 2019). There is no critical habitat designated for the fin whale.

The fin whale is a cosmopolitan species. 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 California, Oregon, and Washington MMPA stock would overlap with the proposed action area seasonally within 345 mi (555 km) of shore. This stock would pass through the proposed action area while migrating between northern foraging grounds and southern wintering grounds. From June through November, BIAs for fin whales have been designated off Oregon (see Figure B-1), marking areas and times where the species concentrate for feeding (Calambokidis et al. 2024).

Fin whales prefer deeper waters, so they are most likely to occur offshore or in coastal locations where waters are deep. They typically congregate in areas of high productivity, where they feed on small invertebrates such as copepods, squid, and schooling fish such as capelin, herring, and mackerel (Goldbogen et al. 2006; Jefferson et al. 2008).

G.4.3. Gray Whale

The gray whale (*Eschrichtius robustus*) 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 gray whale was listed as endangered throughout its range. NMFS recognizes two DPSs of gray whales in the North Pacific: the Eastern North Pacific and the Western North Pacific DPSs. The Eastern North Pacific DPS was delisted in 1994 (59 FR 31094; June 16, 1994); however, the Western North Pacific remains listed as endangered. Only the Western North Pacific DPS is listed as depleted under the MMPA. There is no critical habitat designated for the gray whale.

Most gray whales that may occur within the proposed action area are from the non-ESA-listed Eastern North Pacific DPS as they migrate from Alaska feeding grounds to Mexico breeding grounds in the fall/winter and return to their feeding grounds in the late spring. However, Information from tagging, photo-identification, and genetic studies show that some whales identified in the Western North Pacific DPS off Russia have been observed in the eastern North Pacific, including coastal waters of Canada, U.S., and Mexico (Lang 2010; Mate et al. 2015; Urbán et al. 2013; Weller et al. 2012). These whales then return to Russia in the spring. Thus, individuals from the Western North Pacific DPS may occur within the proposed action area.

Most gray whales in the Eastern North Pacific DPS spend the summer feeding in Alaska outside of the proposed action area. However, a group of 400 individuals, known as the “Pacific Coast Feeding Group,” feed along the Pacific coast of Washington and Oregon. Gray whales are found mainly in shallow coastal waters for feeding, living most of their lives within a few tens of kilometers of shore. They are primarily bottom feeders consuming a wide range of benthic and epibenthic invertebrates.

G.4.4. 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 designated as depleted and classified as a strategic stock under the MMPA. There is no critical habitat designated for the Guadalupe fur seal.

Guadalupe fur seals primarily occur in the waters off California and Mexico; however, stranded individual animals have been observed annually in California and increasingly in Oregon and Washington (Carretta et al. 2020). 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). Although Guadalupe fur seals may be observed in the proposed action area, they would be considered rare.

Guadalupe fur seals primarily feed at night on a variety of cephalopods, fish, and crustaceans (Aurioles-Gamboa and Camacho-Ríos 2007). They prey on nine different vertically migrating squid species, a variety of myctophid fish, and both Pacific and frigate mackerel (Gallo-Reynoso and Figueroa-Carranza 1996).

G.4.5. Humpback Whale

The humpback whale (*Megaptera novaeangliae*) was originally 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 humpback whale was listed as endangered throughout its range. Since then, NMFS published a final rule designating fourteen DPSs (81 FR 62260; September 8, 2016), only two of which are ESA-listed (the endangered Central America DPS and the threatened Mexico DPS) that may occur within the proposed action area. Critical habitat is designated within the proposed action area and will be discussed in Appendix E.

Until 2022, NMFS recognized one humpback whale MMPA stock along the U.S. Pacific Coast – the California/Oregon/Washington stock. As of 2022, North Pacific humpback whale stocks have been redesignated by NMFS based on new data on movements and genetics (Carretta et al. 2023b; Yates et al. 2022). The DPS and current MMPA stock designations are: Central America DPS (Central America/Southern Mexico -California-Oregon-Washington [CA/OR/WA] stock), Hawai'i DPS (Hawai'i stock), Mexico DPS (Mainland Mexico-CA/OR/WA and Mexico-North Pacific stocks), and Western North Pacific DPS (Western North Pacific stock). All of which, except the Hawai'i DPS, are listed as depleted under the MMPA.

Whales from the Central America/Southern Mexico -CA/OR/WA stock winter off southern Mexico and Central America and migrate to feeding grounds off California and Oregon in summer. Humpback whales from the Mainland Mexico CA/OR/WA stock winter off Mexico and spend summers in feeding grounds off California, Oregon, Washington, British Columbia, and Alaska. Whales from these two stocks would be expected to regularly occur throughout the proposed action area in summer as their primary feeding grounds extend from California to British Columbia (Carretta et al. 2023a).

