U.S. Department of Homeland Security

United States Coast Guard

WATERWAYS COMMERCE CUTTER ACQUISITION PROGRAM

DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

U.S. Coast Guard Headquarters

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for

WATERWAYS COMMERCE CUTTER (WCC) ACQUISITION PROGRAM

Lead Agency:	United States Coast Guard
Cooperating Agency:	None
Title of the Proposed Action:	Waterways Commerce Cutter (WCC) Acquisition Program
Designation:	Programmatic Environmental Impact Statement

Abstract

The United States Coast Guard (Coast Guard) prepared this Programmatic Environmental Impact Statement (PEIS) to comply with the National Environmental Policy Act (NEPA). 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 maritime aids to navigation (ATON) missions and provide consistent and reliable presence in the Inland Waterways and Western Rivers (IW&WR). Currently 35 cutters, 27 barges, and a variety of support boats serve as the primary means of ATON maintenance and construction in the IW&WR; however, these assets, henceforth referred to as the "existing inland tender fleet," have reached the end of operational service life. The Proposed Action would allow the Coast Guard to aquire and operate a planned 30 Waterway Commerce Cutters (WCC), thereby enabling the safe navigation of waters that support the nation's economy through maritime commerce and recreation. The following four Alternatives were analyzed in the PEIS:

- The No Action Alternative included the fulfillment of the Coast Guard's missions in the IW&WR using the existing inland tender fleet, each vessel of which is reaching the end of its service life.
- Alternative 1 (Preferred Alternative, referred to as the "Proposed Action") included the construction and operation of a planned 30 WCCs to fulfill ATON mission requirements in the IW&WR.
- Alternative 2 included the acquisition of fewer Coast Guard owned and operated systems, including the exploration of a hybrid government and contracted options for mission performance.
- Alternative 3 included the use of a mixed fleet—a combination of cutters and shore-based assets (including Aids to Navigation team units), implementation of electronic ATON, and use of contracted ATON services to achieve Coast Guard ATON missions throughout the IW&WR.

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

[**Placeholder**: The Draft PEIS was released on September 17, 2021. The comment letters are reproduced in Appendix G and annotated with Coast Guard's specific responses to comments. Appendix I identifies the changes between the Draft and Final PEIS.]

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EXECUTIVE SUMMARY

ES.1 Introduction

The United States (U.S.) Coast Guard (Coast Guard) is a military, multi-mission, maritime service within the Department of Homeland Security (DHS), is proposing to acquire and operate a planned 30 Waterways Commerce Cutters (WCCs), each with a design service life of 30 years, to replace the 35 cutters (henceforth referred to as the “existing inland tender fleet”) that have reached the end of their operational service life. This draft Programmatic Environmental Impact Statement (PEIS) was prepared in accordance with the National Environmental Policy Act (NEPA; 40 CFR 1502.14(d)); the regulations implemented by the Council on Environmental Quality (CEQ); DHS Directive Number 023-01 Rev 01 and DHS Instruction Manual 023-01-001-01, Rev 01; and Coast Guard Commandant Instruction 5090.1 This PEIS considers the potential impact of a Proposed Action to acquire and operate a planned 30 WCCs. The Coast Guard develops, establishes, maintains, and operates maritime aids to navigation (ATON) in federal waterways to promote safety, assist navigation, prevent disasters and collisions, and serve the maritime commerce needs of the United States. These responsibilities include the United States’ vast network of inland waterways and western rivers, referred to henceforth collectively as the Inland Waterways and Western Rivers (IW&WR). The IW&WR includes the Gulf and Atlantic Intracoastal Waterway (ICW), the Mississippi, Missouri, Alabama, Tennessee, Columbia, and Ohio Rivers, their associated tributaries and other connecting waterways, portions of the Alaska Inside Passage, portions of the Great Lakes, and other navigable waterways around the United States. A Coast Guard buoy tender (tender) is a type of Coast Guard cutter designed to service ATON in federal waters of the United States including the vast network of the IW&WR. Coast Guard tenders service the IW&WR and operate across a wide range of temperature and weather conditions, including strong river and tidal currents, and in areas affected by ice, debris, and shoaling. The dynamic waters of the IW&WR are largely inaccessible by other larger and geographically distant Coast Guard cutters. The existing inland tender fleet, 27 barges, and a variety of support boats serve as the primary means of ATON maintenance and construction in the IW&WR.

The Coast Guard’s existing inland tender fleet is responsible for maintaining more than 28,200 ATON across approximately 12,000 miles (mi) (19,312 kilometers [km]) of inland waterways. The existing inland tender fleet protects vital infrastructure and enables the free flow of commerce throughout the nation’s marine highways. These waterways generate billions of dollars in commerce annually making them critical to the country’s economic livelihood, protection of jobs, and contribution to energy security. The existing inland tender fleet also provides similar capabilities as the Coast Guard’s oceangoing cutter fleet, enabling Coast Guard to quickly and effectively respond to emergencies, such as search and rescue (SAR), environmental incidents, and severe weather events.

This PEIS assesses the reasonably foreseeable impacts to physical, biological, and socioeconomic resources that could result from the full operation of up to 30 total WCCs. It also describes the affected environment as it currently exists based on available information; the environmental consequences of incorporation of a planned 30 WCCs into the Coast Guard’s fleet to replace the operational capabilities of the existing inland tender fleet; and associated WCC operations and training in the proposed action areas.

ES.2 Purpose and Need for the Proposed Action

The U.S. Coast Guard ensures the Nation's maritime safety, security, and stewardship. The Coast Guard has documented a need to replace the capabilities provided by the existing inland tender fleet servicing the IW&WR. The 35 cutters and associated 27 barges that comprise the existing inland tender fleet servicing the IW&WR have significantly exceeded their design service life of 30 years. The purpose of the Proposed Action is to acquire and operate a planned 30 WCCs[1], thereby enabling the safe navigation of waters that support the nation's economy through maritime commerce and recreation.

In order to maintain the Coast Guard's vital inland waterways mission and continue to provide a consistent and reliable presence in the IW&WR, the Coast Guard is proposing to replace the existing aging inland tender fleet. The need for the Proposed Action is to address the current and long term mission demand with a reliable and operationally-available presence to accomplish assigned ATON missions and to provide consistent and reliable presence in the IW&WR.

ES.3 Environmental Analysis and Mitigation

The Coast Guard has prepared this PEIS based on international, federal, state, and local laws, statutes, regulations, and policies that are pertinent to the implementation of the Proposed Action. The topics addressed in this PEIS include physical resources (air quality, ambient sound, bottom habitat and sediments, and water quality), biological resources (including special status species), and socioeconomic resources. This PEIS describes the affected environment as it currently exists based on available information; the environmental consequences of incorporation of a planned 30 WCCs into the Coast Guard's fleet to replace the operational capabilities of the 35 cutters and associated 27 barges that comprise the existing inland tender fleet; and associated WCC operations and training in the proposed action areas. This PEIS analyzes expected vessel operation and training activities for a planned 30 WCCs, based on the operations and training activities of the Coast Guard's existing inland tender fleet. There are no anticipated significant changes between the existing inland tender fleet's operations and training activities and future WCC operations and training activities.

Stressors associated with the Proposed Action that may potentially impact the environment include: acoustic stressors, such as the fathometer and Doppler speed log, vessel, ATON signal testing, tool, and pile driving noise; and physical stressors, such as vessel movement, bottom devices, construction, brushing, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines. The potential environmental consequences of these stressors have been analyzed in this PEIS for resources associated with the physical, biological, and socioeconomic environments. After analyzing the Proposed Action within the affected environment, the potential for impact was considered to be negligible or nonexistent for the following resources, which were not evaluated in this PEIS: airspace; land use; parks, forests, and prime and unique farmland; aesthetic resources; archaeological/historical resources; cultural resources; environmental justice; infrastructure; and utilities.

The Coast Guard completed consultation under section 7 of the Endangered Species Act (ESA), Essential Fish Habitat (EFH), and critical habitat for the U.S. Coast Guard Federal Aids to Navigation Program on April 19, 2018 for those species under the National Marine Fisheries Services' (NMFS) jurisdiction. Any information provided in this PEIS includes WCC support of ATONs, only as it pertains to the Proposed

[1] This document refers to vessels of the Proposed Action as Waterways Commerce Cutters (WCC) and any reference to the current fleet as "existing inland tender fleet."

Action and any effects determination is consisten with the 2018 ESA consultation with NMFS. Although the Coast Guard offers a "may affect" determination for those ESA-listed species under the United States Fish and Wildlife Services' (USFWS) jurisdiction, this determination should be considered preliminary for these USFWS species, since the consultation process under Section 7 of the ESA has not been completed. Similarly, any effects analysis of critical habitat should also be considered preliminary. The determinations presented herein may be modified as a result of these consultations. The Coast Guard is not requesting authorization under Section 101(a)(5) of the Marine Mammal Protection Act (MMPA) at this time, because the Proposed Action discussed in this PEIS would not deliver the first operational WCC until 2032. This PEIS may contain information relevant and applicable to assist with future Coast Guard consultations that are in support of a request for future incidental take authorizations under the MMPA. Under the Magnuson-Stevens Fishery Conservation and Management Act, the Coast Guard determined that all activities of the Proposed Action would have no significant adverse effect on designated EFH.

On the basis of the analyses in this PEIS, the types of impacts that could occur during routine operations and training activities would be similar among the action alternatives. The alternatives principally differ on the basis of vessel acquisition. Coast Guard currently uses a variety of guidance and proactive operational measures to help minimize the environmental impacts of Coast Guard operations and training. Although Standard Operating Procedures (SOPs) are established on a vessel-by-vessel basis, SOPs for WCCs are not currently developed since WCCs are not yet operational; however, those used on the vessels of the existing inland tender fleet are provided in Appendix B of this PEIS. These SOPs are subject to change, given the timeframe until all WCC vessels are fully operational.

The Coast Guard is conducting a feasibility study for all potential homeports. NEPA documentation related to homeporting and facilities improvement decisions would be completed by Coast Guard independent of this PEIS. Because the completion date for all WCCs is not expected until 2032, the Coast Guard anticipates that supplemental NEPA documentation may be prepared. New information would be tiered to this PEIS 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 WCC maintenance and decommissioning. All WCCs would be decommissioned in accordance with all applicable laws (Appendix A), and this PEIS would be incorporated, where applicable, in any future NEPA analysis of decommissioning.

ES.4 Public Involvement

The public scoping period began with issuance of the Notice of Intent (NOI) in the Federal Register (86 FR 20376) April 19, 2021. The scoping period lasted 45 days, concluding on June 11, 2021, and two comments were received. The public was provided a variety of methods to comment on the scope of the PEIS during the scoping period, including at WaterwaysCommerceCutter@uscg.mil. Additional information about this environmental action was made available to the public at: https://www.dcms.uscg.mil/Our-Organization/Assistant-Commandant-for-Engineering-Logistics-CG-4-/Program-Offices/Environmental-Management/Environmental-Planning-and-Historic-Preservation.

The Coast Guard will issue a Record of Decision once the Final PEIS has been made publicly available for 45 days. Scoping for preparation of the Draft PEIS and public commenting on the Draft PEIS were used to obtain input from stakeholders, including individuals, public interest organizations, governmental agencies, and tribes. This input was used to develop the alternatives and issues analyzed in this PEIS.

ES.4.1. Alternative 1: Preferred Alternative or Proposed Action

Based on all the alternatives analyzed, the acquisition and operation of a planned 30 WCCs is the preferred alternative. Under Alternative 1, the Coast Guard would acquire ad operate a planned 30 WCCs to replace the capabilities of the existing inland tender fleet (consisting of 35 cutters and 27 barges) to fulfill mission requirements in federal waterways, including the vast network of the IW&WR. The proposed WCCs would consist of a planned 16 WCC river buoy class (WLR), a planned 11 WCC construction class (WLIC), and a planned 3 inland bouy class (WLI). The first WCCs would potentially be operational as soon as 2025, with a planned 30 WCCs delivered and operational by 2032. Up to four WLR and WLIC vessels could be constructed per year, dependent upon industry capability, beginning in 2025 and continuing until 27 total WLRs and WLICs have been received. The first WLI would not be expected until 2027 with a planned two WLIs being delivered in a year, dependent upon industry capability. WCCs are expected to be operational within three months of the time of acceptance from the contractor.

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

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

Activity[1]	*WCC Type*	*Includes*	*Estimated Hours per Activity*	*Source(s) of Acoustic Stressors*	*Source(s) of Physical Stressors*
Functionality and maneuverability testing	All	Ensuring properly working systems after vessel maintenance		Fathometer and Doppler speed log noise; vessel noise	Vessel movement
Towing	All	Towing another vessel from the stern or either side and ability to be towed	Dependent on distance of tow	Fathometer and Doppler speed log noise; vessel noise	Vessel movement; tow lines
ATON maintenance	All	Inspecting and replacing ATON chains, sinkers, buoys, dayboards, ladders, platforms, and pilings; repairing lighting equipment, power systems (batteries and solar panels), and sound signals; responding to and repairing ATON discrepancies; and conducting repairs to any ATON support structures	Most < 1 hour Duration of pile replacement is dependent on number of pilings[2]; but may take 1, 8, or 16 hours*	Fathometer and Doppler speed log noise; vessel noise; ATON signal testing noise; tool noise; pile driving noise	Vessel movement; bottom devices[1]; pile driving; construction[2]; brushing; unrecovered jet cone moorings; ATON retrieval devices; tow lines
Establishment of a floating ATON	WLR; WLI	Use of dump boards, a jet pipe, or cranes and winches to position a floating ATON		Fathometer and Doppler speed log noise; vessel noise	Vessel movement; bottom devices
Establishment of a fixed ATON	WLR; WLIC	Construction of a shore ATON structure; may include pile driving (see below) if the ATON is fixed into the bottom (in-water)		Fathometer and Doppler speed log noise; vessel noise; tool noise; pile driving noise	Vessel movement; bottom devices; pile driving; construction; brushing
Discontinuing and recovering a floating ATON	WLR; WLI	May include the use of a crane or spuds; may include jet cone mooring removal		Fathometer and Doppler speed log noise; vessel noise; pile driving noise; equipment noise (e.g., crane, spuds)	Vessel movement; bottom devices; unrecovered jet cone moorings; ATON retrieval devices; tow lines

Activity[1]	*WCC Type*	*Includes*	*Estimated Hours per Activity*	*Source(s) of Acoustic Stressors*	*Source(s) of Physical Stressors*
Discontinuing and recovering a fixed ATON	WLIC	Permanent removal of a fixed (in-water) pile structure or shore structure		Fathometer and Doppler speed log noise; vessel noise; pile driving noise; tool noise	Vessel movement; pile driving; construction; brushing
Brushing	All	Clearing of vegetation using chainsaws, pole saws, hand tools, pesticides, and herbicides		Tool noise	Brushing
Anchoring	All	Dredging the anchor and kedging the anchor; may be done in water depths of 15–25 feet (ft) (5–8 meters [m])		Fathometer and Doppler speed log noise; vessel noise	Vessel movement; bottom devices
Spudding	All	Maintaining station in water depths of 5.5–20 ft (1.7–6.0 m)	Dependent on the duration of the activity being performed	Fathometer and Doppler speed log noise; vessel noise	Vessel movement; bottom devices
Wreckage recovery	All	Use of cutter boat, grapnel hook, or wire sweeping methods; may include pile extraction		Fathometer and Doppler speed log noise; vessel noise; pile driving noise	Vessel movement; bottom devices; pile driving; ATON retrieval devices; tow lines
Pile driving	WLIC	Use of impact pile driver or vibratory pile driver	Duration of pile replacement is dependent on number of pilings[3]; but may take 1, 8, or 16 hours*	Fathometer and Doppler speed log noise; vessel noise; pile driving noise	Vessel movement; pile driving
Training	All	Practicing cutter navigation, damage control, and engineering casualty control		Fathometer and Doppler speed log noise; vessel noise	Vessel movement

[1] Bottom devices are described in Section 3.2.2.2 and include anchors, spuds, sinkers, and chain.
[2] Note: Construction and pile driving are considered separately in this PEIS.
[3] On average, one pile is expected to take no more than 1 hour to install, multiple piles may take up to 8 hours, and a platform structure may take up to 16 hours.

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

ES.4.2.1 Acoustic Stressors

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

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

Source Type	***Frequency Range (in hertz [Hz] or kilohertz [kHz])***	***Source Level (1 microPascal [µPa]= in-water 20 µPa= in-air)***	***Associated Action***
Small vessel (cutter small boat)	1–7 kHz	175 decibels referenced at 1 microPascal (dB re 1 µPa) at 1 m	Law enforcement, SAR training, crew and passenger transfer
Large vessel (WCC)	20–300 Hz	190 dB re 1 µPa at 1 m	OPC operations and training
Single-beam echosounder (i.e., fathometer)	3.5–1,000 kHz (50–200 kHz)[a]	205[b] dB re 1 µPa at 1 m	OPC operations, training, and testing
Doppler speed log	270–284 kHz	-	OPC operations, training, and testing
ATON signal testing noise	300–850 Hz	118–140 A-weighted decibels (dBA)	ATON signal maintenance
Tool noise	less than 1 kHz	74–116 dBA	Construction, brushing
Impact pile driving	below 500 Hz	max 220 dB dB re 1 µPa @ 10 m	Pile driving with impact hammer
Vibratory pile driving	20-40 Hz	165-185 dB re 1 µPa @ 1 m	Pile driving with vibratory hammer

Based on the analysis, impacts from acoustic sources associated with the Proposed Action are expected to result in, at most, minor to moderate behavioral responses over short and intermittent periods. Table ES- 3 summarizes the potential acoustic impacts to all resources from acoustic stressors. For those species listed as endangered or threatened under Section 7 of the ESA, they would not be expected to respond to acoustic stressors associated with the Proposed Action in ways that would significantly disrupt normal behavior patterns, which include, but are not limited to: migration, breathing, nursing, breeding, feeding, or sheltering. Acoustic stressors from the Proposed Action would not cause population level effects to any ESA-listed species in the proposed action areas. The Coast Guard also evaluated the potential impacts to critical habitat and determined that the Proposed Action would not cause the destruction or adverse modification of critical habitat in WCC operational or transit areas[2].

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

Potentially Impacted Resource	*Summary of Impacts from Acoustic Stressors*
Air quality	No significant impact
Ambient sound	No significant impact
Bottom habitat and sediments	No significant impact
Water quality	No significant impact
Riverine vegetation	No significant impact
Marine vegetation	No significant impact
Insects	No significant impact
Aquatic invertebrates	No significant impact
Amphibians	No significant impact
Fish	No significant impact
Essential fish habitat (EFH)	No significant impact
Birds	No significant impact
Reptiles	No significant impact
Terrestrial mammals	No significant impact
Marine mammals	No significant impact

ES.4.2.2 Physical Stressors

Physical stressors (Table ES- 4) associated with the Proposed Action that may impact the environment include vessel movement, bottom devices, construction, brushing, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines. Vessels associated with the Proposed Action would be widely dispersed throughout the proposed action areas. The physical presence of vessels and crews could elicit behavioral reactions caused by visual or auditory cues. In assessing the potential impact to species from physical sources, a variety of factors were considered, including vessel and operation characteristics, animal presence, and likelihood of exposure. The Coast Guard evaluated the data and conducted an analysis of the species distribution and likely responses to the physical stressors based on available scientific literature. Behavioral responses often include changes in general activity (e.g., from resting or feeding to active avoidance), changes in surface respiration or dive cycles (marine mammals), and changes in speed and direction of movement. The severity and type of response exhibited by an individual may also include previous encounters with vessels. Some species have been noted to tolerate slow-moving vessels within several hundred meters, especially when the vessel is not directed toward

[2] The Coast Guard completed an ESA Section 7 and Essential Fish Habitat consultation with NMFS on U.S. Coast Guard Federal Aids to Navigation Program, finalized on April 19, 2018. Any information provided in this PEIS includes WCC support of ATONs, only as it pertains to the Proposed Action and any determination provided herein is consistent with the findings in the NMFS Biological Opinion. Any determinations provided in this PEIS for species not included in the NMFS Biological Opinion or for those species that are under the jurisdiction of the USFWS, should be considered preliminary, until the consultation process with the Regulatory Agencies is complete.

the animal and when there are no sudden changes in direction or engine speed (Richardson et al. 1995). In addition, vessels could collide with resources found in all proposed action areas.

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

Physical Stressor	*Description*	*Activity*
Vessel movement: WCC vessel	Vessel operating at an average of 10 knots	General operation
	< 10 knots	Towing another vessel
Vessel movement: cutter small boat	Speeds of up to 30 knots (average 15–20 knots)	General operation
	Speeds of less than 8 knots	Towing another vessel
Bottom devices	Use of anchors and spuds on vessels, and ATON sinkers and chains	Holding vessel on station and securing ATON to the bottom
Construction	Erecting a tower on land, on a platform, or on riprap	Establishment of fixed ATON structures ashore
Brushing	Use of pesticides or other chemicals and lawn care equipment to remove vegetation	Removal of vegetation on and around ATON
Pile driving	Impact pile driving or vibratory pile driving, depending on the	Establish, discontinue, or replace piles
Unrecovered jet cone moorings	If unable to be recovered, the jet cones mooring an ATON to the riverbed are left behind in the bottom	Mooring devices left behind in rivers
ATON retrieval devices	Devices such as a sweeping wire or grappling hook	Wreckage recovery
Tow lines	Vessel may require towing to a safe location	Vessel tow (by WCC or cutter small boat)

Table ES- 4 details the operational speeds for the WCCs and cutter small boats, depending on activity type, including vessel tow. WCCs and cutter small boats would not operate at their maximum speeds unless involved in an emergency[3] response, which is not part of the Proposed Action.

Anchors and spuds may be used to hold vessels on station while working. Other bottom devices would hold ATON in position, such as sinkers, chains, and jet cone moorings. These bottom devices would need to be moved or brought aboard the WCC if the ATON requires repositioning or other type of maintenance. When an ATON secured to a jet cone mooring must be retrieved for maintenance, recovery of the jet cone mooring from the riverbed may not be possible. Therefore, it is assumed that some of these moorings would be left behind in the sediment (e.g., unrecovered jet cone mooring). The retrieval of ATON wreckage would require the use of devices, such as sweeping wires and grappling hooks, to retrieve the ATON and bottom devices, such as sinkers, chains, or broken piles.

[3] While emergency response is not a part of the Proposed Action, WCCs would support Coast Guard emergency response missions within the proposed action areas when needed. To ensure efficiency, WCC emergency response training would be conducted and 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 WCC.

ATON construction would occur ashore or on a platform using a variety of tools. The WLIC would also be equipped with an impact hammer, similar to the existing construction tenders, but with space available for a vibratory hammer attachment. Vibratory hammers may be purchased by the Coast Guard and kept readily available on the vessel or rented as needed. Either the impact hammer or vibratory hammer would be used to establish, discontinue, or replace piles, depending on the conditions present.

The location of some ATON would require brushing to clear vegetation from, on, and around the ATON, to ensure the line of sight to the ATON is clear. Brushing would involve the use of tools (such as those used in lawn maintenance) or chemicals, but Coast Guard would follow best management practices to minimize potential impacts. Pests or vegetation that is a danger to crews ashore may also require management.

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

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

Potentially Impacted Resource	***Summary of Impacts from Physical Stressors***
Air quality	No significant impact
Ambient sound	No significant impact
Bottom habitat and sediments	No significant impact
Water quality	No significant impact
Riverine vegetation	No significant impact
Marine vegetation	No significant impact
Insects	No significant impact
Aquatic invertebrates	No significant impact
Amphibians	No significant impact
Fish	No significant impact
Essential fish habitat (EFH)	No significant impact
Birds	No significant impact
Reptiles	No significant impact
Terrestrial mammals	No significant impact
Marine mammals	No significant impact

Devices associated with the Proposed Action with a potential for entanglement include the lines used in vessel tow. For an organism to become entangled in a line or material, the materials must have certain properties, such as the ability to form loops and a high breaking strength. Towing lines would not be expected to have any loops or slack. The likelihood that a biological resource would become entangled in tow lines is extremely low. As shown in Table ES- 5, vessel movement, bottom devices, construction, brushing, pile driving, ATON retrieval devices, and tow lines would not result in significant impact to air quality, ambient sound, bottom habitat and sediments, water quality, riverine vegetation, marine vegetation, insects, aquatic invertebrates, amphibians, birds, marine fish, EFH, marine reptiles, terrestrial mammals, and marine mammals.

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

ES.4.2.3 Socioeconomic Resources

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

These resources may be found inland (along freshwater waterways), within 3 nautical miles (nm) of shore (nearshore), or 3–12 nm from shore. The Coast Guard analyzed the patterns of existing and emerging ocean uses in the U.S. waters similar to D'Iorio et al. (2015) including many zones (e.g., shoreline, intertidal, nearshore, coastal, and oceanic). For the purposes of the analysis in this PEIS, only inland and nearshore zones are presented as reference points for the zones in which WCCs would be expected to transit or conduct operational activities.

ES.4.2.4 Summary of Impacts to Socioeconomic Resources

The predominant socioeconomic impact of WCCs would be considered negliglible due to the continued Coast Guard presence in the proposed action areas and the Coast Guard's jurisdictional areas. Replacement of the Coast Guard's existing inland tender fleet would facilitate the Coast Guard's ability to support the Coast Guard ATON mission enabling the safe navigation of waters that support the nation's economy through maritime commerce and recreation.

The acquisition and operation of the Coast Guard's WCC fleet would be beneficial to socioeconomic resources, and any potential negative impacts caused by the Coast Guard's presence and operations and training would be mitigated by the implementation of SOPs. The safe navigation of the IW&WR and readily available Coast Guard support during an at-sea emergency is the principal benefit to these industries, including commercial fishing, coastal marine construction, mineral extraction, oil and gas extraction, recreation and tourism, renewable energy, transportation and shipping, and subsistence fishing and hunting resources, as well as the communities that depend on them.

ES.4.3. Alternative 2: Reduced Acquisition of Coast Guard Owned and Operated Systems

Under Alternative 2, the Coast Guard would explore hybrid government and contracted options for mission performance. Ship platforms would meet similar technical specifications discussed in Alternative 1. Scenarios include: contractor-owned vessels that are government-operated (Coast Guard employees or a partner agency provides the crew for third-party, contractor-owned vessels); government-owned vessels that are contractor-operated (a commercial operating company provides the crew for Coast Guard or partner agency owned vessels); or contractor-owned and contractor-operated systems (Coast Guard provides neither the vessels nor personnel). The logistical costs of contracting a combination of unique hulls to satisfy the requirements to service ATON in the proposed action areas would exceed the corresponding costs of maintaining a class of 30 cutters that would be built specifically to conduct missions in the Coast Guard's proposed action areas. Similarly, one-for-one replacement would cost far more per replacement hull because it eliminates any workforce savings associated with a ship with capabilities designed specifically to conduct Coast Guard missions in the IW&WR.

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

ES.4.4. Alternative 3: Mixed Fleet

Under Alternative 3, the Coast Guard would utilize a mixed fleet—a combination of cutters and shore-based assets (including Aids to Navigation team units), implementation of electronic ATON, and use of contracted ATON services to achieve Coast Guard ATON missions throughout the IW&WR. To accomplish a mixed fleet solution, additional Coast Guard ATON personnel and teams would be required. To accommodate the additional ATON teams, existing facilities would require expansion and construction of new shore based facilities could be necessary. Use of electronic ATON instead of physical ATON could also prove necessary. Similar to Alternative 2, the logistical costs to satisfy the requirements to service ATON in the proposed action areas would exceed the corresponding costs of maintaining a class of 30 cutters that would be built specifically to conduct missions in the IW&WR.

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

ES.4.5. Alternative 4: No Action

The evaluation of a No Action Alternative is required by the regulations implementing NEPA (40 CFR 1502.14(d)). Under the No Action Alternative, the Coast Guard would fulfill its missions in the IW&WR using the existing inland tender fleet, each vessel of which has exceeded the end of its service life. The existing assets would continue to age, causing a decrease in efficiency, increasing operational and replacement costs, and increasing risk of equipment failure or damage due to significant systems and parts no longer being available. In addition, it would become more difficult for an ageing fleet to remain in compliance with environmental laws and regulations and standards for safe operation.

The No Action Alternative would also not meet the Coast Guard's statutory mission requirements in the IW&WR by providing ATON service and maintenance in those areas. The Coast Guard also provides ports, waterways, and coastal security; SAR; marine safety; and marine environmental protection, and without reliable Coast Guard presence, these services would be significantly reduced. As such, the No

Action Alternative does not meet the purpose and need, but is included here for comparison of environmental impacts with the Preferred Alternative.

ES.5 Conclusion

The Proposed Action supports the Coast Guard's acquisition and operation of a planned 30 WCCs to fulfill mission requirements in the vast network of the IW&WR. The proposed WCCs would consist of a planned 16 WLRs, a planned 11 WLICs, and a planned 3 WLIs.

This PEIS is consistent with the requirements of NEPA (42 U.S.C. 4321), CEQ regulations for implementing NEPA (40 CFR Part 1500); DHS Directive Number 023-01 Rev 01 and DHS Instruction Manual 023-01-001-01, Rev 01; and Coast Guard Commandant Instruction 5090.1. The Coast Guard will issue a Record of Decision once the Final PEIS has been made publicly available for 45 days. Scoping for preparation of the Draft PEIS and public commenting on the Draft PEIS were used to obtain input from stakeholders, including individuals, public interest organizations, governmental agencies, and tribes. This input was used to develop the alternatives and issues analyzed in this PEIS. On the basis of the analyses in this PEIS, the types of impacts that could occur during routine operations and training activities would be similar among the action alternatives. The alternatives principally differ on the basis of vessel acquisition. The first WCCs would potentially be operational as soon as 2025, with a planned 30 WCCs delivered and operational by 2032. This PEIS documents the acquisition and full operation of a planned 30 WCCs.

The Coast Guard evaluated acoustic stressors, including fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, and pile driving noise. The Coast Guard also evaluated physical stressors of the Proposed Action, including vessel movement, bottom devices, construction, brushing, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines. Any potential environmental impacts would be temporary or short term and the Coast Guard's SOPs would appropriately and reasonably reduce the potential environmental impact resulting from the Proposed Action. In the analysis of stressors, it was concluded that the Proposed Action would not likely result in significant impact to the physical, biological, or socioeconomic environment, including riverine vegetation, marine vegetation, insects, aquatic invertebrates, amphibians, fish, essential fish habitat, birds, reptiles, terrestrial mammals, marine mammals, and socioeconomic resources. Table ES- 6 provides a summary of impacts to each resource under each alternative. Pursuant to Section 7 of the ESA, the Coast Guard has made "may affect" determinations consistent with the NMFS 2018 Biological Opinion for those species under NMFS' jurisdiction and preliminary determinations for those species under the USFWS' jurisdiction (Table 3-45).

Based on the information and analyses included in this PEIS on the past, present, and reasonably foreseeable future actions within the proposed action areas, the Coast Guard has determined that the proposed WCC operations and training within the proposed action areas would not be expected to significantly contribute to the cumulative impacts on species, critical habitat, the environment, or socioeconomics.

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

Resource	***Alternative 1***	***Alternative 2: Reduced Acquisition***	***Alternative 3: Mixed Fleet***	***No Action Alternative***
Physical Environment				
Air Quality	The majority of the states within the proposed action areas are in attainment of the criteria pollutants; therefore, the General Conformity Rule does not apply. In those states which are not in attainment of the National Ambient Air Quality Standards (i.e., Delaware, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Minnesota, Missouri, New Jersey, Ohio, Pennsylvania, Texas, Virginia, Washington DC, and West Virginia), air pollutant emissions under Alternative 1 would not result in violations of state or federal air quality standards because they would not have a measurable impact on air quality. Because the existing inland tender fleet would be replaced with new, more efficient WCC vessels (overall fewer vessels than in the current fleet), there would be no change to baseline air quality conditions as a result of the Proposed Action.			No change to environmental baseline.
Ambient Sound	Ambient sound within the proposed action areas would be similar to what is currently present because the new WCCs would replace the existing inland tender fleet. In addition, the frequency and duration ATON maintenance would not be expected to change. Noise created by the Proposed Action, including noise from vessels and pile driving, would occur intermittently (only for the duration that the sound is active) in any given location and would be spread over a very large area. Because vessels would be replaced with new, more efficient vessels (overall fewer vessels than in the current fleet) that have been built to modern stringent noise and vibration standards, there would be no change to baseline ambient sound conditions as a result of the Proposed Action.			No change to environmental baseline.
Bottom habitat and sediments	Bottom disturbance may occur as a result of vessel movement in shallow water, construction, or brushing operations. Some sediment may become suspended, but would resettle after vessels have left the area. Impacts from the degradation of unrecovered jet cones used for mooring ATON would be undetectable due to the low density of debris left behind during ATON recovery. Similarly, levels of herbicides and pesticides in bottom habitat and sediments would be undetectable due to the infrequent nature of brushing activities and the limited amount of these chemicals used. Bottom devices, ATON retrieval devices, and pile driving may disturb or alter bottom habitats; however, these operations are isolated and only occur in a small area compared to the size of the proposed action areas. Soft sediments would be expected to shift back as they normally would following a disturbance and there would be no change to baseline conditions of bottom habitat and sediments as a result of the Proposed Action.			No change to environmental baseline.
Water quality	Impacts to water quality from vessel operations would not occur because Coast Guard Standard Operating Procedures (SOPs; Appendix B) would ensure all vessel discharges would be in compliance with state and federal regulations and policies. Chemicals leaching from the degradation of			No change to environmental baseline.

Resource	*Alternative 1*	*Alternative 2: Reduced Acquisition*	*Alternative 3: Mixed Fleet*	*No Action Alternative*
	unrecovered jet cone moorings would be undetectable because of the low density of jet cones that are unable to be recovered. Bottom disturbance, which may be caused by bottom devices, ATON retrieval devices, construction, brushing, or pile driving, has the potential to suspend sediment, which in turn may impact water quality. The area where these ATON maintenance operations would occur would not remain disturbed for long, or lead to long term impacts, such as discoloring the water, reducing light penetration and visibility, or changing the chemical characteristics of the water. Therefore, there would be no change to baseline water quality conditions as a result of the Proposed Action.			
Biological Environment				
Riverine vegetation	There would be no impacts to riverine vegetation from acoustic stressors. Construction, brushing, bottom Devices, pile driving, and ATON retrieval devices may physically remove (e.g., uproot) or crush individual plants, or cover vegetation in the water with suspended sediment. Vegetation that may be crushed during WCC operations would have the potential to regrow and bottom disturbance would only impact a small percentage of the overall vegetative population. Due to SOPs (Appendix B), significant amounts of runoff would not be expected to enter waterways and alter plant community composition. There would be no population level impacts to riverine vegetation as a result of the Proposed Action.			No change to environmental baseline.
Marine Vegetation	There would be no impacts to marine vegetation from acoustic stressors. Construction, brushing, bottom devices, pile driving, and ATON retrieval devices may physically remove (e.g., uproot) or crush individual plants, or cover vegetation in the water with suspended sediment. Vegetation that may be crushed during WCC operations would have the potential to regrow and bottom disturbance would only impact a small percentage of the overall vegetative population. Due to SOPs (Appendix B), significant amounts of runoff would not be expected to enter waterways and alter plant community composition. There would be no population level impacts to marine vegetation as a result of the Proposed Action.			No change to environmental baseline.
Insects	Any potential impacts to insects would be limited to construction and brushing operations. Insects inhabiting areas where these ATON maintenance activities occur could be impacted by disturbance, loss of habitat, injury, or mortality. These activities would only impact a small percentage of the overall insect population, and many insects are mobile enough to leave the area of disturbance in order to avoid injury or mortality. Due to SOPs (Appendix B), no significant loss of habitat would occur as vegetation would have the potential to regrow and brushing would only impact a small percentage of available habitat for insects. There would be no population level impacts to insect as a result of the Proposed Action.			No change to environmental baseline.
Aquatic Invertebrates	Any potential impacts to aquatic invertebrates would be limited to low frequency noise (e.g., vessel noise and pile driving noise) and bottom disturbance from bottom devices, ATON retrieval devices,			No change to environmental baseline.

Resource	*Alternative 1*	*Alternative 2: Reduced Acquisition*	*Alternative 3: Mixed Fleet*	*No Action Alternative*
	construction, pile driving, and unrecovered jet cone moorings. Potential impacts to aquatic invertebrates as a result of noise include masking and behavioral responses in those species that may detect low-frequency noise. Bottom disturbance may cause alteration of habitat, injury, and mortality to aquatic invertebrates. The area exposed to disturbance would be a very small portion of the bottom in all proposed action areas, and only a small number of individuals would be affected compared to overall abundance. Activities are not expected to yield any lasting effects on the survival, growth, recruitment, or reproduction of invertebrate species at the population level.			
Amphibians	Potential impacts from acoustic sources, including fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, or tool noise, would be limited to masking and behavioral responses. Impacts from brushing activities would be minimal. In addition, there would be a discountable risk of entanglement in ATON retrieval devices or tow lines due to the small size of most amphibians and the unlikely overlap of these devices with amphibians. Vessel movement has the potential to impact amphibians by causing a behavioral response or causing mortality or serious injury from a collision with the vessel. Bottom disturbance from bottom devices and ATON retrieval devices has the potential to impact amphibians in the water. Construction, brushing operations, and pile driving may cause disturbance, alteration of habitat, injury, or mortality. The most likely reaction to these activities would be a behavioral response and fleeing the area. Disturbed amphibians should resume pre-disturbance activities after the period of disturbance has passed.			No change to environmental baseline.
Fish	Potential impacts from acoustic sources, including vessel noise, ATON signal testing noise, or tool noise would be limited to masking or behavioral response. The frequency of fathometer and Doppler speed log noise and pile driving noise would be outside of the range of hearing of most fish and therefore is unlikely to cause impacts to most fish species. While pile driving noise may cause impacts to fish, due to the ramp up of the pile driver, any fish in the area would be expected to leave the area and return once pile driving has ceased. Therefore, pile driving would result in temporary behavioral responses and avoidance of the area for a brief time and impacts from pile driving noise would decrease with increased distance. Vessel movement could cause short term and localized disturbances to fish and ichthyoplankton. Bottom disturbance may cause habitat disturbance, vibrations, strike, injury, mortality, or behavioral response. Short term behavioral responses from the Proposed Action, including vessel movement, the use of bottom devices and ATON retrieval devices, and pile driving, would not be expected to result in long term impacts to individuals.			No change to environmental baseline.
Essential Fish Habitat (EFH)	Vessel movement and tow lines may disturb different life stages of fish species within the water column or at the surface. However, this disturbance would be temporary as a vessel moves through the proposed action areas. While unrecovered jet cone moorings and constructed structures would occupy a small area of benthic EFH, this area would be very small as compared to the total available amount of EFH in each proposed action area. The impact of brushing to EFH would not be			No change to environmental baseline.

Resource	*Alternative 1*	*Alternative 2: Reduced Acquisition*	*Alternative 3: Mixed Fleet*	*No Action Alternative*
	measureable and therefore would be discountable. Therefore, potential impacts to EFH would be limited to pile driving noise, bottom devices, and ATON retrieval devices associated with the Proposed Action. The potential reduction in the quality of the acoustic habitat as a result of fathometer and Doppler Speed log and vessel noise, as well as vessel movement, would be localized and temporary. Due to the attenuation of the echosounder and movement of the vessels throughout the proposed action areas, the quality of the water column environment as EFH would be restored to normal levels immediately following the departure of vessels. The potential reduction in the quality of the acoustic habitat during pile driving would be localized to the pile driving site in the proposed action areas, and would occur only for a short duration of time. It would be expected that fish species would utilize other adjacent habitats during pile driving activities. Bottom devices and ATON retrieval devices may cause bottom disturbance and a reduction of habitat where ATON are established. The reduction in quantity or quantity of benthic EFH in the footprint of each ATON would be small in relation to the available EFH within the proposed action areas.			
Birds	Acoustic stressors, including ATON signal testing noise and tool noise, may startle birds and cause them to flush from an area. They would be expected to return after the disturbance has concluded. Impacts to birds from brushing, ATON retrieval devices, and tow lines would be minimal, causing disturbance and potentially a behavioral response only while in use. In addition, the risk of a bird becoming entangled in an ATON retrieval devices or tow line would be negligible. There would be no impact to birds from fathometer and Doppler speed log noise, bottom devices, pile driving, or unrecovered jet cone moorings. It is unlikely that bottom devices, such as anchors, spuds, and sinkers, would impact birds because even those species that dive or swim spend only a short duration of time diving underwater. Any potential impacts to birds would be from vessel noise, pile driving noise, vessel movement, construction, and brushing. The area exposed to noise and disturbance from vessels would be a small portion of the proposed action areas, and only a small number of individuals would be affected compared to overall abundance. Therefore, the impact of vessel movement and vessel noise on birds would be inconsequential. Any short term behavioral responses to disturbance from construction and brushing are not expected to result in long term impacts to individuals. The Proposed Action would not present a significant threat to bird populations.			No change to environmental baseline.
Reptiles	Potential impacts from vessel noise, ATON signal testing noise, and tool noise would be brief and intermittent and limited to masking and behavioral response. The risk of a reptile becoming entangled in ATON retrieval devices or tow lines would be negligible. There would be no impact to reptiles from fathometer and Doppler speed log noise, as it is outside their range of best hearing, or unrecovered jet cone moorings, which are buried in the riverbed. While pile driving noise may cause impacts to reptiles, due to the ramp up of the pile driver, any reptiles in the area would be expected to leave the area and return once pile driving has ceased. Therefore, pile driving would result in			No change to environmental baseline.

Resource	*Alternative 1*	*Alternative 2: Reduced Acquisition*	*Alternative 3: Mixed Fleet*	*No Action Alternative*
	temporary behavioral responses and avoidance of the area for a brief time and impacts from pile driving noise would decrease with increased distance. Vessel movement could cause short term and localized disturbances to reptiles in the water. Disturbance caused by bottom devices, ATON retrieval devices, construction, and brushing may potentially impact species through disturbance and alteration of habitat. However, these operations are isolated and only occur in a small area compared to the size of the proposed action areas. Reptiles may flee the area of increased activity, but once operations have completed, reptiles would be expected to return to the area.			
Terrestrial Mammals	Potential impacts to terrestrial mammals would be limited to vessel noise, ATON signal testing noise, tool noise, pile driving noise, construction, and brushing associated with the Proposed Action. There would be no impact to terrestrial mammals from in-water stressors including vessel movement, bottom devices, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines. Acoustic stressors detected in-air may cause masking or behavioral responses in terrestrial mammals. Behavioral responses may include flushing, fleeing, or freezing in place, depending on species; however, responses to noise would be short term and insignificant, and thus, would not be expected to have any population level impacts. Any temporary increase in ambient noise as a result of pile driving would be temporary and localized to the position of the pile and the surrounding area and the effects of pile driving noise would be limited to temporary behavioral effects and masking. No significant loss of habitat would occur as a result of construction or brushing, as vegetation would have the potential to regrow and would only impact a small percentage of habitat that is available to terrestrial mammals within each proposed action area. Short term behavioral responses to the Proposed Action would not result in long term impacts to individuals or populations of terrestrial mammals.			No change to environmental baseline.
Marine Mammals	Marine mammal species would only be located in marine portions of the proposed action areas, which include the USEC-MidATL, USEC-South, GoMEX and Mississippi River, and SEAK[1] proposed action areas. There would be no impact to marine mammals from ATON signal testing noise, tool noise, construction, or brushing as these stressors would occur on land, away from most marine mammals. Due to SOPs (Appendix B), the risk of entanglement in ATON retrieval devices or tow lines would be discountable. Potential impacts from vessel noise would be limited to masking or behavioral response in marine mammals. Pinnipeds hauled out of the water could be exposed to detectable levels of sound in air; however, the sound pressure levels are not expected to be high enough to produce auditory effects to the animals exposed. Potential impacts of vessel noise to marine mammals includes masking and behavioral responses. Coast Guard would follow SOPs (Appendix B) to minimize the impact of vessel noise by monitoring the presence of marine mammals and maintaining or increasing distance between the vessel and a marine mammal. Any increase in ambient sound as a result of fathometer noise or vessel noise would be temporary and localized to			No change to environmental baseline.

Resource	*Alternative 1*	*Alternative 2: Reduced Acquisition*	*Alternative 3: Mixed Fleet*	*No Action Alternative*
	the position of the vessel as it moves throughout the proposed action areas. Marine mammals are either not likely to respond to in water noise or are not likely to respond in ways that would significantly disrupt normal behavior patterns. Coast Guard pile driving will not result in prolonged periods of elevated underwater sound since each pile driving event only lasts, at most, a few hours. The Coast Guard will employ a 1,000-meter safety zone around each pile (Appendix B), which encompasses the entire permanent threshold shift (PTS) zone for impact and vibratory pile driving and the entire behavioral disturbance zone for impact pile driving and a portion of the behavioral disturbance zone for vibratory pile driving. If marine mammals are exposed to pile driving noise within either zone, it may result in masking or a behavioral response. However, any instances of masking or a behavioral response from Coast Guard pile driving are not expected to create the likelihood of injury to affected animals by disturbing them to such an extent as to significantly disrupt normal behavioral patterns. Vessels have the potential to impact marine mammals by disturbing them in the water column or causing mortality or serious injury from vessel collisions. Marine mammals such as dolphins, porpoises, and pinnipeds do not appear to be as susceptible to vessel collisions, and these species are more often found within the coastal portions of the proposed action areas. Therefore, with minimal overlap and SOPs (Appendix B), the most likely response of a marine mammal to vessel movement is a behavioral reaction. In addition, the most likely response to the use of bottom devices, ATON retrieval devices, and pile driving would also be a behavioral response. Short term behavioral responses to the Proposed Action would not be expected to result in long term impacts to individuals or populations.			
Socioeconomic Environment				
Commercial and Recreational Fishing	The Proposed Action would positively impact all the proposed action areas by facilitating the Coast Guard's ability to support the Coast Guard ATON mission enabling the safe navigation of waters that support the nation's economy through maritime commerce and recreation. The safe navigation of the IW&WR and readily available Coast Guard support during an at-sea emergency is the principal benefit to these industries, in addition to the Coast Guard missions of maritime safety/search and rescue. The Proposed Action would not result in significant negative impacts to commercial or recreational fishing.			No change to environmental baseline.
Transportation and Shipping, Recreation and Tourism	The Proposed Action would positively impact all the proposed action areas by facilitating the Coast Guard's ability to support the Coast Guard ATON mission enabling the safe navigation of waters that support the nation's economy through maritime commerce and recreation. The safe navigation of the IW&WR and readily available Coast Guard support during an at-sea emergency is the principal benefit to these industries, in addition to the Coast Guard missions of maritime safety/search and rescue. The Proposed Action would not result in significant negative impacts to transportation and shipping, or recreation and tourism.			No change to environmental baseline.

Resource	*Alternative 1*	*Alternative 2: Reduced Acquisition*	*Alternative 3: Mixed Fleet*	*No Action Alternative*
Coastal Marine Construction, Mineral Extraction, Oil and Gas Extraction, and Renewable Energy	The Proposed Action would positively impact all the proposed action areas by facilitating the Coast Guard's ability to support the Coast Guard ATON mission enabling the safe navigation of waters that support the nation's economy through maritime commerce and recreation. The safe navigation of the IW&WR and readily available Coast Guard support during an at-sea emergency is the principal benefit to these industries, in addition to the Coast Guard missions of maritime safety/search and rescue. The Proposed Action would not result in significant negative impacts to coastal marine construction, mineral extraction, oil and gas extraction, or renewable energy.			No change to environmental baseline.
Subsistence Fishing and Hunting and Cultural Resources	The Proposed Action would positively impact all the proposed action areas by facilitating the Coast Guard's ability to support the Coast Guard ATON mission enabling the safe navigation of waters that support the nation's economy through maritime commerce and recreation. The safe navigation of the IW&WR and readily available Coast Guard support during an at-sea emergency is the principal benefit to subsistence fishing and hunting, in addition to the Coast Guard missions of maritime safety/search and rescue. The Proposed Action would not result in significant negative impacts to subsistence fishing and hunting. The Proposed Action would have no significant impact on cultural resources in all proposed action areas as cultural resources would be avoided.			No change to environmental baseline.