Overall, ESA-listed humpback whales would be expected to occur throughout the proposed action area in summer, but they would be considered rare in any other season. Humpbacks mostly inhabit coastal and continental shelf waters. From March through November, BIAs for humpback whales have been designated off Washington and Oregon (see Figure B-1), marking areas and times where the species concentrate for feeding (Calambokidis et al. 2024). Humpbacks exhibit a wide range of foraging behaviors and feed on a range of prey types, including small schooling fish, euphausiids, and other large zooplankton (Bettridge et al. 2015).

G.4.6. Killer Whale

The Southern Resident DPS of killer whale (*Orcinus orca*) (hereinafter referred to as SRKW) is listed as endangered under the ESA (70 FR 69903; February 16, 2005). It is also designated as depleted under the MMPA. Critical habitat is designated within the proposed action area and will be discussed in Appendix E.

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 distinct ecotypes of killer whales recognized in the North Pacific: resident, transient, and offshore killer whales (Bigg et al. 1990; Ford 1991). While there are numerous separate stocks identified within the North Pacific, only the Eastern North Pacific – Southern Resident stock includes ESA-listed SRKW, which would overlap with the proposed action area.

Killer whales tend to be most common within 497 mi (800 km) of shore (Carretta et al. 2023b), and the resident ecotype generally stays even closer. SRKWs spend most of the year in the Salish Sea in the inland waters of Washington and British Columbia, outside of the proposed action area (Carretta et al. 2023b). In winter, they tend to move into the Pacific Ocean. They primarily remain in northern Washington and British Columbia; however, they have been observed as far south as Monterey Bay, California. Within the proposed action area, they would most likely be found between Grays Harbor and the Columbia River, although they have been sighted throughout the proposed action area (Carretta et al. 2023b).

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 et al. 1996; Jefferson et al. 2008). SRKW prefer Pacific salmon species, particularly the ESA-listed Chinook salmon (Ford and Ellis 2006; Ford et al. 1998).

G.4.7. North Pacific Right Whale

The North Pacific right whale (*Eubalaena japonica*) was originally 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 northern right whale was listed as endangered throughout its range. In 2008, NMFS reclassified the northern right whale as two separate endangered species, North Pacific right whale and North Atlantic right whale (73 FR 12024, March 6, 2008). The North Pacific right whale is also designated as depleted and classified as a strategic stock under the MMPA. Critical habitat for the North Pacific Right whale does not overlap with the Proposed Action.

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). Only the Eastern North Pacific stock would be expected to occur within the proposed action area. Right whales (single animals) have been occasionally sighted along the U.S. West Coast, including locations in California and Baja California. While considered extremely rare, it is possible that North Pacific right whales may be in the proposed action area. North Pacific right whales forage on copepods, shrimp, euphausiids, and cyprids primarily in the waters off Alaska and would not be expected to forage in the proposed action area (National Marine Fisheries Service 2024a, 2024b)).

G.4.8. Sei Whale

The sei whale (*Balaenoptera borealis*) was originally 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 sei whale was listed as endangered throughout its range. It is also designated as depleted and classified as a strategic stock under the MMPA. 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, the ranges of these populations are not known to overlap (Rice 1998). There is no critical habitat designated for the sei whale.

Sei whales have a global distribution. The Eastern North Pacific stock of sei whales (*B. borealis borealis*) would be the only stock expected to occur within the proposed action area. This stock may occur throughout the U.S. West Coast EEZ but are rare and primarily occur in offshore waters (Carretta et al. 2019).

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). Sei whales have also been found to feed on a variety of other fish species, including saury, whiting, lamprey, and herring (Flinn et al. 2002).

G.4.9. 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 and classified as a strategic stock under the MMPA. There is no critical habitat designated for the sperm whale.

Only the California-Oregon-Washington stock would overlap with the proposed action area. This stock is 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 seen off Washington and Oregon in every season except winter (Green et al. 1992). Their presence and use of Washington coastal waters throughout the years was confirmed using year-round acoustics surveys (Jaquet and Whitehead 1996).

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 forage during deep dives (routinely exceed a depth of 1,300 ft (400 m) (Watkins et al. 2002)) on squid, other cephalopods, bottom-dwelling fish, and invertebrates (Davis et al. 2007; Marcoux et al. 2007; Rice 1989).