[1] USEC-MidATL = U.S. East Coast–Mid-Atlantic; USEC-South = U.S. East Coast–South, including Florida and the Bahamas; GoMEX and Mississippi River = Gulf of Mexico and U.S. Inland States, including the Mississippi River and it's tributaries; SEAK = Southeast Alaska

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ACRONYMS AND ABBREVIATIONS

° C	degrees Celsius
° F	degrees Fahrenheit
° E	degrees East longitude
° N	degrees North latitude
° S	degrees South latitude
° W	degrees West latitude
ABR	Auditory brainstem response
ADFG	Alaska Department of Fish and Game
AFPMB	Armed Forces Pest Management Board
AOR	Area of Responsibility
ATON	Aids to Navigation
AUTEC	Atlantic Undersea Test and Evaluation Center
BOEM	Bureau of Ocean Energy Management
BTS	Bureau of Transportation Statistics
CAA	Clean Air Act
CATEX	Categorical Exclusion
CEQ	Council on Environmetnal Quality
CFR	Code of Federal Regulations
CITES	The Convention on International Trade in Endangered Species of Wild Fauna and Flora
cm	centimeter(s)
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	equivalent CO_2 rate
Coast Guard	United States Coast Guard
COMDTINST	Commandant Instruction
CZMA	Coastal Zone Management Act
dB	decibels
dBA	A-weighted decibel
DHS	Department of Homeland Security
DPS	Distinct Population Segment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ENOW	NOAA's Economics: National Ocean Watch data set
ENP	Eastern North Pacific
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily significant unit
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FMC	Fishery management council
FMP(s)	Fisheries Management Plan(s)

FR	Federal Register
ft	foot (feet)
GDP	Gross domestic product
GHG	Greenhouse gas
GMFMC	Gulf of Mexico Fisheries Management Council
GoMEX and Mississippi River	Gulf of Mexico and U.S. Inland States, including the Mississippi River its Tributaries
HAPC	Habitat Areas of Particular Concern
HAP	Hazardous air pollutant
HF	high-frequency marine mammal hearing group
Hz	hertz
ICW	Intracoastal Waterway
IMO	International Maritime Organization
in	inch(es)
IPM	Intergrated Pest Management program
IW&WR	Inland Waterways and Western Rivers
kg	kilogram
kHz	kilohertz
km	kilometer(s)
km^2	square kilometers
km/hr	kilometers per hour
lb	pound(s)
LF	low-frequency marine mammal hearing group
m	meter(s)
m^2	square meters
MAFMC	Mid-Atlantic Fisheries Management Council
MARPOL	International Convention for the Prevention of Pollution from Ships
mi	mile(s)
mi^2	square miles
mi/hr	miles per hour
mm	millimeter(s)
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MBTA	Migratory Bird Treaty Act
MEM	Military Expended Materials
MF	mid-frequency marine mammal hearing group
mg/m^2	milligrams per square meter
mg/m^3	milligrams per cubic meter
mph	miles per hour
$\mu g/m^3$	micrograms per cubic meter
µPa	microPascal
MMPA	Marine Mammal Protection Act
MRIP	Marine Recreational Information Program
MW	megawatt(s)
MWh	megawatt hours
NAAQS	National Ambient Air Quality Standards
Navy	U.S. Department of the Navy
NEFMC	New England Fisheries Management Council

NEPA	National Environmental Policy Act
NIOSH	National Institute for Occupational Safety and Health
nm	nautical mile(s)
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOX	Nitrogen oxide
OCS	Outer continental shelf
OCSPP	Office of Chemical Safety and Pollution Prevention
ORD	Operational Requirement Document
OPA	Oil Pollution Act
OPSUM	Operational Summary
OTEC	Ocean Thermal Energy Conversion
OW	otariid and non-phocid marine carnivores
Pb	Lead
PBF	Physical and biological feature(s)
PCE	Primary constituent elemnt(s)
PEIS	Programmatic Environmental Impact Statement
PM	particulate matter
PNW	Pacific Northwest
ppm	parts per million
PTS	Permanent Threshold Shift
PW	Phocid pinnipeds
Radar	radio detection and ranging
RMS	root mean square
SAFMC	South Atlantic Fisheries Management Council
SAR	Search and Rescue
SEAK	Southeast Alaska
SEL	sound exposure level
SO_2	Sulfer Dioxide
SOP(s)	Standard Operating Procedure(s)
SOSUS	Sound Surveillance System
SPL	sound pressure level
TL	transmission loss
TTS	Temporary Threshold Shift
TTP	Tactics, Techniques, and Procedures
U.S.	United States
U.S.C.	United States Code
USD	U.S. dollars
USEC-MidATL	United States East Coast – Mid-Atlantic
USEC-South	United States East Coast – South, Including Florida and the Bahamas
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	Volitile organic compound

WCC	Waterways Commerce Cutter
WLI	Inland Buoy Tender
WLIC	Inland Construction Tender
WLR	River Buoy Tender
WNP	Western North Pacific
Yd	yards

CHAPTER 1 Introduction

1.1 Background

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 to include the Nation's coasts, ports, and inland waterways.

The Coast Guard develops, establishes, maintains, and operates maritime aids to navigation (ATON) in federal waterways to promote safety, assist navigation, prevent disasters and collisions, and serve the maritime commerce needs of the United States. These responsibilities include the United States' vast network of inland waterways and western rivers, referred to henceforth collectively as the Inland Waterways and Western Rivers (IW&WR). The IW&WR includes the Gulf and Atlantic Intracoastal Waterway (ICW), the Mississippi, Missouri, Alabama, Tennessee, Columbia, and Ohio Rivers, their associated tributaries and other connecting waterways, portions of the Alaska Inside Passage, portions of the Great Lakes, and other navigable waterways around the United States. A Coast Guard buoy tender (tender) is a type of Coast Guard cutter designed to service ATON in federal waters of the United States including the vast network of the IW&WR. Coast Guard tenders service the IW&WR and operate across a wide range of temperature and weather conditions, including strong river and tidal currents, and in areas affected by ice, debris, and shoaling. The dynamic waters of the IW&WR are largely inaccessible by other larger and geographically distant Coast Guard cutters. Thirty five cutters, 27 barges and a variety of support boats currently serve as the primary means of ATON maintenance and construction in the IW&WR. These assets are henceforth referred to as the "existing inland tender fleet" in this PEIS.

The Coast Guard's existing inland tender fleet is responsible for maintaining more than 28,200 ATON across approximately 12,000 miles (mi) (19,312 kilometers [km]) of inland waterways. The existing inland tender fleet protects vital infrastructure and enables the free flow of commerce throughout the nation's marine highways. These waterways generate billions of dollars in commerce annually making them critical to the country's economic livelihood, protection of jobs, and contribution to energy security. The tenders also provide similar capabilities as the Coast Guard's oceangoing cutter fleet, enabling Coast Guard to quickly and effectively respond to emergencies[4], such as search and rescue (SAR), environmental incidents, and severe weather events.

1.2 Purpose and Need

The U.S. Coast Guard ensures the Nation's maritime safety, security, and stewardship. The Coast Guard has documented a need to replace the capabilities provided by the existing inland tender fleet servicing the IW&WR. Every tender in the Coast Guard's existing inland tender fleet has exceeded the end of its operational service life.

[4] While emergency response is not a part of the Proposed Action, WCCs would support Coast Guard emergency response missions within the proposed action areas when needed. To ensure efficiency, WCC emergency response training would be conducted and 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 WCC.

The purpose of the Proposed Action is for the acquisition, operation, and training of up to 30 Waterway Commerce Cutters (WCC)[5], thereby enabling the safe navigation of waters that support the nation's economy through maritime commerce and recreation. The 35 cutters and associated 27 barges that comprise the existing inland tender fleet servicing the IW&WR are, on average, more than 54 years old and all have significantly exceeded their design service life of 30 years. There is no redundant vessel capability within the Coast Guard, Department of Homeland Security (DHS), or other government agencies. Without replacement of the existing inland tender fleet, the Coast Guard could face an increasing risk of ATON mission failure throughout the IW&WR and other navigable waters around the United States. The need for the Proposed Action is to maintain Coast Guard's capability to execute its ATON mission and provide consistent and reliable presence in the IW&WR.

Due to obsolescence, hull limitations, and asset age, service life extension and modernization efforts are increasingly difficult, expensive to maintain, and unsupportable. In order to maintain the Coast Guard's vital inland waterways mission and continue to provide a consistent and reliable presence in the IW&WR, the Coast Guard is proposing to replace the existing aging inland tender fleet. WCCs would be designed to replace the capabilities provided by the existing inland tender fleet servicing the IW&WR while implementing today's industry standards with regards to safety, environmental compliance, and crew habitability as well as other standards. The WCCs would implement modern design changes to optimize performance and improve standardization.

Standardization increases operational flexibility, maintains fleet resilience, streamlines logistics, decreases maintenance costs, reduces the training burden for operators, and improves operational proficiency. Design normalization would facilitate the ATON mission work to be accomplished with vast improvements in safety and risk management mitigation, as well as time required for training and operation completion, enhancing the Coast Guard's ability to support the ATON mission.

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 port, waterways, and coastal security; drug interdiction; aids to navigation; search and rescue (SAR); living marine resources; marine safety; defense readiness; migrant interdiction; marine environmental protection; ice operations; and other law enforcement (e.g., illegal fishing). WCCs, similar to the existing inland tender fleet, would support a primary mission of Aids to Navigation, and may support secondary non-ATON missions such as:

- Ports, Waterways, and Coastal Security;
- Search and Rescue;
- Marine Safety; and
- Marine Environmental Protection.

1.3.1 Scope of the Programmatic Environmental Impact Statement

The Coast Guard has prepared this PEIS in accordance with the National Environmental Policy Act (NEPA), as implemented by the Council on Environmental Quality (CEQ) Regulations (40 Code of Federal Regulations [CFR] §§ 1500 et seq.); DHS Directive Number 023-01, Rev. 01 and Instruction 023-001-01,

[5] This document refers to vessels of the Proposed Action as Waterways Commerce Cutters (WCC) and any reference to the current fleet as "existing inland tender fleet."

Rev. 01; and Coast Guard Commandant Instruction (COMDTINST) 5090.1. The Coast Guard will issue a Record of Decision after the Final PEIS has been made publicly available for at least 30 days.

The purposes for preparing this PEIS are to:

- Identify and assess the potential impacts on the natural and human environment that would result from the implementation of the Proposed Action;
- Describe and evaluate reasonable alternatives to the Proposed Action;
- Identify and recommend specific mitigation measures, as necessary, to avoid or minimize environmental effects; and
- Encourage and facilitate involvement by the public and interested agencies in the environmental review process.

The topics addressed in this PEIS include physical resources (noise and air quality), biological resources (including special status species), and socioeconomics. This PEIS describes the associated WCC operations and training that would occur in the proposed action areas (Figure 2-1), the affected environment as it currently exists based on available information, and the environmental consequences of incorporation of a planned 30 WCCs into the Coast Guard's fleet to replace the operational capabilities of the existing inland tender fleet (i.e., 35 aging inland tenders and their 27 associated barges). It also compares the project's potential impact to that of various alternatives.

The Coast Guard anticipates that supplemental NEPA documentation would be prepared in support of individual proposed homeporting, maintenance, and decommissioning. New information would be tiered[6] to this PEIS and may include, but is not limited to, changes to a species listing status or any other applicable laws and directives. This PEIS analyzes expected vessel operation and training activities for a planned 30 WCCs, based on the operations and training activities of the Coast Guard's existing inland tender fleet. There are no anticipated significant changes between the existing inland tender fleet's operations and training activities and future WCC operations and training activities.

1.3.2 Agency Coordination Process

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

In a 2002 Memorandum from CEQ for the Heads of Federal Agencies[7] it was stated: "The benefits of enhanced cooperating agency participation in the preparation of NEPA analyses include: disclosing

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

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

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

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

1.4 Applicable Laws and Policies

The Coast Guard has prepared this PEIS based on international, federal, state, and local laws, statutes, regulations, and policies that are pertinent to the implementation of the Proposed Action. For a complete description of all federal, tribal, state, and local statutes and regulations that are potentially applicable to the Proposed Action and Alternatives presented in this PEIS, refer to Appendix A.

Specifically, the Coast Guard has prepared this document in accordance with federal and state laws, statutes, regulations, and policies pertinent to the implementation of the Proposed Action, including:

- NEPA; 42 U.S.C. sections 4321–4370h, which requires an environmental analysis for major federal actions that have the potential to significantly impact the quality of the human environment; and
- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR parts 1500–1508) which went into effect on September 14, 2020 (85 FR 43304; July 16, 2020).

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

1.5 Public Participation, Review and Comment

1.5.1 Project Website

Additional information about this environmental action can be accessed at: https://www.dcms.uscg.mil/Our-Organization/Assistant-Commandant-for-Engineering-Logistics-CG-4-/Program-Offices/Environmental-Management/Environmental-Planning-and-Historic-Preservation.

To facilitate public input, comments identified in docket number USCG-2021-0191 can be provided using the Federal portal at https://www.regulations.gov or via email at HQS-SMB-CG-WaterwaysCommerceCutter@uscg.mil.

1.5.2 Scoping Period

A Notice of Intent (NOI) to prepare a PEIS pursuant to NEPA was published in the Federal Register (86 FR 20376) April 19, 2021. The scoping period lasted 45 days, concluding on June 11, 2021. The public was provided a variety of methods to comment on the scope of the PEIS during the scoping period, including the email address provided in Section 1.5.1 above.

1.5.3 Scoping Comments

The Coast Guard received two comments during the scoping period. Scoping comments were received from the Environmental Protection Agency (EPA) and a representative from the American Waterways Operators. Additional Information can be found in Appendix G: Response to Public Comments.

Placeholder: *This section remains incomplete because the Coast Guard intends to conduct a 45-day public comment period on the Draft PEIS and will update this section based on feedback received during that period before the Final PEIS is completed.*

1.6 Organization of this PEIS

This PEIS is organized as follows:

- Chapter 1: Provides background information, identifies the purpose and need for the Proposed Action, and regulatory setting.
- Chapter 2: Describes proposed action areas and alternatives, including the preferred alternative and the Proposed Action.
- Chapter 3: Describes the affected environment and environmental consequences of the Proposed Action, including any acoustic and physical stressors, and socioeconomic impacts.
- Chapter 4: Describes the consultation and coordination process.
- Chapter 5: Presents the conclusion.
- Chapter 6: Presents a list of preparers of the document.
- Chapter 7: Provides references.
- Appendix A: Describes applicable laws and policies referenced in this document.
- Appendix B: Describes Coast Guard Standard Operating Procedures (SOPs) applicable to activities associated with the Proposed Action.
- Appendix C: Provides more detail on the propagation of sound.
- Appendix D: Provides the quantifying acoustic impacts analysis including the method and analytical approach.
- Appendix E: Describes species-specific hearing capabilities.
- Appendix F: Describes the National Ambient Air Quality Standards (NAAQS).
- Appendix G: Provides scoping comments and comments onto the Draft PEIS, as well as Coast Guard responses to all public comments.
- Appendix H: Provides additional information by species group.
- Appendix I: Provides ESA-listed species considered in the 2018 National Marine Fisheries Biological Opinion
- Appendix I: Identifies the changes made between the Draft PEIS to the Final PEIS.

CHAPTER 2 Proposed Action and Alternatives

The Coast Guard is proposing to acquire up to 30 WCCs with a design service life of 30 years each to replace the capabilities provided by the existing inland tender fleet, barges, and smaller support boats. This PEIS specifically documents WCC acquisition, operations, and training activities.

Several possible alternatives to completing the Proposed Action were considered (Section 2.3). The no action alternative considered continued use of the existing assets with no replacement. Other alternatives considered included the acquisition of vessels on a one-for-one basis using whatever replacement hulls the Coast Guard could obtain when deterioration or obsolescence would dictate decommissioning.

This chapter identifies and describes the Proposed Action, and its alternatives, including the no action alternative. Because there are no anticipated significant changes to the Coast Guard's missions in the six proposed action areas that have been identified as locations where the WCCs would support (Section 2.1), this PEIS analyzes expected WCC operations and training activities based on the existing inland tender fleet's operation and training activities.

2.1 Description of Proposed Action Areas

The WCCs would service the same areas of operation where the existing inland tender fleet operates in Coast Guard Districts Five, Seven, Eight, Nine, Thirteen, and Seventeen (Figure 2-9). Identical to that of the existing inland cutter fleet, the proposed action includes six proposed action areas, all described in detail below. In general, the serviced waterways include the Gulf and Atlantic Intracoastal Waterway; the Mississippi, Missouri, Alabama, Tennessee, Columbia, and Ohio Rivers and their associated tributaries and other connecting waterways; portions of the Alaska Inside Passage; portions of the Great Lakes; and other navigable waterways across the country (Figure 2-1). Where applicable, the proposed action areas also include state and territorial seas extending 12 nautical miles ([nm]; 22 km) from the coast. The fleet of WCCs would conduct operations necessary for ATON establishment, maintenance, and discontinuance, as well as other responsibilities pertaining to the Coast Guard missions within these waters as well as ashore. Potential WCC homeport locations are not known at this time, but all homeports would be located within the proposed action areas.

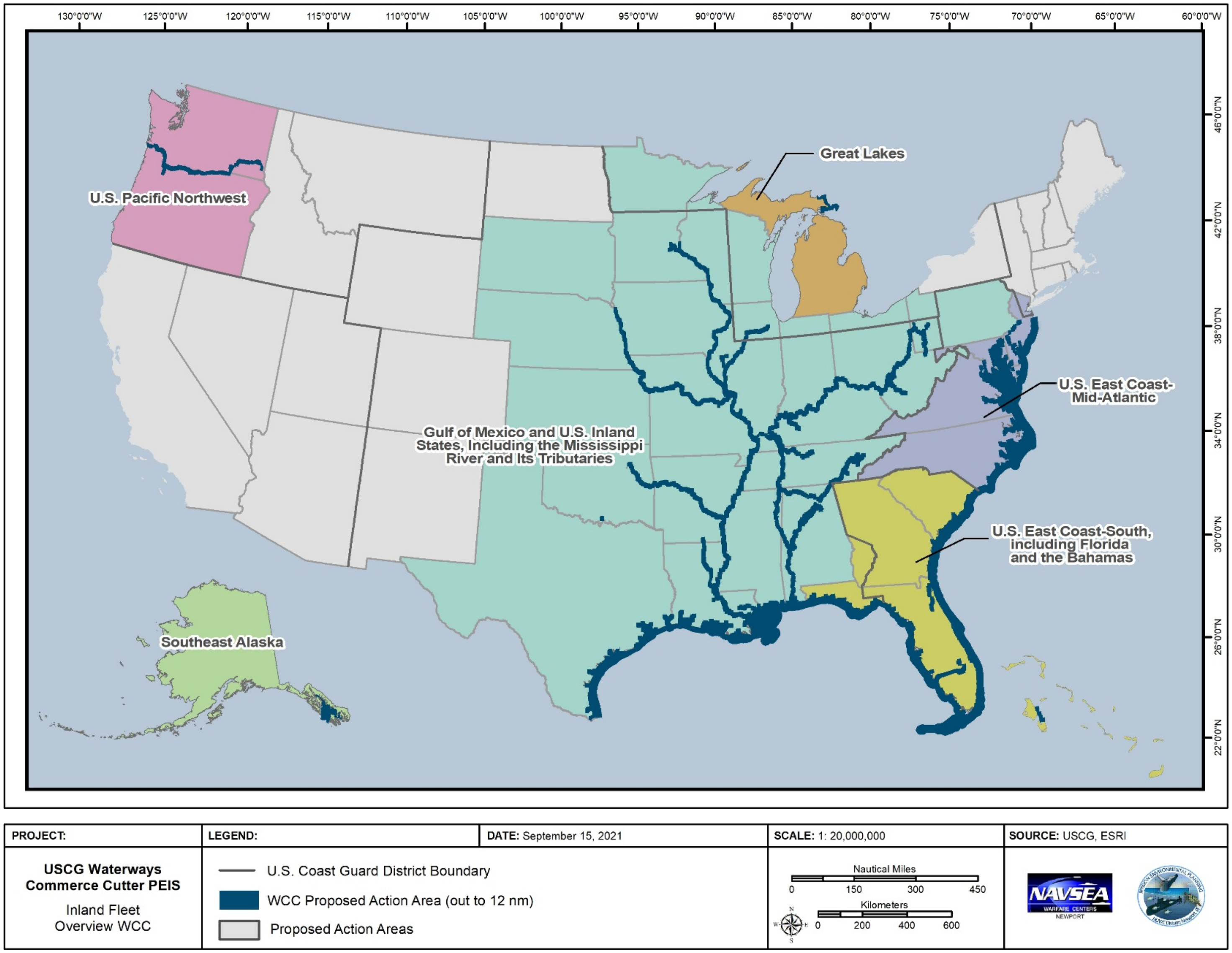


Figure 2-1. Overview of All WCC Proposed Action Areas

2.1.1 U.S. East Coast—Mid-Atlantic Proposed Action Area

The U.S. East Coast—Mid-Atlantic (USEC-MidATL) proposed action area includes state and territorial waters extending 12 nm (22 km) from New Jersey (where it borders with New York) to the border of North Carolina (where it borders with South Carolina; Figure 2-2). The proposed action area also extends into inland waterways, specifically in the Chesapeake Bay in Maryland, the Potomac River in the District of Columbia, the Delaware Bay in Delaware, the Delaware River in Pennsylvania and New Jersey, and the James River in Virginia (Figure 2-2). This proposed action area lies within Coast Guard District Five. The majority of ATON in the USEC-MidATL proposed action area are located in the Delaware River, Chesapeake Bay, and the Atlantic Ocean.

2.1.2 U.S. East Coast—South, Including Florida and the Bahamas, Proposed Action Area

The U.S. East Coast—South, including Florida and the Bahamas, (USEC-South) proposed action area includes state and territorial waters extending 12 nm (22 km) from South Carolina (where it borders with North Carolina) to Florida (where it borders with Alabama) and extends to include the Florida Keys and Dry Tortugas off the southwest coast of Florida (Figure 2-3). This proposed action area also includes inland waterways, such as the St John's River and the Caloosahatchee River. The Department of Defense-owned ATON, near the Atlantic Undersea Test and Evaluation Center (AUTEC) in the Bahamas, are also included in this proposed action area (Figure 2-3). This proposed action area overlaps with Coast Guard Districts Seven and Eight. USEC-South includes the ATON in coastal rivers and the Atlantic Ocean.

2.1.3 Great Lakes Proposed Action Area

The Great Lakes (Great Lakes) proposed action area includes waters off northern Michigan to the border between the United States and Canada. This proposed action area includes the northern portion of Lake Michigan extending into St. Mary's River, Munuscong Lake, and Lake Nicolet (Figure 2-4). This proposed action area lies within Coast Guard District Nine. No marine waters are part of this proposed action area.

2.1.4 Gulf of Mexico and U.S. Inland States, Including the Mississippi River and Its Tributaries, Proposed Action Area

The Gulf of Mexico and U.S. Inland States, including the Mississippi River and its Tributaries, (GoMEX and Mississippi River) proposed action area includes state and territorial waters extending 12 nm (22 km) from Alabama (where it borders with Florida) to Texas (where it borders with Mexico; Figure 2-5 and Figure 2-6). Due to the size of this proposed action area and for ease of review, the map of the proposed action area is divided into the northern portion (Figure 2-5) and the southern portion (Figure 2-6). This proposed action area also includes inland waterways and their tributaries along the Ohio and Tennessee Rivers, the Cumberland River in Kentucky and Tennessee, Tombigbee River in Alabama and Mississippi; the Mississippi River in Louisiana, Mississippi, and Arkansas; and the Ouachita River in Louisiana and Arkansas (Figure 2-5 and Figure 2-6). Typically, when water levels are relatively stable and floating objects seldom move, these waters are referred to as "pooled waters," which are often found in this proposed action area. When water levels fluctuate more often, it is referred to as "fast water" (e.g., the Mississippi River downstream from St. Louis and the Missouri River). This proposed action area overlaps with Coast Guard Districts Eight and Nine.

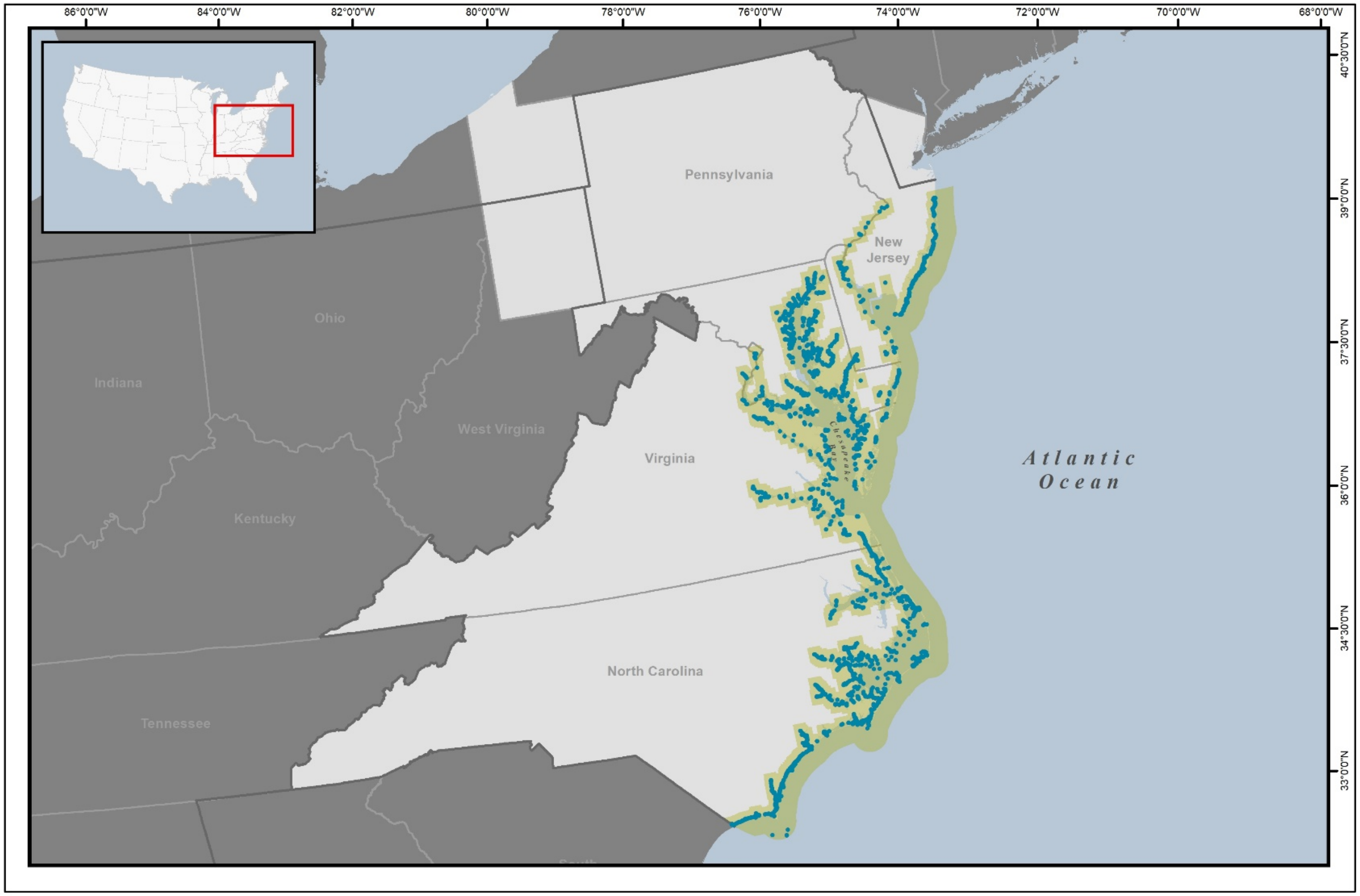
2.1.5 U.S. Pacific Northwest Proposed Action Area

The U.S. Pacific Northwest (PNW) proposed action area includes state and territorial waters extending 12 nm (22 km) from southern Washington State to northern Oregon where they border each other along the Columbia River (Figure 2-7). The proposed action area includes the Columbia River from the mouth at the Pacific Ocean to where it joins the Snake River and ends at the border of Washington and

Idaho. The proposed action area also includes a northern segment of the Willamette River that joins with the Columbia River in Oregon (Figure 2-7). This proposed action areas lies within Coast Guard District Thirteen. The Pacific Ocean is not a part of this proposed action area.

2.1.6 Southeast Alaska Proposed Action Area

The Southeast Alaska (SEAK) proposed action area includes state and territorial waters extending 12 nm (22 km) from Baranof and Prince of Wales Islands (Figure 2-8). This proposed action area consists primarily of a portion of the inside passage from Juneau south to Revillagigedo Island (Figure 2-8). This proposed action area lies within Coast Guard District Seventeen and includes only coastal passages of the Pacific Ocean.



PROJECT:	LEGEND:	DATE: September 15, 2021	SCALE: 1: 6,000,000	SOURCE: USCG, ESRI
USCG Waterways Commerce Cutter PEIS U.S. East Coast - Mid- Atlantic Proposed Action Area	ATON U.S. Coast Guard District Boundary WCC Proposed Action Area (out to 12 nm)	**NOTE:** Only data within the current WCC Proposed Action Area are displayed	Miles 0 50 100 150 Kilometers 0 50 100 150 200	NAVSEA WARFARE CENTERS NEWPORT

Figure 2-2. U.S. East Coast—Mid-Atlantic Proposed Action Area

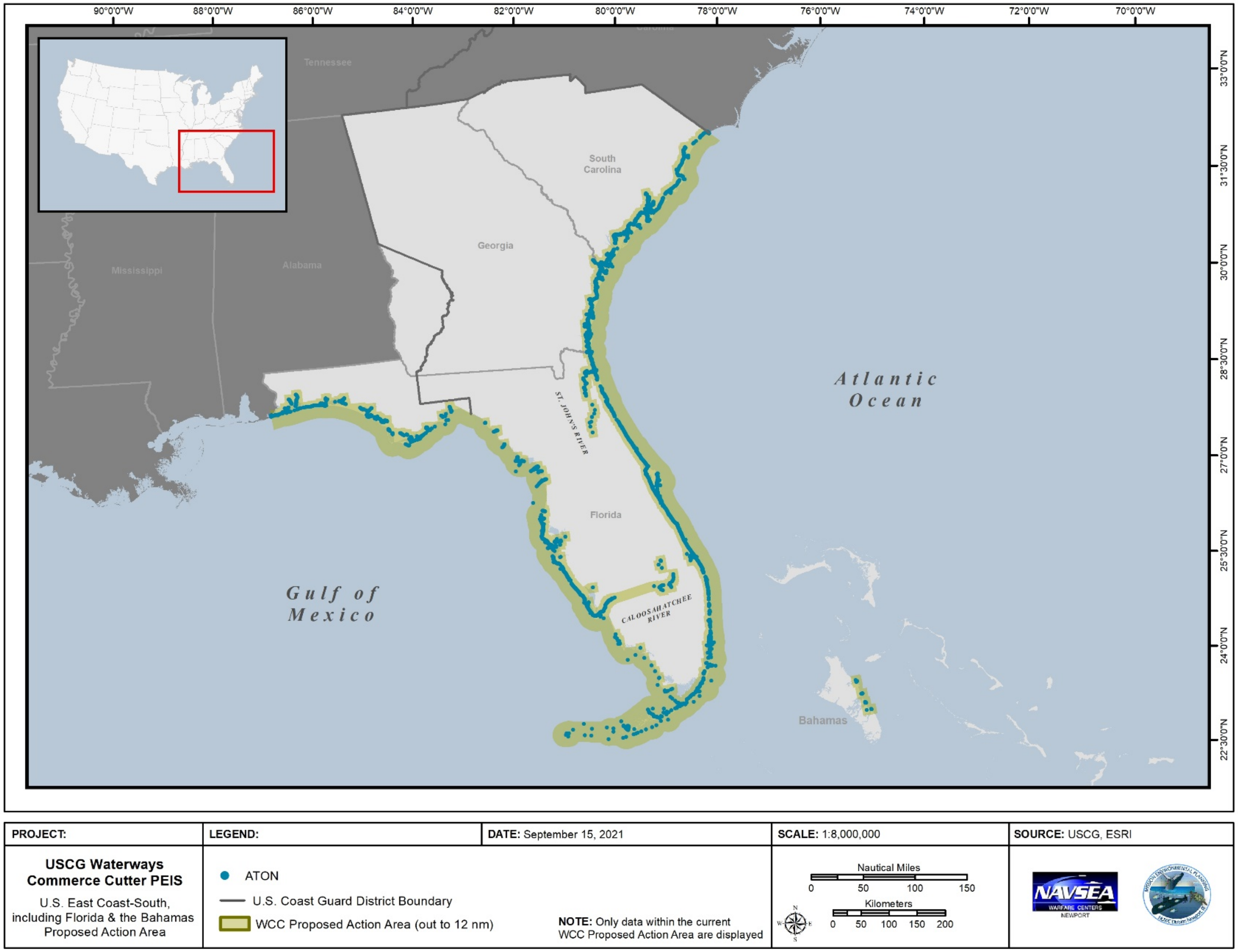
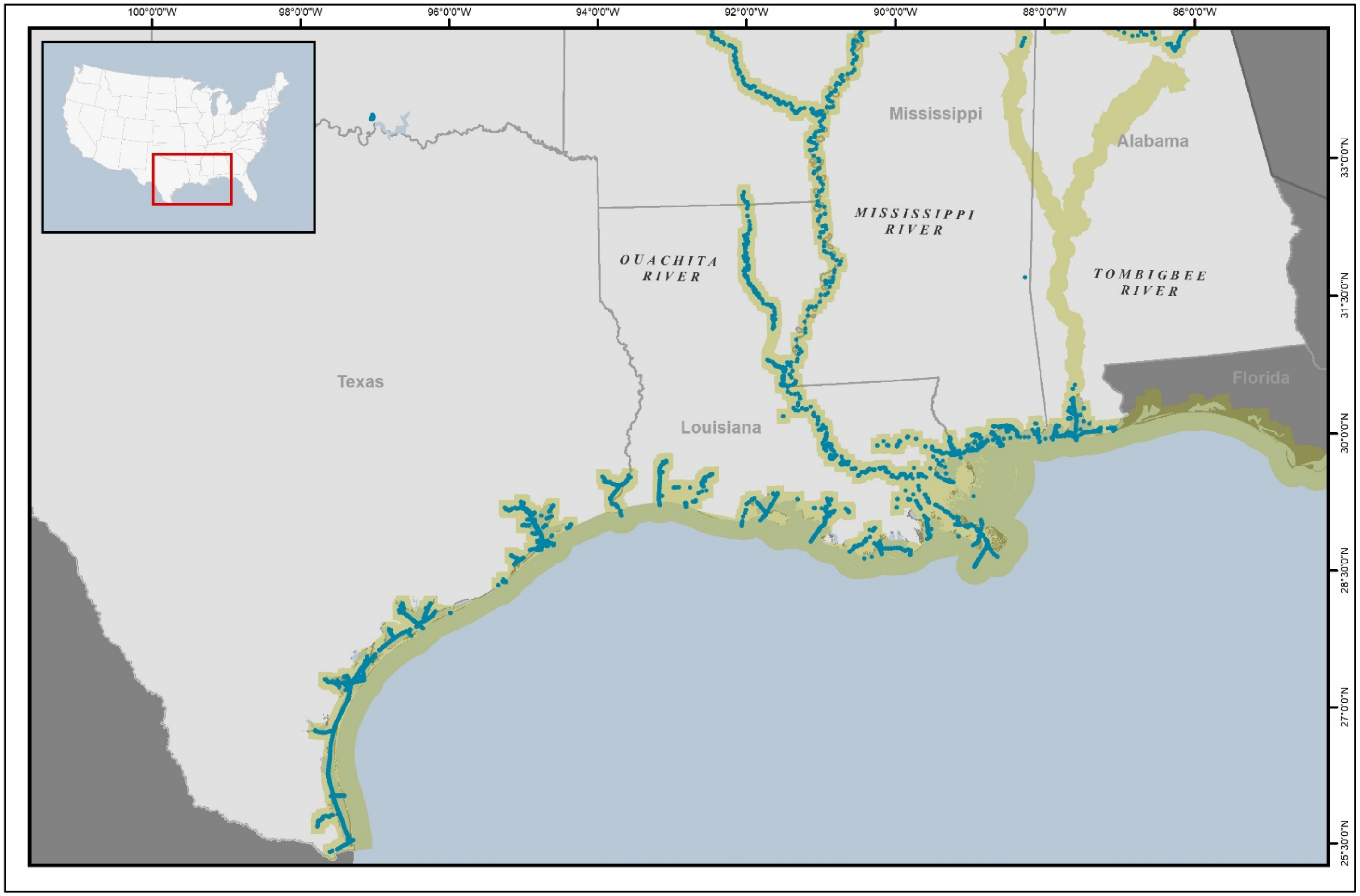


Figure 2-3. U.S. East Coast—South, Including Florida and the Bahamas, Proposed Action Area

Figure 2-4. Great Lakes Proposed Action Area

Figure 2-5. Gulf of Mexico and U.S. Inland States, Including the Mississippi River and Its Tributaries, Proposed Action Area (Northern)



PROJECT: **USCG Waterways Commerce Cutter PEIS**
Gulf of Mexico and U.S. Inland States, Including the Mississippi River and Its Tributaries Proposed Action Area

LEGEND:
ATON
U.S. Coast Guard District Boundary
WCC Proposed Action Area (out to 12 nm)

NOTE: Only data within the current WCC Proposed Action Area are displayed

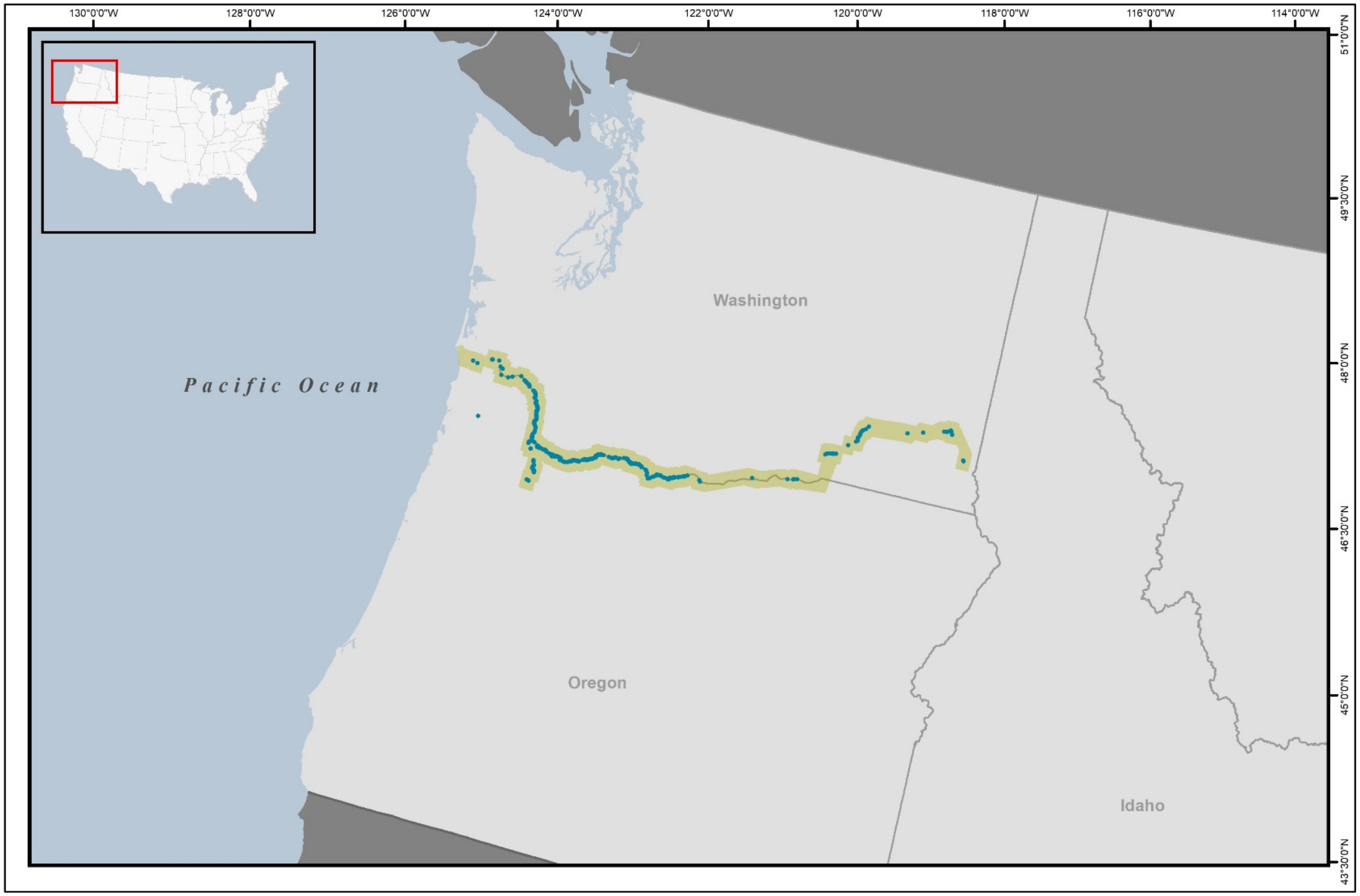
DATE: September 15, 2021

SCALE: 1: 8,000,000

Nautical Miles: 0 25 50 75 100
Kilometers: 0 50 100 150

SOURCE: USCG, ESRI

Figure 2-6. Gulf of Mexico and U.S. Inland States, Including the Mississippi River and Its Tributaries Proposed Action Area (Southern)



PROJECT:	LEGEND:	DATE: September 15, 2021	SCALE: 1:5,000,000	SOURCE: USCG, ESRI
USCG Waterways Commerce Cutter PEIS U.S. Pacific Northwest Proposed Action Area	ATON U.S. Coast Guard District Boundary WCC Proposed Action Area	**NOTE:** Only data within the current WCC Proposed Action Area are displayed	Miles 0 25 50 75 100 Kilometers 0 25 50 75 100	

Figure 2-7. U.S. Pacific Northwest Proposed Action Area

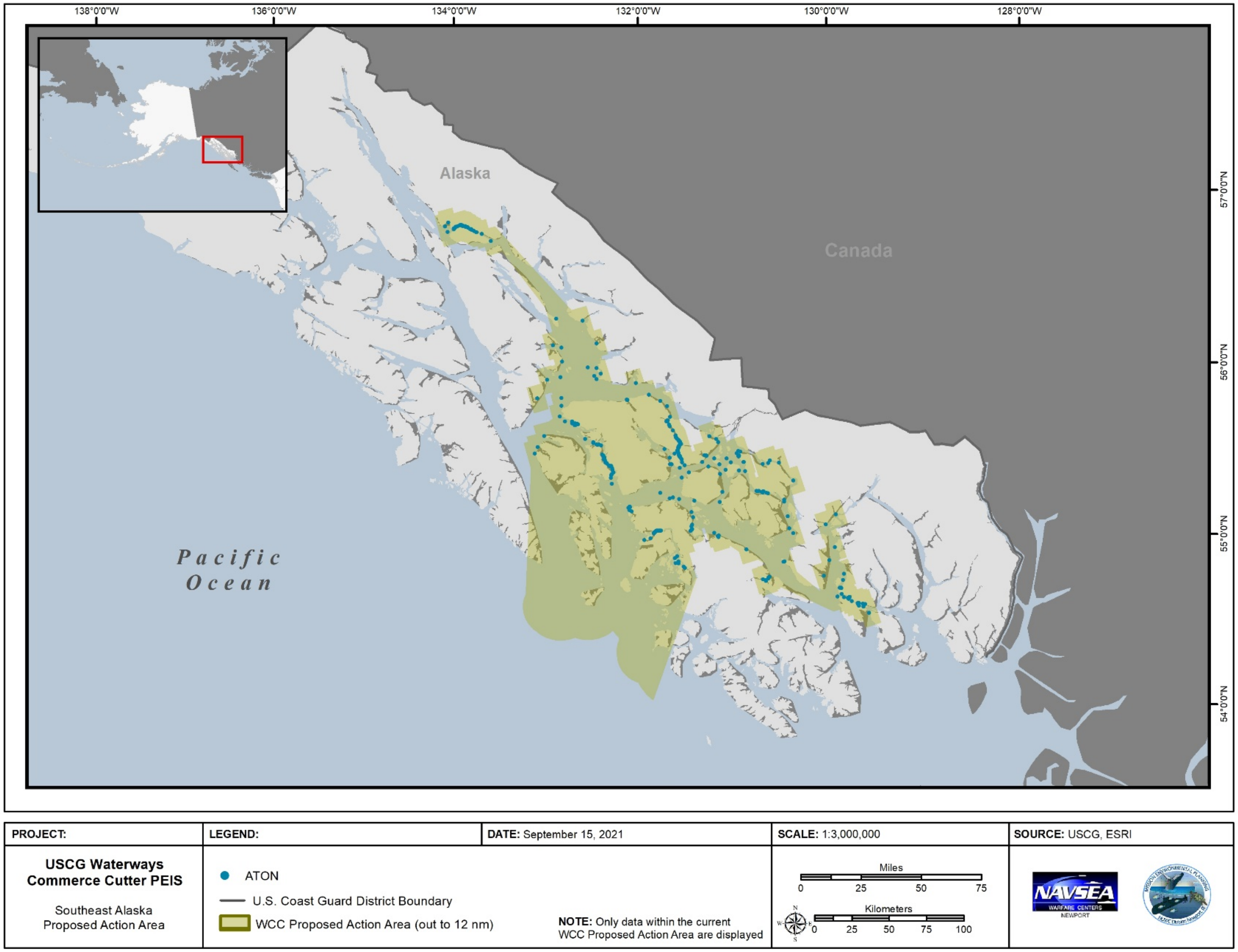


Figure 2-8. Southeast Alaska Proposed Action Area

2.2 Alternative 1, Preferred Alternative: Proposed Action

Under Alternative 1, the Coast Guard would acquire and operate up to 30 WCCs with design service lives of 30 years each to fulfill mission requirements in the proposed action areas throughout the IW&WR (Section 2.1). This would provide consistent and reliable Coast Guard presence in the proposed action areas. Similar to the existing fleet's operations, the Proposed Action would include vessel operations as well as training exercises to meet the Coast Guard's mission responsibilities in the proposed action areas (Section 2.2.2). The Proposed Action would include vessel operations to establish, operate, and maintain the lighted and unlighted buoys and beacons that comprise the United States Visual ATON System throughout the IW&WR.

Full operational capability would be achieved when all planned WCCs are operational. Coast Guard WCC operations and training would commence upon delivery of each WCC from the shipbuilder to the Coast Guard. For example, the first WCC delivery to the Coast Guard is expected in 2024 and the cutter would then be operational in 2025. The last WCC is expected to be delivered and operational in 2032.

The Proposed Action would include WCC operation, maintenance, and decommissioning of a planned 16 WCC river buoy class (WLR) tenders replacing the existing 18 river buoy tenders; a planned 11 construction class (WLIC) tenders replacing the existing 13 construction tenders; and a planned three inland buoy class (WLI) tenders replacing the existing four inland buoy tenders.

The Proposed Action would provide continuous and improved fulfillment of the Coast Guard's IW&WR ATON mission, guided by the National Security Strategy, National Maritime Strategy (A Cooperative Strategy for 21st Century Seapower), National Strategies for Homeland Security, and Executive Order (EO) 13840 (Appendix A). The WCC class recapitalization allows the Coast Guard to continue their mission in support of over 28,200 ATON and more than 12,000 mi (19,312 km) of navigable channels vital to national commerce moving over 630 million tons of cargo annually and servicing 361 commercial ports[8]. Reducing transit risks contributes to protecting national interests by ensuring safe and efficient flow of commercial vessel traffic through our nation's waters.

The Coast Guard has a statutory mission to establish, maintain, and operate ATON in the IW&WR. The existing inland tender fleet, which serves as the primary means of ATON maintenance and construction in the IW&WR, includes a total of nine classes and subclasses of vessels, as well as their associated barges and other support vessels (Figure 2-9). These classes include river bouy tenders, construction tenders, and inland buoy tenders with a mix of subclasses based upon vessel size and characteristics. Although it is expected that the WCCs, similar to the existing inland tender fleet, would be capable of performing non-ATON missions such as Ports, Waterways and Coastal Security; SAR; Marine Environmental Protection; and Marine Safety, their primary focus would remain performance of the ATON mission. The area of responsibility (AOR) for the existing inland tender fleet includes: the Gulf of Mexico and Atlantic ICW; the Mississippi, Missouri, Alabama, Tennessee, Columbia, and Ohio Rivers, their associated tributaries, and other connecting waterways; portions of the Alaska Inside Passage; portions of the Great Lakes; and several other navigable waterways. The homeports designated in Figure 2-9 are of the vessels in the existing inland tender fleet, not the WCCs.

[8] https://www.dcms.uscg.mil/Our-Organization/Assistant-Commandant-for-Acquisitions-CG-9/Programs/Surface-Programs/WCC/

Figure 2-9. The Homeports and Area of Responsibility of the Existing Inland Tender Fleet

2.2.1 Waterways Commerce Cutters Capabilities and Design

There are three proposed WCC classes—the WLIC, the WLR, and the WLI, and a detailed description of each of the WCC classes is provided below. Although there are three classes proposed and design specifications are not final, the design would maximize commonality between the three classes to reduce sustainment costs, training needs, and other associated requirements. All WCCs would be equipped with a crane with a maximum reach of 70 feet (ft) (21 meters [m]) and a lift capacity of 4,000 pounds (1,814 kilograms [kg]) at maximum reach. The WCCs would have a fully enclosed bridge that spans the full width of the vessel from starboard to port (threshold) or an enclosed bridge with bridge-wings that combine to extend the full width of the vessel (objective). These would allow operators direct visual observation of an area of 360 degrees around the ship. Required vessel capabilities, performance thresholds, and objectives considered essential for successful accomplishment of the WCC missions are provided in Section 2.2.2, which also includes a summary of the proposed WCC's anticipated operational duties. Table 2-1 summarizes the key performance parameters for the proposed WCCs that are described for the WLIC (Section 2.2.1.1), WLR (Section 2.2.1.2), and WLI (Section 2.2.1.3).

2.2.1.1 WCC Construction Class Tenders—WLIC

The Proposed Action would include the operation, maintenance, and decommissioning[9] of up to 11 WLICs to replace the current capabilities of the 13 construction tenders. The WLIC would be located in the USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas, which support the Coast Guard's Fifth, Seventh, and Eighth Districts. More than 60 percent of the Coast Guard's 21,670 beacons are located in these proposed action areas. These proposed action areas contain over 14,000 beacons and over 200 floating ATON. WLICs, like the WLRs (Section 2.2.1.2), would approach, establish, maintain, and discontinue floating ATON and fixed ATON structures that are located in 4 ft (1 m) of water up to 20 ft (6 m) from "good" water (≥5 ft [1.5 m] depth), without the keel touching the riverbed or seafloor. WLICs would service inland and nearshore ATON and would be specifically designed for establishing and replacing fixed ATON (Section 2.2.2.1) in these environments. WLICs would be designed with a maximum length of 160 ft (49 m; threshold)/150 ft (46 m; objective) and would be driven by two diesel propulsion engines. The WLIC would have the ability to sustain speeds of 11.0 knots (12.7 miles per hour [mph]) in deep waters and 8 knots (9 mph) in shallow waters, and have an endurance of 11 days. The WLIC would also have the capability to launch 21 ft (6.4 m) cutter small boats, with typical speeds ranging from 15–20 knots (17–23 mph).

In addition to the crane described in Section 2.2.1, WLICs would also be equipped with impact and vibratory pile driving[10] / extraction equipment (e.g., diesel-powered or hydraulic impact pile driving hammer and vibrating pile extractor / driver hammer; Section 2.2.2.6), and spuds (Section 2.2.2.4). These vessels would have the ability to carry up to 32 piles that are 60 ft (18 m) long and 18 inches ([in]; 46 centimeters [cm]) in diameter for a total cargo weight of up to 100,000 pounds (45,359 kg). WLICs would have the capability to self-load piles or ATON from a pier; place or lift a pile or ATON into and out of the water; secure the pile and its associated navigational signal equipment or ATON; and lift a manned basket with the crane, while spudded-down. These vessels would also have the capability to install a 50 ft (15 m) metal tower on top of a platform that rises 17 ft (5 m) above the waterline. Metal towers are currently used for ATON and serviced by the existing inland fleet. Similar to the existing

[9] As described in Section 1.3.1, the Coast Guard anticipates that supplemental NEPA documentation would be prepared in support of individual proposed homeporting, maintenance, and decommissioning.

[10] The WLIC would be capable of operating a vibratory hammer; however, the vibratory hammer would not a permanent installation on the vessel (e.g., it would likely be leased on an as needed basis for pile installation).

construction tenders, the WLIC would build a wooden platform and place the tower on top of that platform.

2.2.1.2 WCC River Buoy Class Tenders—WLR

The Proposed Action would include the operation, maintenance, and decommissioning[11] of up to 16 WLRs to replace the capabilities of the existing river buoy tenders. WLRs would service 12,000–15,000 ATON in pooled waters or open flowing rivers in the GoMEX and Mississippi River proposed action area (Section 2.1.4), which overlaps the Coast Guard's Eighth and Ninth Districts.

The WLRs would be designed with a maximum length of 180 ft (55 m; threshold)/ 170 ft (52 m; objective) and driven by two diesel propulsion engines. The WLRs, like the WLICs (Section 2.2.1.1), would establish, maintain, and discontinue floating ATON and fixed ATON structures that are located in 4 ft (1 m) of water up to 20 ft (6 m) from water (≥5 ft [1 m] depth) and without the keel touching the riverbed or seafloor. TheWLRs would have the ability to sustain speeds of 11.0 knots (12.7 mph) in deep waters and 8 knots (9 mph) in shallow waters, and have an endurance of 11 days. The WLR would also have the capability to launch 21 ft (6.4 m) cutter small boats, with typical speeds ranging from 15–20 knots (17–23 mph).

In addition to the crane described in Section 2.2.1, WLRs would carry sinkers and buoys. These vessels would also have the capability to self-load from a pier, secure a buoy and its associated equipment on the working deck, and also place and lift a buoy (and its associated equipment) while underway. The WLRs would have capability to deploy and retrieve buoy mooring equipment from the seabed/riverbed using a water jet system (Section 2.2.2.1.1.1), including jet cone mooring deployment and other mooring equipment. The WLR would also be equipped to move buoys, and move and recover sinkers, chain, wire rope, synthetic rope, and other materials without the crane (e.g., using cross decks, winches, and chain stoppers).

2.2.1.3 WCC Inland Buoy Class Tenders—WLI

The Proposed Action would include the operation, maintenance, and decommissioning[9] of up to three WLIs to replace the capabilities of the existing inland buoy tenders. The WLI would service ATON in inland waters in the PNW (Section 2.1.5) and Great Lakes (Section 2.1.3) proposed action areas and in waters close to shore in the SEAK (Section 2.1.6) proposed action area, which overlap Coast Guard Districts Nine, Thirteen, and Seventeen, respectively. WLIs would be designed with a maximum length of 120 ft (37 m; threshold)/ 100 ft (30 m; objective) and driven by two diesel propulsion engines and bow thrusters. These vessels would have the ability to sustain speeds of 11.0 knots (12.7 mph), and have an endurance of 7 days. WLIs would not be equipped with cutter small boats.

In addition to the crane described in Section 2.2.1, the WLI would also have the capability to self-load from a pier, secure a buoy and its associated equipment on the working deck, and also place and lift a buoy (and its associated equipment) while underway. The WLI would also be equipped with a handling chain, wire rope, and synthetic rope for deploying and retrieving buoy moorings over the side of the vessel (e.g., cross decks, winches, chain stoppers). The WLI would not be equipped with spuds (Section 2.2.2.4) to hold station. Therefore, bow thrusters would be used for this purpose on these vessels.

[11] As described in Section 1.3.1, the Coast Guard anticipates that supplemental NEPA documentation would be prepared in support of individual proposed homeporting, maintenance, and decommissioning.

Table 2-1. WCC Key Performance Parameters

Criterion		***WLR***	***WLIC***	***WLI***
Access	***Length (maximum)***	180 ft	160 ft	120 ft
	Draft	≤ 5 ft 6 in		
	Maneuverability	Ability to approach, establish, discontinue, and maintain floating ATON and fixed ATON structures that are located 4 ft of water up to 20 ft from "good water" (≥ 5 ft depth) without the keel touching the riverbed or seafloor.		
Speed		Open water – Threshold: 11 knots		
Endurance		Threshold: 11 days		Threshold: 7 days
Berthing		Threshold: 16 Objective: 19		Threshold: 14 Objective: 16
Mission Execution		Up to USCG 4 NR buoy	Up to 60 ft pile	Up to USCG 1992-type 6x20 LR buoy

2.2.1.4 Vessel Operations

2.2.1.4.1 Functionality and Maneuverability Testing

Functionality and maneuverability testing for a WCC would be similar to the testing conducted for the existing inland tender fleet. Scheduled maintenance would likely occur within close proximity to the WCC's homeport. The exact locations of all the homeports for all WCCs are not known at this time.

For each WCC, a major dry dock maintenance event would occur approximately every 4 years, and a major dockside maintenance event would occur approximately every 4 years. A propulsion test would likely occur after these events and involve running the WCC at speeds of up to 11 knots (12.7 mph) to execute various maneuvers (i.e., tactical turns, zigzags, deceleration).

2.2.1.4.2 Vessel Towing

All WCCs would have the ability to tow one vessel (of equivalent displacement) in either a side tow or an astern tow. Each WCC would also have the capability to be towed by the bow, pushed ahead from the stern, and towed alongside from either port or starboard. However, the WCC towing another vessel would not occur frequently and is not a primary mission requirement. Vessels would be towed according to specifications in the Cutter Towing Operations Tactics, Techniques, and Procedures manual (U.S. Coast Guard 2017b). Personnel would follow safety precautions covered in the CGTTP manual (and other applicable publications) whenever conducting vessel towing operations. Cutter small boats would also be capable of towing a similar sized vessel and of being towed.

2.2.2 WCC Operations, Mission Support, and Training

Since the mid-1940s, the Coast Guard has carried out the inland ATON mission, a key role in the Coast Guard's support of the U.S. Marine Transportation System. The proposed WCCs would be expected to support the Coast Guard's ATON mission in federal inland waterways, similar to the Coast Guard's existing inland tender fleet. The WCCs would play a vital role performing the ATON mission, which directs the traffic of the nation's Marine Transportation System and supports the U.S. economy by enabling the efficient flow of goods nationwide. The WCCs would perform identical missions as those of the existing inland tender fleet, which is responsible for maintaining more than 28,200 marine aids throughout 12,000 mi (19,312 km) of inland waterways that are responsible for moving 630 million tons of cargo annually. WCC deployment schedules would be based on WLIC, WLR, and WLI operations in support of the ATON mission. This would include constructing, establishing, repairing, maintaining, setting, relocating, and recovering fixed ATON, lights, and day beacons in the proposed action areas. Although not a primary responsibility, the WCCs may also carry out secondary missions when situations require. These secondary missions include SAR; ports, waterways and coastal security; marine safety; and marine environmental protection. While emergency response is not a part of the Proposed Action, WCCs would support Coast Guard emergency response missions within the proposed action areas when needs present. Therefore, WCC emergency response training 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 WCC.

The proposed WCCs would service ATON in pooled waters, open flowing rivers, and the ICW. ATON service would require transit between each vessel's homeport and the ATON service areas (which are within the same operational footprint of the existing inland tender fleet's operational footprint). No activities outside the normal scope of operating an underway vessel would occur during transit from a point of origin (e.g., the homeport) to an operational destination. Typical port-of-call would include docking to pick up crew, refueling, and resupplying the vessel. When a WCC is in transit to and from a homeport, the vessel would abide by regulations affecting transiting vessels, which may be different in each port.

The proposed WCCs would service floating, fixed, and shoreside ATON; however, the WCCs may not be able to access all aids in the proposed action areas. Cutter small boats may be up to 21 ft (6.4 m) in length and travel at speeds up to 30 knots (34.5 mph). However, general operation of the cutter small boat would be at significantly slower speeds (average of 10 knots). They would each be equipped with a depth sounder for navigational purposes. Cutter small boats would provide access to an ATON, such as a shoreside ATON, that may not be easily approached by the WCC. Cutter small boats would give the Coast Guard the capability to respond more quickly and transport equipment more easily in situations where there would be limited WCC access. The cutter small boat would also transport up to six servicing personnel and the appropriate equipment to these locations. Cutter small boats would also be used in wreckage recovery (Section 2.2.2.5) to tow buoys that are either free-floating, grounded, or still attached to a mooring. These small boats would tow buoys at speeds of less than 8 knots to an area accessible by the WCC where the WCC could re-float the buoy, if necessary. Cutter small boats would also assist in wire sweeping operations associated with wreckage recovery (Section 2.2.2.5) when there is a damaged or destroyed ATON. Cutter small boats would also be capable of towing another vessel of similar size and of being towed by a vessel.

Table 2-2 provides a summary of activities associated with the Proposed Action and the proposed action areas where those activities are expected to occur. Activities may involve the WLIC, WLR, WLI, and/or cutter small boats. The activities listed in Table 2-2 are not expected to occur during transit. Sections 2.2.2.1 through 2.2.2.6 provide further details for each activity performed by the WCCs and any associated cutter small boat.

Table 2-2. Summary of Waterways Commerce Cutter Proposed Action Activities and Corresponding Proposed Action Area

<table>
<tr><th rowspan="2">Proposed Action Activities</th><th colspan="3">Class of Cutter (and Proposed Action Area Serviced)</th><th rowspan="2">Described in Section</th></tr>
<tr><th>WLR (GoMEX and Mississippi River)</th><th>WLI (Great Lakes, PNW, and SEAK)</th><th>WLIC (USEC-MidATL, USEC-South, and GoMEX and Mississippi River)</th></tr>
<tr><td>Anchoring</td><td>x</td><td>x</td><td>x</td><td>Section 2.2.2.3</td></tr>
<tr><td>Spudding</td><td>x</td><td></td><td>x</td><td>Section 2.2.2.4</td></tr>
<tr><td>Wreckage Recovery (Methods listed below)</td><td colspan="3"></td><td rowspan="5">Section 2.2.2.5</td></tr>
<tr><td>Use of cutter boat</td><td>x</td><td></td><td>x</td></tr>
<tr><td>Grapnel hook</td><td></td><td>x</td><td></td></tr>
<tr><td>Wire sweeping</td><td></td><td></td><td>x</td></tr>
<tr><td>Pile extraction</td><td></td><td></td><td>x</td></tr>
<tr><td>Towing</td><td>x</td><td>x</td><td>x</td><td>Section 2.2.1.4.2</td></tr>
<tr><td>Floating ATON Establishment (Methods listed below)</td><td colspan="3"></td><td rowspan="4">Section 2.2.2.1.1.1</td></tr>
<tr><td>Use of dump boards</td><td>x</td><td></td><td></td></tr>
<tr><td>Use of a jet pipe</td><td>x</td><td></td><td></td></tr>
<tr><td>Use of crane and winches</td><td></td><td>x</td><td>x*</td></tr>
<tr><td>Fixed ATON Establishment (Methods listed below)</td><td colspan="4"></td></tr>
<tr><td>Shore structure construction</td><td>x</td><td></td><td></td><td>Section 2.2.2.1.1.2</td></tr>
<tr><td>Pile driving</td><td></td><td></td><td>x</td><td>Section 2.2.2.6</td></tr>
<tr><td>ATON Maintenance (service, inspection, repair, and replacement as needed)</td><td colspan="3"></td><td rowspan="2">Section 2.2.2.1.2</td></tr>
<tr><td>Repositioning of floating ATON</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td>Brushing</td><td>x</td><td>x</td><td>x</td><td>Section 2.2.2.2</td></tr>
<tr><td>Fixed ATON repairs</td><td></td><td></td><td>x</td><td>Section 2.2.2.1.2</td></tr>
<tr><td>Floating ATON Discontinuance</td><td>x</td><td>x</td><td>x*</td><td>Section 2.2.2.1.4</td></tr>
<tr><td>Fixed ATON Discontinuance</td><td></td><td></td><td>x</td><td>Section 2.2.2.6.2</td></tr>
</table>

*Non-standard is defined as having the capability, but rarely occurring and not considered standard operations for that vessel class.

2.2.2.1 Aids to Navigation

WCC support of ATON activities is considered part of the Proposed Action[12]. The primary components of the U.S. ATON System are beacons and buoys. In general, Coast Guard ATON are established to mark channels and other areas of "safe water" or water that is considered safe for navigation. The Coast Guard also establishes ATON at the request of other federal agencies to mark designated anchorage, quarantine, danger, restricted, and prohibited areas (U.S. Coast Guard 2005). Additionally, the Coast Guard may establish ATON to mark marine parades and regattas regulated by the Coast Guard under 33 CFR 100; channel approaches and restricted areas caused by tunnel or bridge construction; hazards to navigation, wrecks, and obstructions; or, in the Great Lakes proposed action area, pier heads belonging to the United States; amongst other hazards (U.S. Coast Guard 2005). The Coast Guard also establishes and maintains lighted and unlighted buoys and lighted and unlighted fixed ATON such as day beacons and lights, ranges, and lighthouses.

ATON are placed on shore or in waterways to assist a navigator in determining their position or safe course. Fixed ATON may be on the natural shoreline or on riprap (rock or stone rubble pieces ranging in size from 4 in [10 cm] to 2 ft [0.6 m]). Riprap absorbs wave energy to trap and slow the flow of water, thereby reducing erosion of the fixed ATON site. ATON may mark limits of navigable channels or warn of dangers or obstructions to navigation. The ATON activities performed by the WCCs would fall into three main categories: construction and maintenance of fixed ATON (both in water and ashore); positioning and maintenance of floating ATON; and repositioning, placement, or removal of river ATON based on changes in water level and river conditions. Table 2-3 provides the Coast Guard District; WCC proposed action area; corresponding number of floating ATON, fixed ATON in water, and fixed ATON on land with location (i.e., ashore or on riprap); and whether fixed ATON are lighted or unlighted.

Table 2-3. Number of Floating and Fixed ATON

Coast Guard District	*Proposed Action Area*	*Floating ATON (Buoys)*	*Fixed ATON (in Water)*	*Fixed ATON (on Land)*			
				Ashore		*Riprap*	
				Lighted	*Unlighted*	*Lighted*	*Unlighted*
5	USEC-MidATL	2,214	4,635	149	24	8	1
7	USEC-South	982	5,313	132	52	2	-
8	GoMEX and Mississippi River	1,154	3,670	322	85	1	-
8 (Western Rivers)	GoMEX and Mississippi River	>10,000[a]	3,290[b]	1,147	1,474	23	10
9	Great Lakes	1,720	847	442	22	34	-
13	PNW	502	1,205	449	42	16	1
17	SEAK	399	918	523	126	6	1
Total		10,715[c]	20,997	3,634	1,872	114	19

[a] Buoys in the IW&WR are placed as needed to mark the 9-ft (2.7-m) contour line.
[b] IW&WR portion of District 8
[c] Total excluding IW&WR

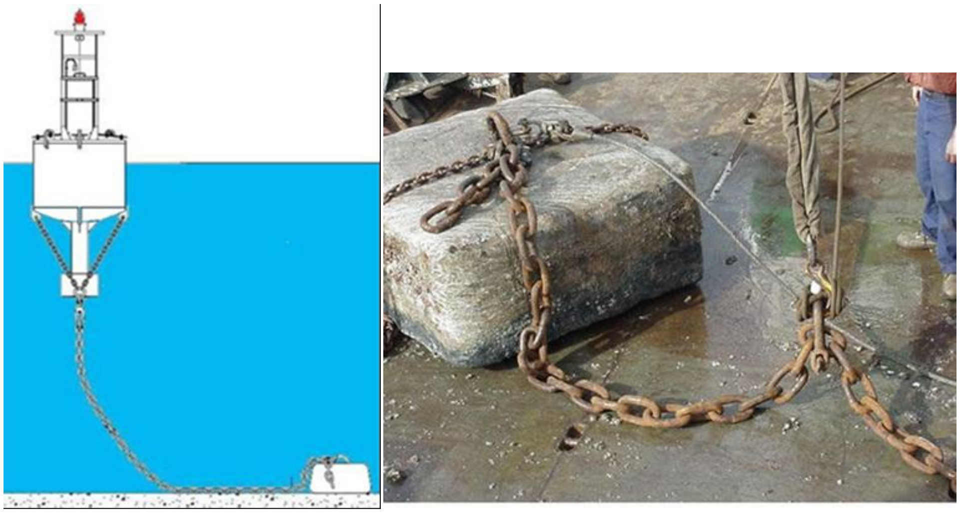
[12] The Coast Guard completed an ESA Section 7 and Essential Fish Habitat consultation with NMFS on U.S. Coast Guard Federal Aids to Navigation Program, finalized on April 19, 2018. Any information provided in this PEIS includes WCC support of ATONs, only as it pertains to the Proposed Action.

2.2.2.1.1 Types of ATON

2.2.2.1.1.1 Buoys (Floating ATON)

Floating ATON are buoys of various shapes and sizes made of steel, foam, or plastic. Some buoys have attached lights or sound signals such as bells, whistles, and gongs. Others have a radio detection and ranging (radar) beacon (RACON) attached to make the buoy more distinguishable on a vessel's radar. In pooled water, the WCC River Buoy tender, similar to the WLR, would set buoys using sinkers with wire or chain moorings. Buoys and sinkers (Figure 2-10) would be set using pry bars (to assist in tilting the buoy off the deck or overboard) or dump boards. A dump board is a deck-mounted device that when tilted, allows the buoy and sinker to slide off the dump board and into the water (Figure 2-11).

A



B

Figure 2-10. Diagram of a Buoy and Sinker (A) and a Concrete Sinker and Chain (B)

Figure 2-11. Deployment of an ATON from a Dump Board (Aboard a WLR)

In fast water (e.g., the Mississippi River downstream from St. Louis and the Missouri River), water levels fluctuate more often, requiring continuous establishment of new ATON or the repositioning of implemented ATON. Buoys would be set using sinkers with a wire rope, similar to the deployment procedures described above for pooled water; however, different methods could be required to set the ATON. For example, on the Missouri River in areas with a soft bottom, buoys are set using a jet pipe (Figure 2-12). When setting buoys using a jet pipe, the position of the buoy would be determined and then the spud would be set to temporarily hold the vessel in place (Section 2.2.2.4). A jet pipe is a device that uses water pressure to force a mooring into the bottom to hold the buoy on station. The jet cone would be attached to the wire rope, then placed over the end of the jet pipe, and lowered to the bottom of the water column. Once the jet pump is engaged, the water pressure forces the jet cone into the soft bottom burying it. The wire rope mooring would be cleared from any obstructions on deck and the buoy would be pushed overboard. In areas with a rock bottom, the buoys would be set using sinkers.

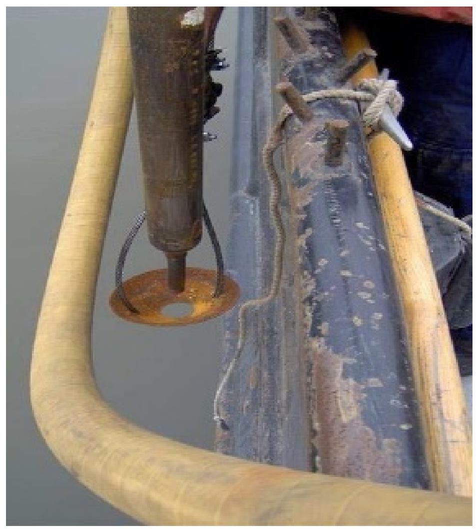


Figure 2-12. Jet Pipe Deployed Over the Side of a Vessel

ATON hardware currently used by WLRs (e.g., the sixth class and fourth class buoys) are different from the hardware used by the rest of the existing inland tender fleet. Most sixth class river buoys are attached to 1,000–1,500 pound (454–680 kg) sinkers or jet cones using 1/2 in (12.7 millimeters [mm]) or 3/8 in (9.5 mm) wire rope and wire rope clips. Buoys may be set using wire rope or chain and a sinker. When setting buoys using wire rope and a sinker, the sinker would be positioned at the deck's edge or on the dump board (Figure 2-11) with the standard mooring attached and the wire coiled clockwise and placed on the sinker. Once set over the side of the vessel, the coil could be dropped or the wire could be streamed. Streaming the wire would allow the wire to pay out on its own by the downward force of the sinker going to the river bottom. When in position, the sinker would be set and the buoy would be pushed overboard. When setting buoys using chain and a sinker, the sinker would be positioned at the deck edge or on the dump board. The chain would be faked (wound to make a complete circle of chain, line, or wire), coiled (several tiers of flaked chain, line, or wire superimposed on each other), or flemished (chain, line, or wire coiled in concentric circles, closely pressed together) on top of the sinker or on the deck. The sinker would be set first, followed by the buoy.

The WLI would establish, operate, and maintain 600 buoys within the USEC-MidATL, Great Lakes, PNW, and SEAK proposed action areas. Similar to the existing inland bouy tender, the WLI would establish a floating ATON by attaching a mooring chain to the sinker and the buoy and hanging it over the side of the vessel (i.e., over the water). On the existing inland buoy tender, the crane hoist is hooked into the mooring chain to lift the sinker overboard and into the water, while loading the chain into the chain stopper to prevent chain slippage. The mooring is then attached to the buoy and the buoy is hoisted and set into the water. The evolution for a WLI to establish a floating ATON would be similar to that of the existing inland buoy tender. Unlike the other WCCs, it would not be a standard duty for the WLIC to establish a floating ATON. This would only occur occasionally.

2.2.2.1.1.2 Beacons (Fixed Structures)

In general, ATON beacons (or fixed structures) support visual and audible signal equipment (Section 2.2.4) in a fixed location and at a design elevation, which establishes the geographical range of the aid. Structures are built in a variety of configurations because of the unique geological and environmental conditions at a given location, as well as the specific type of signal required. They can range from simple and inexpensive daybeacons to complex and costly offshore lights.

Due to the lack of a pile driver, the existing river buoy tender build fixed ATONs on shore structures, not in the water. These structures are typically built using metal towers (e.g., Triangle or Rohn), which are three-legged, cross braced, metal towers. The towers, which are fixed to a concrete foundation and supported by guy wires, provide an efficient and economical means to support ATON signal equipment on land. The WLR would follow the same protocol as the existing river buoy tender for establishing fixed ATON since it would also not have pile driving capabilities. Construction of fixed ATON would be the primary responsibility for the WLIC (Section 2.2.1.1); they would be the only WCC with pile driving capabilities (Section 2.2.2.6).

2.2.2.1.2 Maintenance

Coast Guard maintenance of federal ATON refers to servicing activities including, but not limited to: inspecting and replacing ATON chains, sinkers, buoys, dayboards, ladders, platforms, and piles; repairing lighting equipment, power systems (batteries and solar panels), and sound signals; responding to and repairing ATON discrepancies; and conducting repairs to any structures. Any touch-up painting of ATON would be done on the deck of the WCC. Paint would cure before the ATON would be placed back into the water. No painting would occur over or in the water.

Based on the existing inland tender fleet's activities, a single maintenance service event would last less than an hour. The most time-intensive maintenance activity would be the replacement of pilings, which could take up to one hour for a single pile, eight hours for a multi-pile wood platform, or 16 hours for a steel platform. Maintenance work is typically conducted during daylight hours. ATON would also be serviced if a discrepancy has been reported. A discrepancy is the failure of an ATON to provide the advertised light, sound signal, appearance, or position as described in the Light List (U.S. Coast Guard 2021) or on navigation charts. Discrepancies include loss of buoyancy (for floating ATON), loss of dayboard (for fixed ATON), movement from an assigned position, fouling with debris, extinguished lights, discharged batteries, or other issues. The incidence of discrepancies would vary seasonally and across all proposed action areas.

Due to the dynamic nature of the IW&WR and the variability of water levels, floating ATON could be repositioned in order to maintain a safe and navigable channel. When buoys need to be repositioned a short distance from their current location, a WLR (similar to the existing river buoy tenders) would drag the buoy, rather than completely recovering it and redeploying it. A boat hook would be used to snag the chain and run it through the chain stopper. The WCC would then begin to pull away from the original position in order to release the sinker from the bottom. Once free from the bottom, the WCC would drag the buoy and mooring to the desired location and reset it. This would typically occur on mud-bottomed rivers and would not occur over sensitive rocky substrate or coral. If the buoy were to require repositioning and is fixed to the bottom with a jet cone mooring, the jet cone mooring may not be recovered from the riverbed. The WLR would also be required to recover any stray, stranded, or scrap buoys. Currently, river buoy tenders are used for this task, typically with a barge. The Proposed Action would not include the use of barges; therefore, all activities described above would involve only a WCC and/or cutter small boat.

As water levels fluctuate and bottom contours change, a floating ATON could need repositioning to accurately delineate safe and navigable channels. The WLI (similar to the existing inland buoy tenders) would be specifically assigned to areas that would not be easily accessible by other Coast Guard platforms, such as those areas in shallow waters. Often, if maintenance of an ATON and establishment of a different floating ATON were necessary in adjacent areas, these activities would occur at the same time, due to the limited opportunity to access shallow waters and to limit the number of trips.

The existing inland buoy tenders are the smallest ATON cutters and lack cutter small boats; thus, fixed ATON maintenance is not currently considered a standard vessel operation. The proposed WLI (designed to replace the capabilities of the existing inland buoy tenders) could facilitate fixed ATON maintenance, but this would not be considered a standard vessel operation.

The proposed WLIC would primarily construct and repair fixed ATON structures (similar to the existing construction tenders) and occasionally perform buoy maintenance. Under current operations, construction tenders spud down to secure location (Section 2.2.2.4), then hook and hoist the buoy, setting the chain into the chain stopper. This allows the buoy to be lowered on deck and secured in order to be serviced. If the sinker also needs to be recovered, it can be hoisted via the crane and placed on deck.

2.2.2.1.3 Discontinuance of ATON

Discontinuance is the removal of an aid permanently (as opposed to temporarily for maintenance). Coast Guard policy and procedures dictate (U.S. Coast Guard 2016) that an aid be discontinued when the underlying conditions that warranted its establishment no longer exist. For example, an aid that once marked a safe channel would be discontinued if the channel were filled in and no longer navigable. When necessary, any WCC could support the discontinuance of ATON in any of the proposed action areas.

2.2.2.1.4 Discontinuing and Recovering Floating ATON

The methods for discontinuing and recovering floating ATON secured with a traditional sinker would be similar for all WCCs. The buoy would be hooked on to the crane and hoisted aboard, setting the chain in the chain stopper to secure the sinker and allow for disconnection of the chain from the buoy. Once the buoy is secure on deck, the crane would haul up the rest of the mooring chain and the sinker. A WCC may need to spud down (Section 2.2.2.4) before using the crane to hoist the buoy, but this would be determined on a case-by-case basis.

Recovering floating ATON that have been established with a jet cone mooring require a different approach as compared to traditional ATON removal. In this case, the WCC would be positioned so that the buoy is next to the vessel's open buoy port where a lasso or hook would be secured to the buoy. The

WCC's capstan would reel in the lasso or hook, bringing the buoy aboard to unshackle the mooring. The wire mooring would wind around the capstan until the jet cone breaks free of the bottom. In most cases, the jet cone mooring would not be recovered due its strong hold in the riverbed. If necessary, the wire mooring would be cut using bolt cutters, a saw, or an oxyacetylene torch and then left behind. Pile extraction could also be required for discontinuing an ATON. Section 2.2.2.6 describes the methods for pile extraction for common pile materials.

2.2.2.2 Brushing

Brushing is defined as the clearing of vegetation that obscures or endangers a beacon and reduces the operational range of an ATON. To ensure visibility, WCCs would deploy crews to manually clear any vegetation obscuring or endangering ATON structures. Crews would conduct surveys prior to arrival, as well as once on site, to verify what kinds of vegetation may be expected, determine what equipment is needed, determine a landing site, and verify land ownership. Potential equipment that could be used includes chainsaws, pole saws, hand tools, pesticides, and herbicides[13]. Once a brushing operation is complete, the site would be left in a similar condition as when the crew arrived. Leaving the brush as it lies after clearing may be appropriate; however, complete removal of cleared brush may be necessary depending on the location.

ATON brushing operations fall under the Categorical Exclusion (CATEX L38) for ATON operations (U.S. Coast Guard 2019a). This CATEX applies to "actions performed as a part of Coast Guard operations and the aids to navigation program to carry out statutory authority in the area of establishment of floating and minor fixed aids to navigation, except electronic sound signals."

ATON brushing operations fall within the CATEX for ATON operations (U.S. Coast Guard 2019a); however, common situations that might preclude the use of the CATEX for brushing operations include:

- The presence of endangered or threatened species impacted by brushing.
- The use of pesticides in the vicinity of a waterway.
- The clearing of vegetation in national park land or similar protected areas.

As such, brushing operations are analyzed in this PEIS. It should be noted that pesticides used in brushing operations are approved by the Armed Forces Pest Management Board (AFPMB) and are registered with the EPA (AFPMB 2021; EPA 2021a). The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA; Appendix A) requires all pesticides sold or distributed by the United States to be registered by the EPA. Before a product can be registered with the EPA, the agency completes a risk assessment that evaluates the potential for that chemical (or mixture of chemicals) to harm humans, wildlife, fish, and plants, including endangered species and non-target organisms, as well as the potential for contamination of surface water or ground water from leaching, runoff, and spray drift (EPA 2021a).

2.2.2.3 Anchoring

The WCC's anchor would likely be made of steel or aluminum. All WCCs would have the ability to anchor in water that is at least five times the vessel's draft; however, anchoring would typically occur in water

[13] Coast Guard personnel may need to obtain a license or certification by the state in which they are applying the pesticide, which includes herbicides, insecticides, fungicides and other products intended to prevent, destroy, repel or mitigate a pest and substances intended for use as a plant regulator, defoliant or desiccant. States provide their general pesticide licensing and certification requirements for pesticide applicators online.

depths of 15–25 ft (5–8 m). Berthing would occur along public (state or city-owned) or military docks and piers; therefore, anchoring would not be expected in these locations.

Maneuverability of the cutters in heavy winds and currents can prove to be difficult, especially when attempting to establish or service an ATON. Occasionally, WCCs would dredge their anchor in order to maneuver to an ATON or desired location. Commonly referred to as the "Poor Man's Tug," the technique of dredging an anchor is highly effective for maneuvering with a smaller turn radius in challenging winds and currents. The WCC may dredge an anchor to mitigate the loss (or absence) of thrusters (e.g., available only on the WLI), as the anchor provides a constant force to drive against and increases the effectiveness of the rudder.

Kedging the anchor to service a buoy is the basic technique of allowing the cutter to "weather vane" or shift in response to the prevailing conditions while on the anchor, and then walk the anchor chain out. This would allow the WCC to set astern in order to position the buoy to the port side. By using the rudder, kedging would allow the WCC to use the prevailing wind or current to its advantage while using minimal effort to counteract the force.

Dredging or kedging the WCC's anchor would occur in areas where the bottom type allows for effective vessel maneuverability using the anchor. Bottom types of shell, clay, mud, and sand are ideal for dredging and kedging, whereas rocky or other angular type bottoms would prove difficult and would be unlikely to occur. Prior to dredging or kedging, paper or electronic charts and the U.S. Coast Pilot (NOAA 2021) would be reviewed to avoid any submarine cables, pipelines, and other obstructions.

2.2.2.4 Spudding

Spuds are steel beams that are lowered on wire through the hull of the vessel by winches. Spuds embed in the riverbed or seabed to temporarily hold the vessel in place. Both the WLIC and WLR would be able to deploy spuds and maintain station in water depths of 5.5–20 ft (1.7–6.0 m), a water speed of 2.5 knots (2.9 mph) without the risk of spuds bending, and wind speeds of 20 knots (23 mph) from any direction. Because spuds would be susceptible to damage in certain conditions, for example from wakes created by high vessel traffic, high wind, waves, or other environmental conditions, they would not be deployed in dangerous conditions. The WLI would not be equipped with spuds.

Similar to anchoring, spudding would only occur in soft bottom types such as mud, sand, or clay, and would avoid areas of hard rock and coral. The WLR and WLIC would each have four spuds of 50 ft (15 m) and 27 ft (8.2 m) in length. In addition to holding the vessel in place, spuds could also be used for general maneuvering and mooring. Using the spuds in combination with the engine and rudder, the pivot point of the WCC could be moved forward or aft. This technique is known as "walking the cutter" and is especially useful when approaching an ATON or for precise maneuvering.

2.2.2.5 Wreckage Recovery

The Proposed Action would require all WCCs to recover stray, stranded, and scrap buoys. Similar to the wreckage recovery method of the existing inland tenders, the WLI would drag a grapnel hook along the bottom, moving slowly upstream and working diagonally across the search area in order to snag a submerged buoy to recover the buoy and sinker. Sunken buoys and moorings typically lay parallel to the current, allowing this search method to increase the probability of recovery. Buoys that have washed ashore would also be recovered by the WLI. In this instance, a shore party would disembark to assess the condition of the buoy. If the buoy structure were deemed sound, the buoy would be disconnected from its mooring then rigged and towed to a safe area for recovery. ATON wreckage would be repaired, recycled, or disposed of in accordance with Coast Guard SOPs (Appendix B).

If a fixed ATON were knocked down or destroyed, a WLIC would rebuild the ATON and help recover any wreckage. Similar to the existing construction tenders, the WLIC would sweep the area with a wire in order to determine if any hazards exist below the water and if any portion of the old structure exists above the mud line. This wire sweeping method is most effective when there are minimal bottom obstructions and is less effective in areas where the wire rope sweep may encounter snags (e.g., deadheads, tree stumps, rocks, debris). The most effective method of wire sweeping would be to spud down with the ATON's assigned position forward of the bow. The WLIC would then deploy a cutter small boat (Section 2.2.2) with a length of wire rope or weighted line. With the bitter end (i.e., the last part of the wire or chain) attached to the WLIC, the cutter small boat would then sweep an arc of 180 degrees forward of the WCC from bow to bow. Any wreckage would then be removed. If there were two cutter small boats available, then a wire cable or chain would be strung between the two boats and dragged along the bottom to locate the wreckage. In either situation, after locating the wreckage, the cutter small boat crew would establish a temporary marker or buoy to alert the WCC to the location of the wreckage that requires retrieval.

If a pile were knocked down or broken, a WLIC would extract it. Wooden piles typically break at or below the mud line when knocked down, making recovery much easier. A wire sling could be wrapped around the broken pile to hoist the pile on deck. If the pile would need to be intentionally broken, the pile would be brought in contact with the bow of the WCC and pushed against until it breaks. The primary method to extract a steel pile would be to wrap a chain or strap around the pile, connect the chain or strap to the crane on the WCC, and pull the pile straight up and out of the ground. Alternate methods for extraction include use of a vibratory pile driver (Section 2.2.2.6.2) to loosen the suction, a jet pipe to force water next to the pile, or a vibratory extractor to disturb and loosen the soil around the pile. If these methods were to prove unsuccessful, commercial divers would potentially need to remove the wreckage by cutting off the pile at the mud line.

2.2.2.6 Pile Driving

Pile driving activities would only be conducted by the WLIC and could occur in any area within the following proposed action areas where the WLIC operates: USEC-MidATL, USEC-South, GoMEX and Mississippi River proposed action areas, but operational areas are subject to depth of water and tidal fluctuations. As shown in Table 2-3, fixed ATON in water also occur in the Great Lakes, PNW, and SEAK proposed action areas. In these areas, if pile driving were required, Coast Guard would utilize a contractor vessel for support, no WLIC with these capabilities would be expected to operate in these proposed action areas. There are fewer fixed ATON in in the Great Lakes, PNW, and SEAK proposed action areas when compared to other areas, so pile driving in these areas would be required less frequently. In general, ATON replacement occurs less frequently than routine inspection, with inspection frequency ranging from every six months to every five years. Although the Coast Guard does not keep centralized records of exactly where ATON are replaced and where piles are driven, District offices maintain appropriate records. The total number of piles used in each Coast Guard District and corresponding proposed action area (Table 2-4) represents the relative extent of pile replacement conducted by the existing inland tender fleet. It is expected that the WLIC would conduct similar pile replacement.

The existing construction tenders are equipped only with impact hammers. The WLIC would be equipped with an impact hammer with space available for a vibratory hammer attachment. Vibratory hammers may be purchased by the Coast Guard and kept readily available on the vessel or rented as needed.

Table 2-4. Incidence of Pile Driving in the Proposed Action Areas

Proposed Action Area	*Coast Guard District*	*Annual Number of Structures (Driven Piles)*	*Average Annual Number of Wood Piles*	*Average Annual Steel Piles*	*Percentage of Piles Contracted*	*Percentage of Piles Driven by Vibratory Hammer*
USEC-MidATL	5	170	105	85	0%	40%
USEC-South	7	410	420	100	0%	10%
USEC-South GoMEX	8	1,076	1,447	0	0%	1%
Great Lakes	9	6	0	6	100%	-
PNW	13	30	0	30	100%	-
SEAK	17	1	0	1	100%	-
Total		1,693	1,972	222	N/A	

2.2.2.6.1 Impact Hammer

Existing construction tenders are equipped with a diesel-powered pile driving hammer, a Delmag model D-6 or the Pileco D6-42. It would be anticipated that the WLIC would have a similar impact pile driving hammer and use either the impact hammer or vibratory hammer based upon the conditions present. Impact hammers are single cylinder diesel engines that deliver their primary downward force on the pile when the piston fires. These impact hammers are very effective for driving wood and steel piles into most bottom types.

The WLIC would generally be limited to driving piles in water depths of less than 20 ft (6 m). In water depths greater than 20 ft (6 m), the spuds would be fully extended and could not achieve adequate bottom penetration to keep the WCC in place and stable during pile driving activities.

Using its multiple hoists, the WLIC would attach the hammer of the pile driver to the pile and lift it into position. Once the pile is plumb against the bottom and in a vertical position, the piston would be engaged and pile driving would begin. When the pile is firmly seated in the bottom, the hoists would be removed. Occasionally, if the pile is positioned properly, but the correct height is not reached, the top of the pile would be cut (using a chainsaw for wood and an oxy-acetylene torch for steel). Jetting, the use of pressurized water to displace sediment, is also useful in assisting the driving of piles with standard pile driving equipment in hard bottom conditions and is especially effective in sand and gravel bottoms. The jetting water should be delivered to the pile point in sufficient volume and pressure to wash away the soil from under the point and to reduce the friction of the soil around the pile body. After the pile has reached its desired penetration and the jetting stopped, the soil would settle naturally around the pile to retain the pile in position.

2.2.2.6.2 Vibratory Hammer or Extractor

In addition to the impact hammer, a vibrating pile extractor/hammer could be used to install or extract piles. This type of pile extractor/hammer works by using spinning counter-weights to create vibration to the pile, which allows it to shear the soil-to-pile adhesion causing the soil particles to lose their frictional grip and allow the pile to move downward under the combined weight of the driver and pile. If pile driving were necessary in hard bottom, an impact hammer would be used (Section 2.2.2.6.1), since vibratory hammers do not work in these bottom types.

Different methods exist for pile extraction depending on the pile material. The methods discussed in Section 2.2.2.5, however, may be insufficient to remove the pile from the sediment. A few downward blows from the pile driver could loosen the suction against the pile so that it could be moved from side to side then be hoisted free of the bottom. If available, a vibratory pile driver/extractor could also be used to extract a steel pile. This process would vibrate the pile and disturb the soil next to the pile, causing the soil particles to lose their frictional grip on the pile. Once clamped to the pile and vibrating, the main purchase on the vibratory hammer could pull the pile out of the bottom sediment and hoist it on deck.

2.2.3 Training

The Coast Guard conducts reoccurring crew training to ensure proficiency in various tasks associated with cutter navigation, damage control, and engineering casualty control. A typical underway training day for a WCC would entail the crew practicing for a man overboard, engineering drills that involve securing various pieces of equipment in the engine room, damage control drills on patching holes in the cutter's shell plating, and drills for fighting fires.

Multiple underway exercises that would be conducted on WCCs are designed to develop boat handling skills, including safely mooring and unmooring a boat, engineering casualty control, executing safe recovery of a man overboard, managing risk, and responding to various emergency situations. Underway training would also include training on standard helm commands, boat handing, basic engineering casualty control exercises, navigation rules, and buoy systems.

2.2.4 Acoustic Sources Associated with the Proposed Action

The Proposed Action would include the introduction of sound into the water and air. In-water sources of sound include the noise created by the navigational equipment (consisting of the fathometer and Doppler speed log), vessel noise (engine and other operational equipment noises made by the vessel), and pile driving noise (sound made by impact or vibratory pile driving). In-air sources of sound include the noise made by tools (such as those used in construction or brushing) and ATON signal noise (emitted from certain types of ATON). The sound signal of a given aid is determined by its function and placement within a given marine environment. The usual range of sound signals is not given in decibels but in practical terms as "the distance at which, in foggy weather, an observer has a 50 percent probability of hearing a sound signal when he is situated on the wing of a ship's bridge in an ambient noise level which is equal to or greater than that found on 50 percent of large merchant vessels, propagation between the sound signaling apparatus and the observer being affected in relatively calm weather, with no intervening obstacles" (U.S. Coast Guard 2005). Most electronic emitters are 300 to 850 hertz (Hz). Although the Coast Guard has a decreased reliance on sound signals, in favor or electronic signals in many instances, the Coast Guard ATON policy recognizes that sound signals are a source of noise and since WCCs would test these signals as part of ATON maintenance, they are included in this PEIS. Table 2-5 provides a list of sources associated with the Proposed Action and their sound characteristics.

Table 2-5. Acoustic Sources Associated with the Proposed Action

Source Type	*Frequency Range*	*Source Level*	*Associated Action*
Small vessel	1–7 kHz	175 dB re 1 µPa @ 1 m	Cutter small boat
Large vessel (WCC)	0.02–0.30 kHz	190 dB re 1 µPa @ 1 m	WCC use
Single-beam echosounder (Fishfinder, Depth Sounder)	3.5–1,000 kHz (24–200)[a] kHz	200[b] dB re 1 µPa @ 1 m	Safe navigation
Doppler speed log	270–284 kHz	-	Safe navigation
Tools	less than 1 kHz	74–116 dBA	Construction, brushing
ATON signal testing noise	300–850 Hz	118–140 dBA	ATON signal maintenance
Impact pile driving	below 500 Hz	max 220 dB dB re 1 µPa @ 10 m	Pile driving with impact hammer
Vibratory pile driving	20-40 Hz	165-185 dB re 1 µPa @ 1 m	Pile driving with vibratory hammer

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

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

2.3 Alternatives

As required by NEPA, the Coast Guard evaluated alternatives to the WCC program to determine whether an alternative would be environmentally preferable and/or technically and economically feasible to the Proposed Action while still meeting the program’s objectives. The Coast Guard evaluated the no action alternative and three action alternatives. These alternatives were evaluated using a specific set of criteria. The evaluation criteria applied to each alternative include a determination 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.

2.3.1 Alternative 1: Preferred Alternative

Based on all the alternatives analyzed, the acquisition of 30 WCCs is the preferred alternative. Under Alternative 1, the Coast Guard would acquire a planned 30 WCCs to replace the capabilities of the existing inland tender fleet (consisting of 35 cutters and 27 barges) to fulfill mission requirements in federal waterways, including the vast network of the IW&WR. The proposed WCCs would consist of a planned 16 WLRs, a planned 11 WLICs, and a planned 3 WLIs. The first WCCs would potentially be operational as soon as 2025, with a planned 30 WCCs delivered and operational by 2032. Up to four WLR and WLIC vessels could be constructed per year, dependent upon industry capability, beginning in 2025 and continuing until 27 total WLRs and WLICs have been received. The first WLI would not be expected until 2027 with a planned two WLIs being delivered in a year, dependent upon industry capability. WCCs are expected to be operational within three months of the time of acceptance from the contractor. During construction of the WCCs, Coast Guard would have up to two dozen personnel imbedded in the contractor's workspaces for design and construction review and inspection. This construction schedule would allow for the existing inland tender fleet to remain present with no service interruptions to Coast Guard missions.

Before the Coast Guard would take ownership of a WCC, the shipbuilder would conduct the first vessel performance test at a location near their facility. Initial performance tests would include tests while the vessel is attached to the pier as well as maneuverability tests into and out of the port and at sea. These initial vessel performance tests conducted before delivery of the WCC to the Coast Guard are not a part of the Proposed Action.

Once the Coast Guard takes possession of each WCC, the ship would be made ready for sea, and would be commissioned at a time appointed by the Coast Guard either prior to or after arriving at its homeport. Once the vessel reaches its homeport, additional training evolutions would take place near their respective homeport. The Coast Guard is conducting a feasibility study for all potential homeports[14].

Because the completion date for all WCCs is not expected until 2032, the Coast Guard anticipates that supplemental NEPA documentation may be prepared. New information would be tiered to this PEIS 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 WCC maintenance and decommissioning. All WCCs would be decommissioned in accordance with all applicable laws (Appendix A), and this PEIS would be incorporated, where applicable, in any future NEPA analysis of decommissioning.

2.3.2 Alternative 2: Reduced Acquisition of Coast Guard Owned and Operated Systems

Under Alternative 2, the Coast Guard would explore hybrid government and contracted options for mission performance. Ship platforms would meet similar technical specifications discussed in Alternative 1. Scenarios include: contractor-owned vessels that are government-operated (Coast Guard employees or a partner agency provides the crew for third-party, contractor-owned vessels); government-owned vessels that are contractor-operated (a commercial operating company provides the crew for Coast Guard or partner agency owned vessels); or contractor-owned and contractor-operated systems (Coast Guard provides neither the vessels nor personnel).

The logistical costs of contracting a combination of unique hulls to satisfy the requirements to service ATON in the proposed action areas would exceed the corresponding costs of maintaining a class of 30 cutters that would be built specifically to conduct missions in the Coast Guard's proposed action areas. Similarly, one-for-one replacement would cost far more per replacement hull because it eliminates any workforce savings associated with a ship with capabilities designed specifically to conduct Coast Guard

[14] Any NEPA analysis that evaluates homeporting and facilities improvement decisions would be completed by Coast Guard independent of this PEIS.

missions in the IW&WR. Major challenges to any combined fleet are that the assets would not be able to communicate in real time, they would operate at differing levels of efficiency (resulting in decreased efficiency throughout the ATON system), and they would incur increased maintenance costs.

2.3.3 Alternative 3: Mixed Fleet

The mixed fleet alternative would involve a combination of cutters and shore-based assets (including Aids to Navigation team units), implementation of electronic ATON[15], and use of contracted ATON services to achieve Coast Guard ATON missions throughout the IW&WR. To accomplish a mixed fleet solution, additional Coast Guard ATON personnel and teams would be required. To accommodate the additional ATON teams, existing facilities would require expansion and construction of new shore based facilities could be necessary. Use of electronic ATON instead of physical ATON could also prove necessary. Similar to Alternative 2, the logistical costs to satisfy the requirements to service ATON in the proposed action areas would exceed the corresponding costs of maintaining a class of 30 cutters that would be built specifically to conduct missions in the IW&WR. One of the major challenges with this approach, similar to Alternative 2, is that assets would not be able to communicate in real time, they would operate at differing levels of efficiency (resulting in decreased efficiency throughout the system), and they would incur increased maintenance costs.

2.3.4 Alternative 4: No Action Alternative

The evaluation of a No Action Alternative is required by the regulations implementing NEPA (40 CFR 1502.14(d)). Under the No Action Alternative, the Coast Guard would fulfill its missions in the IW&WR using the existing inland tender fleet, each vessel of which has exceeded the end of its service life. The existing assets would continue to age, causing a decrease in efficiency, increasing operational costs, and increasing risk of equipment failure or damage due to significant systems and parts no longer being available. In addition, it would become more difficult for an ageing fleet to remain in compliance with environmental laws and regulations and standards for safe operation.

The No Action Alternative would also not meet the Coast Guard's statutory mission requirements in the IW&WR by providing ATON service and maintenance in those areas. The Coast Guard also provides ports, waterways, and coastal security; SAR; marine safety; and marine environmental protection, and without reliable Coast Guard presence, these services would be significantly reduced. As such, the No Action Alternative does not meet the purpose and need, but is included here for comparison of environmental impacts with the Preferred Alternative.

2.3.5 Alternatives Considered But Eliminated from Analysis

In developing the Proposed Action and Alternatives, the Coast Guard assessed the viability of utilizing existing assets until they have reached the end of their service lives and not replacing them. Under this Alternative, the Coast Guard would only be responsible for missions in the IW&WR while assets are available for use, then would be unable to complete these missions after the vessels have been decommissioned. This alternative does not meet the purpose and need of this project for several reasons. First, the Coast Guard is mandated to carry out missions in the IW&WR in order to ensure continued safe navigation of these areas. Secondly, once the inland tender fleet does not exist for this purpose, no other entity has the authority nor the resources to carry out such missions.

[15] An electronic ATON (eATON) can autonomously, and at fixed intervals, broadcast the characteristics, dimensions, name, position, type, and status from or concerning an ATON. eATON can be transmitted to Automatic Identification System (AIS) users only by shore- or ship-based infrastructure.

CHAPTER 3 Affected Environment and Environmental Consequences

This chapter describes the Coast Guard's approach to analyze baseline conditions and potential effects on environmental resources from each alternative. Since Alternatives 2–3 are similar and generally differ in the number and method by which vessels may be acquired by the Proposed Action, the analysis of potential effects to each resource is combined under one subheading. This chapter is organized by resource topic, specifically defined for each proposed action area, with a detailed description of individual resources in the applicable proposed action areas. The discussion also includes an overview of related existing environmental conditions. All potentially relevant environmental resource areas were initially considered for analysis in this PEIS. In compliance with NEPA, CEQ, and Coast Guard guidelines, the discussion of the affected environment (i.e., existing conditions) focuses only on those resource areas potentially subject to impacts. Additionally, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact. Potential impacts to ESA-listed species and critical habitat are also evaluated in this PEIS. Although the Coast Guard offers a "may affect" determination (Table 3-45) under the ESA, this determination should be considered preliminary for U.S. Fish and Wildlife Service (USFWS) species, since the consultation process under Section 7 of the ESA has not been completed. Similarly, any effects analysis of critical habitat should also be considered preliminary. The Coast Guard completed consultation under section 7 of the ESA, EFH, and critical habitat for the U.S. Coast Guard Federal Aids to Navigation Program on April 19, 2018 for those species under the National Marine Fisheries Service (NMFS') jurisdiction. Any information provided in this PEIS includes WCC support of ATONs, only as it pertains to the Proposed Action.

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

Each WCC would not be expected to potentially impact the physical, biological, or socioeconomic environment until it is built, deployed, and operational. The first WCC may be operational as soon as 2025 and the last by 2032; as such, the Coast Guard acknowledges that new information about the existing environment may become available before 2025, but after the publication of this PEIS. Therefore, the Coast Guard presents the best available information on the existing environment in this PEIS, but anticipates that, as new information is obtained (particularly before the last WCC becomes operational in 2032), there may be supplemental environmental assessments or other analyses under NEPA prepared in support of individual proposed actions and tiered to this PEIS. Any potential impacts from vessel maintenance and decommissioning may be analyzed in a supplemental NEPA document once more information becomes known[16].

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. After analyzing the Proposed Actions within the affected environment, thehe potential impact to the resource areas listed in Table 3-1 are considered to

[16] Any NEPA analysis that evaluates homeporting and facilities improvement decisions would be completed by Coast Guard independent of this PEIS

be negligible or nonexistent, and were therefore eliminated from further consideration in this PEIS. Table 3-1 includes the justification for their removal from further analysis.

Table 3-1. Resources Eliminated from Analysis

Resource	***Justification for Removal From Further Consideration***
Physical Environment	
Airspace	There are no aircraft associated with WCC operations. The Proposed Action would not interfere with regular public airspace usage. Therefore, the Proposed Action would not impact the use of airspace.
Land use	The Proposed Action would primarily occur within freshwater rivers and coastal waters. While a limited portion of the Proposed Action maintains land-based ATON, this maintenance would not alter existing land use. Therefore, the Proposed Action would not impact land use.
Parks, forests, and prime and unique farmland	The Proposed Action would primarily occur within freshwater rivers and coastal waters, with the exception of the construction and maintenance of land-based ATON. The Proposed Action would not impact parks, forests, and prime and unique farmland[1] as it is unlikely that ATON would be on these lands.
Socioeconomic Environment	
Aesthetic resources	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 aesthetic resources.
Archaeological and historical resources	The only archaeological or historical resources located within the proposed action areas would be shipwrecks and historical aids to navigation. Training and operations aboard WCC vessels would not disturb these resources as no WCCs are assigned to maintain historic ATON. Therefore, the Proposed Action would not impact archaeological and historical resources.
Cultural resources	The Proposed Action may overlap cultural resources, but only those related to subsistence use, which are discussed in Section 3.5.7. Subsistence is particularly important in the SEAK proposed action area. The Proposed Action would not impact cultural resources, with the exception of subsistence hunting and fishing (Section 3.5.7).
Environmental justice	Federally recognized tribes in the proposed action areas would be invited to consult on the Proposed Action for those activities that may concern Indian Tribal self-government, trust resources, and Indian Tribal treaty and other rights. The Proposed Action would primarily occur on the water in the IW&WR. While some minority, low-income, or underserved populations may rely on fishing within the proposed action areas for sustenance, they would not be disproportionately displaced by the Proposed Action when compared to commercial, recreational, or subsistence fisheries. Socioeconomic impacts, including impacts to employment, are discussed in Section 3.5. There would be no disproportionately high or adverse human health or environmental impacts on minority, low-income, or underserved populations, as any limits to accessibility would be short-term, temporary, and in maritime transit areas with existing vessel traffic. Therefore, the Proposed Action would not impact environmental justice.
Infrastructure	No modification of infrastructure would occur as a result of the Proposed Action. Therefore, the Proposed Action would not impact infrastructure.
Utilities	The Proposed Action would not occur near any utilities. Therefore, the Proposed Action would not impact utilities.

[1] Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas.

3.2 Identification of Potential Stressors Associated with the Proposed Action

Stressors associated with the Proposed Action that may potentially impact the environment include: acoustic stressors such as fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, and pile driving noise; and physical stressors such as vessel movement, bottom devices, construction, brushing, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines. Proposed Action activities and associated stressors are detailed in Table 3-2.

Table 3-2. Proposed Action Activities

Activity[1]	*WCC Type*	*Includes*	*Estimated Hours per Activity*	*Source(s) of Acoustic Stressors*	*Source(s) of Physical Stressors*
Functionality and maneuverability testing	All	Ensuring properly working systems after vessel maintenance		Fathometer and Doppler speed log noise; vessel noise	Vessel movement
Towing	All	Towing another vessel from the stern or either side and ability to be towed	Dependent on distance of tow	Fathometer and Doppler speed log noise; vessel noise	Vessel movement; tow lines
ATON maintenance	All	Inspecting and replacing ATON chains, sinkers, buoys, dayboards, ladders, platforms, and pilings; repairing lighting equipment, power systems (batteries and solar panels), and sound signals; responding to and repairing ATON discrepancies; and conducting repairs to any ATON support structures	Most < 1 hour Duration of pile replacement is dependent on number of pilings[2]; but may take 1, 8, or 16 hours*	Fathometer and Doppler speed log noise; vessel noise; ATON signal testing noise; tool noise; pile driving noise	Vessel movement; bottom devices[1]; pile driving; construction[2]; brushing; unrecovered jet cone mooring; ATON retrieval devices; tow lines
Establishment of a floating ATON	WLR; WLI	Use of dump boards, a jet pipe, or cranes and winches to position a floating ATON		Fathometer and Doppler speed log noise; vessel noise	Vessel movement; bottom devices
Establishment of a fixed ATON	WLR; WLIC	Construction of a shore ATON structure; may include pile driving (see below) if the ATON is fixed into the bottom (in-water)		Fathometer and Doppler speed log noise; vessel noise; tool noise; pile driving noise	Vessel movement; bottom devices; pile driving; construction; brushing
Discontinuing and recovering a floating ATON	WLR; WLI	May include the use of a crane or spuds; may include jet cone mooring removal		Fathometer and Doppler speed log noise; vessel noise; pile driving noise; equipment noise (e.g., crane, spuds)	Vessel movement; bottom devices; unrecovered jet cone moorings; ATON retrieval devices; tow lines

Activity[1]	*WCC Type*	*Includes*	*Estimated Hours per Activity*	*Source(s) of Acoustic Stressors*	*Source(s) of Physical Stressors*
Discontinuing and recovering a fixed ATON	WLIC	Permanent removal of a fixed (in-water) pile structure or shore structure		Fathometer and Doppler speed log noise; vessel noise; pile driving noise; tool noise	Vessel movement; pile driving; construction; brushing
Brushing	All	Clearing of vegetation using chainsaws, pole saws, hand tools, pesticides, and herbicides		Tool noise	Brushing
Anchoring	All	Dredging the anchor and kedging the anchor; may be done in water depths of 15–25 ft (5–8 m)		Fathometer and Doppler speed log noise; vessel noise	Vessel movement; bottom devices
Spudding	All	Maintaining station in water depths of 5.5–20 ft (1.7–6.0 m)	Dependent on the duration of the activity being performed	Fathometer and Doppler speed log noise; vessel noise	Vessel movement; bottom devices
Wreckage recovery	All	Use of cutter boat, grapnel hook, or wire sweeping methods; may include pile extraction		Fathometer and Doppler speed log noise; vessel noise; pile driving noise	Vessel movement; bottom devices; pile driving; ATON retrieval devices; tow lines
Pile driving	WLIC	Use of impact pile driver or vibratory pile driver	Duration of pile replacement is dependent on number of pilings[3]; but may take 1, 8, or 16 hours	Fathometer and Doppler speed log noise; vessel noise; pile driving noise	Vessel movement; pile driving
Training	All	Practicing cutter navigation, damage control, and engineering casualty control		Fathometer and Doppler speed log noise; vessel noise	Vessel movement

[1] Bottom devices are described in Section 3.2.2.2 and include anchors, spuds, sinkers, and chain.

[2] Note: Construction and pile driving are considered separately in this PEIS.

[3] On average, one pile is expected to take no more than 1 hour to install, multiple piles may take up to 8 hours, and a platform structure may take up to 16 hours.

Stressors that were evaluated, but not analyzed further in this PEIS are listed in Table 3-3. Stressors that were analyzed in this PEIS are listed in Table 3-4.

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

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Rationale for Elimination from Analysis*
Physical Resources			
Air quality	n/a	Fathometer and Doppler speed log noise; vessel noise; ATON signal testing noise; tool noise; pile driving noise	There would be no impacts to air quality from any acoustic stressors.
		Bottom devices; construction; unrecovered jet cone moorings; ATON retrieval devices; tow lines	There would be no impacts to air quality from these physical stressors as there are no emissions created during their use.
	Increased emissions	Brushing; pile driving	Some tools used in brushing may be powered by small engines, which burn fuel and thus produce emissions. The impact hammer would be powered by a diesel engine, which would also produce emissions. The emissions generated during use of tools and a pile driver would be minimal due to the size of engines, infrequency of use, and short duration of operation.
Ambient sound	Increased ambient sound levels	ATON signal testing noise; tool noise	These low frequency sounds are emitted in air. As these sounds are not intense or of long duration, and only occur intermittently, it would be unlikely ATON signal testing noise or tool noise would impact in-air ambient sound levels in any proposed action area.
	n/a	Vessel movement; bottom devices; construction; brushing; pile driving; unrecovered jet cone moorings; ATON retrieval devices; tow lines	There would be no impacts to ambient sound from any physical stressors.
Bottom habitats and sediments	n/a	Fathometer and Doppler speed log noise; vessel noise; ATON signal testing noise; tool noise; pile driving noise	There would be no impacts to bottom habitats and sediments from any acoustic stressors.
	Bottom disturbance	Vessel movement	Vessel movement would only impact bottom habitat and sediments if a vessel were operating in very shallow water. Even if a vessel were to operate in very shallow water, it would not be moving quickly and

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Rationale for Elimination from Analysis*
			bottom disturbance would be limited to the suspension of some sediment off the bottom, which would resettle after the vessel has left the area.
	Degradation of unrecovered jet cones	Unrecovered jet cone moorings	Impacts from the degradation of debris, specifically the unrecovered jet cone moorings used for floating ATON in river environments, would be undetectable due to the low density of jet cones left behind during ATON recovery.
	n/a	Tow lines	There would be no impacts to bottom habitats and sediments from tow lines, which would be used only at the water's surface and would not be left behind.
Water quality	n/a	Fathometer and Doppler speed log noise; vessel noise; ATON signal testing noise; tool noise; pile driving noise	There would be no impacts to water quality from any acoustic stressors.
	Discharge of ballast or bilge water and wastewater	Vessel movement	Coast Guard SOPs (Appendix B) would ensure no impact to the riverine or marine environments in which they operate. All vessel discharges would occur in compliance with state and federal regulations and policies.
	Degradation of jet cones	Unrecovered jet cone moorings	Chemicals leaching from the degradation of debris would be undetectable because of the low density of jet cones that are unable to be recovered. In addition, chemicals would be heavily diluted by moving water and the debris would be covered by shifting sediments, as jet cones are used for mooring ATON in rivers.
	n/a	Tow lines	There would be no impacts to water quality from tow lines, which would be used only at the water's surface and would not be left behind.
Biological resources			
Riverine (and riparian) vegetation	n/a	Fathometer and Doppler speed log noise; vessel noise; ATON signal testing noise; tool noise; pile driving noise	There would be no impacts to vegetation from any acoustic stressors.
	Disturbance	Vessel movement	Riverine plants may be disturbed by vessel movement at the surface of the water column, but this would be minimal and limited to the

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Rationale for Elimination from Analysis*
			algae and plant material directly within the path of the vessel. Riparian plants (located on the banks of rivers) may be disturbed by the moving water resulting from a vessel moving through the area. However, this disturbance would not be measureable or cause population level impacts.
Riverine (and riparian) vegetation	Degradation of jet cones	Unrecovered jet cone moorings	There would be no impact to riverine vegetation from unrecovered jet cone moorings.
	Disturbance, entanglement, mortality	Tow lines	Disturbance as a result of tow lines would occur only at the water's surface and would only impact floating vegetation in the water column. The risk of entanglement is considered negligible, due to: 1) the unlikely overlap between riverine plants at the surface and WCC operations; 2) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel; and 3) the predominantly benthic or land-based location of most riverine vegetation. In addition, tow lines would not be left behind.
Marine vegetation	n/a	Fathometer and Doppler speed log noise; vessel noise; ATON signal testing noise; tool noise; pile driving noise	There would be no impacts to vegetation from any acoustic stressors.
	Disturbance	Vessel movement	Marine plants could be disturbed by vessel movement at the surface of the water column, but this would be minimal and limited to the marine plants directly within the path of the vessel. Coastal plants may be disturbed by the moving water resulting from a vessel moving through the area. However, this disturbance would not be measureable or cause population level impacts.
	n/a	Unrecovered jet cone moorings	Jet cones are only used for mooring ATON in riverine habitats. Therefore, there would be no impact to marine vegetation.
	Disturbance, entanglement, mortality	Tow lines	Disturbance as a result of tow lines would occur only at the water's surface and would only impact floating vegetation in the water column. Macroalgae could become entangled due to its large size, but this is primarily attached to benthic substrate, which would not

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Rationale for Elimination from Analysis*
			overlap with tow lines located at the surface. The risk of entanglement is considered negligible, due to: 1) the unlikely overlap between marine vegetation at the surface and WCC operations and 2) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel. In addition, tow lines would not be left behind.
Insects	PTS, TTS, masking, behavioral response	Fathometer and Doppler speed log noise; vessel noise; ATON signal testing noise; tool noise; pile driving noise	Sounds associated with WCC operations would not likely be detected by flying insects as the sounds are outside their best hearing range. Only the fathometer and Doppler speed log noise is high frequency and could be detected, but it is unlikely to impact flying insects as the noise is created underwater and is directed downward from the hull of the vessel.
	Bottom disturbance	Bottom devices; pile driving; ATON retrieval devices; unrecovered jet cone moorings	There would be no overlap between the presence of insects and the locations where bottom devices would be deployed and pile driving would be conducted. Therefore, there would be no impacts to insects from bottom devices or pile driving. Unrecovered jet cone moorings and ATON retrieval devices would occur or be utilized on the bottom, away from the presence of insects.
	Entanglement, disturbance	Tow lines	There would be no overlap between the presence of insects and the locations where tow lines would be deployed on the water's surface. Therefore, there would be no impacts to insects from tow lines.
	Strike, injury, death, disturbance	Vessel movement	Vessel movement would occur on the surface of the water. Only flying insects or insects occurring in the water would have the potential to overlap with vessel movement. However, the number of insects disturbed by vessel movement would be small, and there would be no population level impacts to insects.
Aquatic invertebrates	PTS, TTS, masking, behavioral responses	Fathometer and Doppler speed log noise	High frequency signals from the fathometer and Doppler speed log would likely not impact aquatic invertebrates because invertebrates are unable to sense these high frequency signals.
	PTS, TTS, masking, behavioral responses	ATON signal testing noise; tool noise	These low frequency sounds would be emitted in air and must propagate across the air-water interface in order to be detected by most aquatic invertebrates. Cephalopods may be located within the water column, including at the water's surface. Decapods may be

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Rationale for Elimination from Analysis*
			located outside of the water and may be able to detect low frequency sounds. As these sounds are not intense or of long duration, it would be unlikely that ATON signal testing noise or tool noise would impact aquatic invertebrates that may detect low frequency sounds.
Aquatic invertebrates	Strike, injury, death, disturbance	Vessel movement	Vessel movement would occur on the surface of the water and may impact the water column within the draft of the vessel. The highest density of aquatic invertebrates occurs on or within the sediment, which would only be disturbed by vessel movement in very shallow water. However, the number of invertebrates disturbed by this type of vessel movement would be small, and there would be no population level impacts to aquatic invertebrates.
	Runoff from herbicides and pesticides	Brushing	Only pesticides approved by the AFPMB and registered with the EPA would be used during brushing operations. Application of chemicals would be consistent with SOPs (Appendix B), Safety Data Sheets, and manufacturer instructions. Therefore, the risk of impacts to aquatic invertebrates from pesticide runoff would be negligible.
	Degradation of jet cones	Unrecovered jet cone moorings	There would be no impact to aquatic invertebrates from unrecovered jet cone moorings.
	Entanglement	ATON retrieval devices; tow lines	The risk of entanglement is considered negligible, due to: 1) the unlikely overlap between invertebrates at the surface and WCC operations; 2) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel; and 3) the small size of most invertebrates. In addition, tow lines would not be left behind.
Amphibians	PTS, TTS, masking, behavioral responses	Fathometer and Doppler speed log noise; pile driving noise	The frequency of the fathometer and Doppler speed log and of pile driving noise would be outside the range of hearing of most species of amphibians.
	PTS or TTS	Vessel noise; ATON signal testing noise; tool noise	Due to the transient nature of WCC operations, amphibians would not be exposed to acoustic sources from vessels for durations that could cause hearing threshold shifts. In addition, ATON signal testing noise and tool noise would be brief, intermittent, and would not reach a level that could cause PTS or TTS in amphibians.

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Rationale for Elimination from Analysis*
	Exposure to herbicides or pesticides on land or in the water	Brushing	Only pesticides approved by the AFPMB and registered with the EPA would be used during brushing operations. Application of chemicals would be consistent with SOPs (Appendix B), Safety Data Sheets, and manufacturer instructions. Therefore, the risk of impacts to amphibians from pesticide runoff would be negligible.
	Degradation of jet cones	Unrecovered jet cone moorings	There would be no impact to amphibians from unrecovered jet cone moorings.
	Entanglement	ATON retrieval devices; tow lines	The risk of entanglement is considered negligible, due to: 1) the unlikely overlap between amphibians at the surface and WCC operations; 2) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel; and 3) the small size of most amphibians.
Fish	PTS or TTS	Fathometer and Doppler speed log noise; vessel noise	Due to the transient nature of WCC operations, fish would not be exposed to acoustic sources from vessels for durations that could cause hearing threshold shifts.
	PTS or TTS	ATON signal testing noise; tool noise	Because these sounds occur in-air and must propagate across the air-water interface in order to be detected, it would be unlikely that fish underwater would be exposed to these in-air noises for durations or at intensities that could cause hearing threshold shifts.
	Terrestrial disturbance	Construction	There would be no overlap between the presence of fish and construction activities, which occur around shoreside ATON structures.
	Runoff from herbicides and pesticides	Brushing	Only pesticides approved by the AFPMB and registered with the EPA would be used during brushing operations. Application of chemicals would be consistent with SOPs (Appendix B), Safety Data Sheets, and manufacturer instructions. Therefore, the risk of impacts to fish from pesticide runoff would be negligible.
	Degradation of jet cones	Unrecovered jet cone moorings	There would be no impact to fish from unrecovered jet cone moorings.

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Rationale for Elimination from Analysis*
	Entanglement	ATON retrieval devices; tow lines	The risk of entanglement is considered negligible, due to: 1) implementation of Coast Guard SOPs; 2) the unlikely overlap between fish at the surface and WCC operations; 3) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel.
Essential fish habitat	Reduction in the quality of EFH	Fathometer and Doppler speed log noise; vessel noise	The potential reduction in the quality of the acoustic habitat would be localized and temporary due to the attenuation of the fathometer and Doppler speed log noise and movement of the vessels throughout the proposed action areas. In addition, it would be unlikely that fish in their habitat would detect fathometer and Doppler speed log noise. The quality of the water column environment as EFH would be restored to normal levels immediately following the departure of vessels. Habitat quality compared to baseline conditions would not be expected to change.
	Reduction in the quality of EFH	ATON signal testing noise; tool noise	Sounds associated with WCC operations would not likely be detected by fish in their habitat unless they are in close proximity to the source. Because these sounds occur in air and must propagate across the air-water interface, it would be unlikely that fish in their habitat would detect these sounds. Habitat quality compared to baseline conditions would not be expected to change.
	Disturbance	Vessel movement; tow lines	Vessel movement and tow lines may disturb different life stages of fish species within the water column or at the surface. However, this disturbance would be temporary as a vessel moves through the proposed action areas. Habitat quality compared to baseline conditions would not be expected to change as a result of vessel movement or the use of tow lines. In addition, tow lines would not be left behind.
Essential fish habitat	Quantity of EFH	Construction	Construction could impact some benthic, shoreline, or submerged EFH, due to the disturbance of bottom sediment. Construction activities would be short in duration, causing short-term effects, however, these impacts to habitat would be temporary. Once construction activities have concluded, there would be no impact to the quality of EFH from construction.

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Rationale for Elimination from Analysis*
	Quality of EFH	Brushing	Only pesticides approved by the AFPMB and registered with the EPA would be used during brushing operations. Application of chemicals would be consistent with SOPs (Appendix B), Safety Data Sheets, and manufacturer instructions. Therefore, the risk of impacts to EFH from pesticide runoff would be negligible.
	Quantity of EFH	Unrecovered jet cone moorings	Unrecovered jet cone moorings could cause a decrease in the amount of bottom EFH available to species; however, the natural movement of sediment would eventually cover the unrecovered jet cone moorings, causing short-term effects. In addition, when compared to the overall amount of EFH available, this area would be very small. Therefore, those impacts to habitat would be temporary and minimal.
	Quality of EFH	Unrecovered jet cone moorings	There would be no impact to the quality of essential fish habitat from unrecovered jet cone moorings.
Birds	PTS, TTS, masking, behavioral response	Fathometer and Doppler speed log noise; ATON signal testing noise; tool noise	Sounds associated with WCC operations would not likely be detected by birds in air or underwater, as the sounds are outside of their best hearing range.
	Bottom disturbance	Bottom devices; pile driving; ATON retrieval devices; unrecovered jet cone moorings	It would be unlikely that bottom devices, such as anchors, spuds, and sinkers, would impact diving birds because these species spend a short duration of time diving underwater. Once these devices are deployed, they would move quickly through the water column before resting at the bottom and most diving birds are not feeding on the bottom. Similarly, pile driving, ATON retrieval, and unrecovered jet cone moorings would mostly occur at or near the bottom, and diving birds do not tend to forage at the bottom or dive for long durations. There would be limited overlap of birds and devices that would cause bottom disturbance.
	Entanglement	ATON retrieval devices; tow lines	The risk of entanglement is considered negligible, due to: 1) implementation of Coast Guard SOPs (Appendix B); 2) the unlikely overlap between fish at the surface and WCC operations; and 3) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel.

Impacted Resources	***Stressor(s)***	***Source(s) of Stressor***	***Rationale for Elimination from Analysis***
Reptiles	PTS, TTS, masking, behavioral response	Fathometer and Doppler speed log noise	Sounds associated with WCC operations would not likely be detected by reptiles in air or underwater, as the sounds are outside of their best hearing range.
	PTS or TTS	Vessel noise; ATON signal testing noise; tool noise	Due to the transient nature of vessels, reptiles would not be exposed to vessel noise for durations that could cause hearing threshold shifts. In addition, ATON signal testing noise and tool noise would be brief, intermittent, and would not reach a level that would cause PTS or TTS in reptiles.
	Bottom disturbance, behavioral responses	Bottom devices; pile driving; ATON retrieval devices	There would be no impact to terrestrial reptiles from these devices. It would be unlikely that bottom devices, such as anchors, spuds, and sinkers, would impact aquatic reptiles because these species spend a short duration of time diving underwater. Once these devices are deployed, they would move quickly through the water column before resting at the bottom and most aquatic reptiles are not feeding on the bottom. Similarly, pile driving, ATON retrieval, and unrecovered jet cone moorings would mostly occur at or near the bottom, and aquatic reptiles do not tend to forage at the bottom or dive for long durations. There would be limited overlap of reptiles and devices that would cause bottom disturbance.
	Degradation of jet cones	Unrecovered jet cone moorings	There would be no impact to reptiles from unrecovered jet cone moorings.
	Entanglement	ATON retrieval devices; tow lines	The risk of entanglement is considered negligible, due to: 1) implementation of Coast Guard SOPs (Appendix B); 2) the unlikely overlap between reptiles at the surface and WCC operations; and 3) the unlikely presence of looped or slack tow lines, as tension is required to tow a vessel.
Terrestrial mammals	PTS, TTS, masking, behavioral responses	Fathometer and Doppler speed log noise	The fathometer and Doppler speed log noise is high frequency, created underwater, and directed downward from the hull of the vessel. Therefore, it would not likely be detected by terrestrial mammals.

Impacted Resources	***Stressor(s)***	***Source(s) of Stressor***	***Rationale for Elimination from Analysis***
	PTS or TTS	Vessel noise	Due to the transient nature of vessels, terrestrial mammals would not be exposed to vessel noise for durations that could cause hearing threshold shifts.
	PTS or TTS	ATON signal testing noise; tool noise	ATON signal testing noise and tool noise would be brief, intermittent, and would not reach a level that could cause PTS or TTS in terrestrial mammals.
	Bottom disturbance, behavioral response	Bottom devices; ATON retrieval devices	There would be no overlap between the presence of terrestrial mammals and the use of bottom devices or ATON retrieval devices, which are used along the bottom of a waterway.
	Degradation of jet cones	Unrecovered jet cone moorings	There would be no impact to terrestrial mammals from unrecovered jet cone moorings.
	Entanglement	ATON retrieval devices; tow lines	There would be no overlap between the presence of terrestrial mammals and the use ATON retrieval devices or tow lines, which are used in the water.
Marine mammals	PTS, TTS, masking, behavioral response	ATON signal testing noise; tool noise	Because ATON signal testing noise and tool noise occur in-air, and must propagate across the air-water interface in order to be detected by marine mammals underwater, it is unlikely marine mammals would detect these sounds. Although ATON signal testing noise and tool noise (in air) may be audible to certain marine mammals that are hauled out, ATON signal testing noise and tool noise would be brief, intermittent, and would not reach a level that could cause PTS or TTS in marine mammals, both in air and underwater.
	PTS or TTS	Fathometer and Doppler speed log noise; vessel noise	Fathometer and Doppler speed log noise would be considered *de minimis*, which means this noise would not be expected to cause significant impacts to marine mammals (Section 3.2.1.1). Marine mammals would not be exposed to the fathometer and Doppler speed log noise or vessel noise for durations that would cause hearing threshold shifts.

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Rationale for Elimination from Analysis*
	Degradation of jet cones	Unrecovered jet cone moorings	There would be limited overlap with marine mammals and unrecovered jet cone moorings, since jet cone moorings are used only in river systems. There would be no impact to marine mammals from unrecovered jet cone moorings.
Socioeconomic Resources			
Public health and safety	Physical interactions	Vessel movement	Coast Guard would issue a broadcast which would mitigate interactions between WCC operations and the public.
Accessibility to marine resources	Restrictions due to operations	Vessel movement	The public would not be restricted from use of marine resources by WCC operations.

[1] The Coast Guard completed consultation with NMFS, April 19, 2018, on ESA Section 7 Biological and Conference Opinion and Magnuson-Stevens Fishery Conservation and Management Act EFH Consultation for the Coast Guard's Federal Aids to Navigation Program.

[2] All areas containing existing (already constructed) federally authorized or permitted manmade structures, including ATON, are not included in critical habitat. All waters identified as existing federally authorized channels and harbors are also excluded from this designation (74 FR 45353; October 02, 2009).

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

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Section in PEIS*
Physical Resources			
Air quality	Criteria pollutants	Vessel operations (i.e., vessel emissions)	Section 3.3.1.2
	Hazardous air pollutants		
Ambient sound	Increased in-air noise	Vessel noise; pile driving noise	Sections 3.3.2.2.1 through 3.3.2.2.3
	Increased in-water noise	Fathometer and Doppler speed log noise; vessel noise; pile driving noise	
Bottom habitats and sediments	Bottom disturbance, chain scour, increase in turbidity	Bottom devices and ATON retrieval devices	Section 3.3.3.2.1
		Construction	Section 3.3.3.2.2

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Section in PEIS*
		Pile driving	Section 3.3.3.2.4
	Presence of any residual pesticides and herbicides; erosion	Brushing	Section 3.3.3.2.3
Water quality	Increase in turbidity	Bottom devices and ATON retrieval devices; construction; pile driving	Sections 3.3.4.2.1, 3.3.4.2.2, and 3.3.4.2.4
	Presence of any residual pesticides and herbicides	Brushing	Section 3.3.4.2.3
Biological Resources			
Riverine vegetation	Bottom disturbance, chain scour, mortality	Bottom devices, ATON retrieval devices, and pile driving	Section 3.4.1.2.1
	Terrestrial disturbance	Construction	Section 3.4.1.2.2
	Presence of any residual pesticides and herbicides	Brushing	Section 3.4.1.2.3
Marine vegetation	Bottom disturbance, chain scour, mortality	Bottom devices, ATON retrieval devices, and pile driving	Section 3.4.2.2.1
	Terrestrial disturbance	Construction	Section 3.4.2.2.2
	Presence of any residual pesticides and herbicides	Brushing	Section 3.4.2.2.3
Insects	Strike, injury, mortality, disturbance	Vessel movement	Section 3.5.7
	Disturbance, strike, injury, mortality	Construction	Section 3.4.3.2.1
	Disturbance, strike, injury, mortality (pesticides)	Brushing	Section 3.4.3.2.2
Aquatic invertebrates	Masking, behavioral responses	Vessel noise; pile driving noise	Sections 3.4.4.2.1 and 3.4.4.2.2
	Bottom disturbance, habitat disturbance, mortality	Bottom devices and ATON retrieval devices	Sections 3.4.4.2.3
	Bottom disturbance, vibrations, habitat disturbance, mortality	Pile driving	Section 3.4.4.2.5
	Terrestrial disturbance, mortality	Construction	Section 3.4.4.2.4
Amphibians	Masking, behavioral response	Vessel noise; ATON signal testing noise; tool noise	Sections 3.4.5.2.1 through 3.4.5.2.3
	Strike, injury, mortality, behavioral response	Vessel movement; bottom devices and ATON retrieval devices	Sections 3.4.5.2.4 and 3.4.5.2.5
	Terrestrial disturbance	Construction	Section 3.4.5.2.6

Impacted Resources	*Stressor(s)*	*Source(s) of Stressor*	*Section in PEIS*
	Disturbance, strike, injury, mortality (pesticides, herbicides)	Brushing	Section 3.4.5.2.7
	Bottom disturbance, vibrations, habitat disturbance, strike, injury, mortality, behavioral response	Pile driving	Section 3.4.5.2.8
Fish	Masking, behavioral response	Fathometer and Doppler speed log noise; vessel noise; pile driving noise	Sections 3.4.6.2.1 through 3.4.6.2.3
	Strike, injury, mortality, disturbance	Vessel movement; bottom devices and ATON retrieval devices	Sections 3.4.6.2.4 and 3.4.6.2.5
	Bottom disturbance, vibrations, habitat disturbance, strike, injury, mortality, behavioral response	Pile driving	Section 3.4.6.2.6
EFH	Reduction in the quality and/or quantity of EFH	Pile driving noise	Section 3.4.7.2.1
	Reduction in the quality and/or quantity of EFH	Bottom devices and ATON retrieval devices	Section 3.4.7.2.2
	Reduction in the quality and/or quantity of EFH	Pile driving	Section 3.4.7.2.3
Birds	PTS, TTS, masking, behavioral response	Vessel noise; pile driving noise	Sections 3.4.8.2.1 and 3.4.8.2.2
	Strike, injury, mortality, behavioral response	Vessel movement	Section 3.4.8.2.3
	Strike, injury, mortality, disturbance	Construction	Section 3.4.8.2.4
	Disturbance, strike, injury, mortality (pesticides, herbicides)	Brushing	Section 3.4.8.2.5
Reptiles	Masking, behavioral response	Vessel noise; ATON signal testing noise; tool noise	Sections 3.4.9.2.1 through 3.4.9.2.3
	PTS, TTS, masking, behavioral response	Pile driving noise	Section 3.4.9.2.4
	Strike, injury, mortality, behavioral response	Vessel movement; bottom devices and ATON retrieval devices	Sections 3.4.9.2.5 and 3.4.9.2.6
	Strike, injury, mortality, disturbance	Construction	Section 3.4.9.2.7
	Bottom disturbance, vibrations,	Pile driving	Section 3.4.9.2.8

Impacted Resources	***Stressor(s)***	***Source(s) of Stressor***	***Section in PEIS***
	habitat disturbance, strike, injury, mortality, behavioral response		
Terrestrial mammals	Masking, behavioral response	Vessel noise; ATON signal testing noise; tool noise	Sections 3.4.10.2.1 through 3.4.10.2.3
	PTS, TTS, masking, behavioral response	Pile driving noise	Section 3.4.10.2.4
	Strike, injury, mortality, behavioral response	Construction	Section 3.4.10.2.5
Marine mammals	Masking, behavioral response	Fathometer and Doppler speed log noise; vessel noise	Sections 3.4.11.2.1 and 3.4.11.2.2
	PTS, TTS, masking, behavioral response	Pile driving noise	Section 3.4.11.2.3
	Strike, injury, mortality, behavioral response	Vessel movement; bottom devices and ATON retrieval devices	Sections 3.4.11.2.4 and 3.4.11.2.5
	Bottom disturbance, habitat disturbance, strike, injury, mortality, behavioral response	Pile driving	Section 3.4.11.2.6
Socioeconomic resources			
Commercial and recreational fishing	Behavioral response of biological resources	Vessel noise; vessel movement	Section 3.5.1.2
	Behavioral response of prey of biological resources	Vessel noise; vessel movement	
Coastal marine construction	Increased presence of Coast Guard enforcement; conflicting uses	Vessel operations	Section 3.5.2.2
Mineral extraction	Increased presence of Coast Guard enforcement; conflicting uses	Vessel operations	Section 3.5.3.2
Oil and gas extraction	Increased presence of Coast Guard enforcement; conflicting uses	Vessel operations	Section 3.5.4.2
Recreation and tourism	Increased presence of Coast Guard enforcement; conflicting uses	Vessel operations	Section 3.5.5.2
Renewable energy	Increased presence of Coast Guard enforcement; conflicting uses	Vessel operations	Section 3.5.6.2
Subsistence hunting and fishing	Behavioral response of biological resources	Vessel noise; vessel movement	Section 3.5.7

Impacted Resources	***Stressor(s)***	***Source(s) of Stressor***	***Section in PEIS***
	Behavioral response of prey of biological resources	Vessel noise; vessel movement	
Transportation and shipping	Increased presence of Coast Guard enforcement; Conflicting uses	Vessel operations	Section 3.5.8.2

3.2.1 Acoustic Stressors

This section describes the characteristics of sounds produced during the Proposed Action and provides the basis for analysis of acoustic impacts on resources in Chapter 3. Explanations of the terminology and metrics utilized when describing sound in this PEIS are in Appendix C.

Acoustic stressors associated with the Proposed Action include fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, and pile driving noise. Acoustic sources associated with the Proposed Action are provided in Table 2-5. Characteristics of these sound sources are described in the following sections.

Acoustic stressors may be analyzed for both in-water and in-air impacts, depending on the ability of the sound to cross the air-water interface and the species presence (underwater or in-air) when able to detect (i.e., hear or sense) the sound.

The potential impacts to species from acoustic stressors include injury (Section 3.2.1.6.1), a hearing threshold shift (Section 3.2.1.6.2), masking (Section 3.2.1.6.3), physiological stress (Section 3.2.1.6.4), behavioral responses (Section 3.2.1.6.5), and long term consequences (Section 3.2.1.6.6). Each is discussed in detail below.

3.2.1.1 Fathometer and Doppler Speed Log Noise

Similar to commercial and private vessels, the WCCs would employ navigational acoustic devices. The source for any active underwater acoustic transmission are the fathometer (i.e., single beam echosounder) and Doppler speed log. These would be in use at all times while the vessel is not in port to ensure safe vessel operation. These sources are typically highly directional to obtain specific navigational data. The specifications of this system are discussed in detail in Section 2.2.4 and summarized in Table 2-5. The frequency range for the Doppler speed log is 270–284 kilohertz (kHz). The other navigational source that would produce underwater acoustic noise is the single beam echosounder. The echosounder frequencies can range from 3.5–1,000 kHz; however, most navigational systems operate from 50–200 kHz, which is the assumed operating frequency for the WCC and any supporting vessels. As described in Section 2.2.1, this analysis only evaluates impact from the echosounder's main lobe, since that would represent the highest energy output. For the purposes of this PEIS, the navigational technology noise discussed here, excludes the noise produced by the vessel (Section 3.2.1.2).

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

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

- Transmit primarily above 200 kHz: Sources above 200 kHz are above the hearing range of the most sensitive marine mammals and far above the hearing range of any other animals in the proposed action areas.
- Source levels of 160 dB re 1 µPa or less: Low-powered sources with source levels less than 160 dB re 1 µPa are typically hand-held sonars, range pingers, transponders, and acoustic

communication devices. Assuming spherical spreading for a 160 dB re 1 µPa source, the sound would attenuate to less than 140 dB within 33 ft (10 m) and less than 120 dB within 328 ft (100 m) of the source. Ranges would be even shorter for a source less than 160 dB re 1 µPa source level.

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

Table 3-5. Underwater Acoustic Transmission Sources for Qualitative Analysis

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

The Coast Guard evaluated the *de minimis* criteria, analyzed available information, and conducted an analysis of species distribution and potential acoustic impacts. Based on the short pulse length, narrow beam width, downward-focused beam, and manner of system operation, as well as the *de minimis* criteria, the navigational system (i.e., fathometer or single beam echosounder) could be considered *de minimis*. In addition, based on the manner of system operation and *de minimis* criteria, the Doppler speed log could be considered *de minimis* since it operates above the hearing range of most sensitive marine mammals and far above the hearing range of any other animals in the proposed action areas. Underwater acoustic sources associated with vessel operations and training, specific to vessel type, are listed in Table 2-5. However, for some biological resources, the frequency range (50–200 kHz) does overlap with the hearing range of certain species, and the potential impact of that overlap with hearing is discussed in detail by species group in the appropriate sections below.

Potential acoustic impacts to a species from fathometer and Doppler speed log noise would occur only if that species' hearing range overlaps with the frequency range of the echosounder (50–200 kHz) and/or the Doppler speed log (270–284 kHz), and if the presence of the resource overlaps with the use of the navigational equipment. The Coast Guard has determined that either the following meet the *de minimis* criteria or that the species' hearing range or resource's distribution do not overlap with the navigational equipment and are not evaluated further in this PEIS: riverine vegetation, marine vegetation, aquatic invertebrates, insects, birds, and terrestrial mammals (Table 3-3). Bottom habitats and sediments, water quality, and air quality are physical resources that would not be impacted by fathometer and Doppler speed log noise. No socioeconomic resources would be impacted by fathometer and Doppler speed log noise.

However, based on an analysis of species distribution, species' hearing ranges, and acoustic environment, the Coast Guard has determined that fathometer noise would be expected to impact ambient sound (Section 3.3.2). Fathometer noise would be expected to impact fish (Section 3.4.6) and marine mammals (Section 3.4.11). Section 3.2.1.6.2 provides a general description of temporary and permanent hearing threshold shifts and an evaluation of hearing thresholds for biological resources in the proposed action areas. Based on the Coast Guard's analysis, fathometer and Doppler speed log noise would not be expected to cause a hearing threshold shift per the *de minimis* criteria and transitory vessel movement. The analysis in this PEIS evaluates likely responses to acoustic stressors, such as masking (Section 3.2.1.6.3) and behavioral responses (Section 3.2.1.6.5), based on available scientific literature.

3.2.1.2 Vessel Noise

Vessel noise is a combination of narrowband "tonal" sounds at specific frequencies and "broadband" sounds with energy spread over a range of frequencies. Levels and frequencies of tonal and broadband sounds tend to be related to vessel size. Large ships tend to be noisier than small vessels, and ships that are underway with a full load (or towing a load) produce more noise than unladen vessels. Noise also increases with ship speed. Table 2-5 lists the noise associated with the WCC (categorized as a large vessel), as well as the cutter small boat (small vessel).

Underwater sound from vessels is generally at relatively low frequencies, usually between 5 and 500 Hz (Hildebrand 2009; NRC 2003; Urick 1983; Wenz 1962). However, 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). Anthropogenic sources of sound in the proposed action areas include smaller vessels such as skiffs, larger vessels for pulling barges to deliver supplies to communities or industry work sites, and vessels for tourism and scientific research, which all produce varying noise levels and frequency ranges. Commercial ships radiate noise underwater with peak spectral power at 20–200 Hz (Ross 1976). The dominant noise source is usually propeller cavitation which has peak power near 50–150 Hz (at blade rates and their harmonics), but also radiates broadband power at higher frequencies, at least up to 100,000 Hz (Arveson and Vendittis 2000; Gray and Greeley 1980; Ross 1976). While propeller singing is caused by blades resonating at vortex shedding frequencies and emits strong tones between 100 and 1,000 Hz, propulsion noise is caused by shafts, gears, engines, and other machinery and has peak power below 50 Hz (Richardson et al. 1995). Overall, larger vessels generate more noise at low frequencies (<1,000 Hz) because of their relatively high power, deep draft, and slower-turning (<250 rotations per minute) engines and propellers (Richardson et al. 1995). Large vessels, like the WCC, would be expected to emit vessel noise with a frequency range of 20–300 Hz with a source level of 190 dB re 1 µPa at 1 m. Small vessels, like the cutter small boat, would be expected to emit vessel noise with a frequency range of 1–7 kHz with a source level of 175 dB re 1 µPa at 1 m.

Low frequency ship noise sources include propeller noise (cavitation, cavitation modulation at blade passage frequency and harmonics, unsteady propeller blade passage forces), propulsion machinery such as diesel engines, gears, and major auxiliaries such as diesel generators (Ross 1976). Globally, commercial shipping is not uniformly distributed (NRC 2003). Other vessels may be found widely distributed outside of ports and shipping lanes. These include military vessels participating in training exercises, fishing vessels, and recreational vessels. The WCCs may be in the proposed action areas at any given time for any given amount of time and would overlap spatially and temporally with the other vessels described above.

Vessel noise has the potential to impact the physical and biological environment; however, the Coast Guard has determined that vessel noise would not impact the following resources: riverine vegetation, marine vegetation, and insects. Bottom habitats and sediments, water quality, and air quality are physical resources that would not be impacted by vessel noise. No socioeconomic resources would be impacted by vessel noise. The impacts to these resources from vessel noise are not evaluated further in this PEIS (Table 3-3). Section 3.2.1.6.2 provides a general description of temporary and permanent hearing threshold shifts and an evaluation of hearing thresholds for biological resources in the proposed action areas. Based on the Coast Guard's analysis, vessel noise would not be expected to cause a hearing threshold shift because the sound created by vessels is not typically very intense or of a very long duration (Section 3.2.1.6.2) due to the transient nature of vessels and the ability of some species to move away from vessels if disturbed. The potential impacts of vessel noise to biological resources include masking or behavioral responses, which are discussed in Sections 3.2.1.6.3 and 3.2.1.6.5, respectively.

3.2.1.3 ATON Signal Testing Noise

Some buoys have attached lights or sound signals such as bells, whistles, and gongs. When undergoing ATON maintenance, these signals must be tested to ensure they are in proper working order. Sound signals are distinguished by their tone and phase characteristics. Devices producing sound may include diaphones, diaphragm horns, sirens, whistles, bells, and gongs, each emitting a distinct sound. ATON signal noise would only be expected to transmit through the air and not through the air-water interface.

Phase characteristics are defined by the signal's sound pattern, i.e., the number of blasts and silent periods per minute and their durations. Signals sounded from fixed structures generally produce a specific number of blasts and silent periods each minute when operating. When tested, the intensity of audible signals for beacons ranges from 118–140 dBA. The frequency of these signals range from 300–850 Hz (U.S. Coast Guard 2005).

ATON signal testing noise has the potential to impact the physical and biological environment; however, the Coast Guard has determined that ATON signal testing noise would not impact the following resources: riverine vegetation, marine vegetation, aquatic invertebrates, insects, essential fish habitat (EFH), birds, and marine mammals (Table 3-3). Bottom habitats and sediments, water quality, and air quality are physical resources that would not be impacted by ATON signal testing noise and are not evaluated further in this PEIS (Table 3-3). No socioeconomic resources would be impacted by ATON signal testing noise and are not evaluated further in this PEIS (Table 3-3). Section 3.2.1.6.2 provides a general description of a temporary and permanent hearing threshold shifts and an evaluation of hearing thresholds for biological resources in the proposed action areas (see also Appendix C and Appendix D). Based on the Coast Guard's analysis, ATON signal testing noise would not be expected to cause a hearing threshold shift because the sound created by ATON signals is not typically very intense or of a very long duration (Section 3.2.1.6.2) and the ability of some species to move away from ATON when conducting ATON signal testing, if disturbed. The potential impacts of ATON signal testing noise to biological resources include masking or behavioral responses, which are discussed in Sections 3.2.1.6.3 and 3.2.1.6.5, respectively.

3.2.1.4 Tool Noise

Shoreside construction, maintenance, and brushing activities during the Proposed Action would be expected to occur during daylight hours, for up to 12 hours per day. However, use of tools and equipment would be intermittent and would not occur during this entire 12-hour period. Crew conducting this work would be deployed by the vessel to the shoreside location with any tools and equipment needed to complete shoreside tasks. Tools used in construction, maintenance, and brushing activities may include a chainsaws, brush cutters, drills, grinders, reciprocating saws, etc. Tool noise would only be expected to transmit through the air and not through the air-water interface.

Table 3-6 provides a summary of the frequency and source levels of tools that could potentially be used as part of the Proposed Action. The National Institute for Occupational Safety and Health (NIOSH) has measured the maximum A-weighted sound level of a variety of construction tools in loaded and unloaded conditions.

Table 3-6. Sound Levels Produced by Tool Noise Associated with the Proposed Action

Tool	*Sound Level (dBA)*	*Proposed Action Activity*
Brush cutter	86–110	Brushing
Chainsaw	88–121	Brushing
Pole saw	84–103	Brushing
String trimmer	77–104	Brushing
Circular saw	103–113	Construction
Drill	91–99	Construction
Grinder	95–109	Construction
Hammer drill	99–116	Construction
Impact wrench	101–111	Construction
Reciprocating saw	102–112	Construction

Source: (NIOSH 2021; Schenck 2015)

For the purposes of this document, it is assumed that tool noise sound levels would range from 77–121 dBA. While frequency ranges were not available for these tools, they should be considered broadband noise, in which sound energy is distributed over a wide section of the audible range.

Tool noise has the potential to impact the physical and biological environment; however, the Coast Guard has determined that tool noise would not impact the following resources: riverine vegetation, marine vegetation, aquatic invertebrates, insects, EFH, birds, and marine mammals (Table 3-3). Bottom habitats and sediments, water quality, and air quality are physical resources that would not be impacted by tool noise (Table 3-3). No socioeconomic resources would be impacted by tool noise (Table 3-3). Section 3.2.1.6.2 provides a general description of a temporary and permanent hearing threshold shifts and an evaluation of hearing thresholds for biological resources in the proposed action areas (see also Appendix C and Appendix D). Based on the Coast Guard's analysis, tool noise would not be expected to cause a hearing threshold shift because the sound created by tools is not typically very intense or of a very long duration (Section 3.2.1.6.2) and the ability of some species to move away from sound, if disturbed. The potential impacts of tool noise to biological resources include masking or behavioral responses, which are discussed in Sections 3.2.1.6.3 and 3.2.1.6.5, respectively.

3.2.1.5 Pile Driving Noise

Pile driving is commonly used in the construction of foundations for docks, bridges, wind turbines, and offshore oil and gas platforms. Pile driving may be conducted by WCCs within the USEC-MidATL, USEC-South, and the GoMEX and Mississippi River proposed action areas during the construction of fixed ATON, and potentially during the discontinuation (i.e., removal) of fixed ATON. The noise created by pile driving varies with the material and diameter of the pile, as well as the substrate where the pile is being driven. For fixed ATON, the vast majority of piles driven by the WCCs are wood piles with a diameter of 12 inches. Other fixed ATON structures may contain a combination of wood, steel, or concrete piles. Steel piles may be 12–18 inches in diameter or may be a 12 inch H pile, while concrete piles may be 10–14 inches. The vast majority of fixed structures built each year by the Coast Guard that involve pile driving (98 percent) consist of four or fewer piles. Most structures (85 percent) consist of a single pile. The noise ranges of impact pile driving and vibratory pile driving for these type and size ranges of piles are summarized in Table 3-7.

The most common pile driving technique is impact pile driving, where a heavy weight is lifted and dropped on top of a pile, with blows delivered at approximately one second intervals (Appendix C). High sound pressure levels are produced in the air and underwater. Sound from the hammer striking the pile radiates through the air and causes a pulse that propagates down the pile and into the water and substrate.

The majority of energy in the pulses from an impact hammer is at frequencies below 500 Hz, with near source (within 32 ft [10 m]) peak sound pressure levels underwater ranging up to 220 dB and beyond (University of Rhode Island 2019) (Table 2-5). Based on a review of available information from various pile driving studies, Table 3-7 provides the most relevant data to the proposed action in terms of pile type and size. Table 3-7 identifies sources chosen and the peak, root mean square (RMS), sound exposure level (SEL) values used to assess potential impacts to biological resources.

Based on the data in Table 3-7, impact driving 18 -inch steel pipe piles would have a peak sound pressure level (SPL) ranging from 198–208 dB[17], an RMS ranging from 183 to 187, and SEL ranging from 171–176. These values are for a single strike of a steel pipe that is 20 inches in diameter, though the WCCs would typically only pile drive a steel pipe as large as 18 inches in diameter; therefore, it is expected that sound levels produced by driving an 18 inch pile would be lower than these measurements (Caltrans 2020). The most common type of pile expected to be driven would be a timber pile, which would produce less intense noise levels when compared to steel piles (Table 3-7) (Caltrans 2020).

Sounds produced from a vibratory hammer are similar in frequency to the impact hammer, except the levels are much lower than the impact hammer and the sound is continuous while operating (University of Rhode Island 2019). Vibratory pile driving is considered a continuous type of sound, and is expressed in dB re 1 µPa measured in RMS SPL and measured in peak SPL (Table 3-7). Data is often reported in the average one-third octave band frequency spectrum over the entire pile-driving event. Non-pulse (intermittent or continuous sounds) can be tonal, broadband, or both (Southall et al. 2008). Some of these non-pulse sounds can be transient signals of short duration but without the essential properties of pulses (e.g., rapid rise time) (Southall et al. 2008).

Vibratory pile driving is commonly used to install smaller piles or may also be used to initially drive a larger pile, before the impact hammer is employed depending upon waterways bottom type (Appendix C). Vibratory pile driving may be used when bottom types and missions support employment (Table 2-4). Underwater sound levels from vibratory driving of a 12 inch wood pile is not available; therefore noise levels collected during the vibratory pile driving of a 13 inch steel pile are listed in Table 3-7 (Caltrans 2020).

[17] Underwater sound levels from a 20 inch steel pipe driven where water depth was shallow and 20 inch steel pipe driven on land next to a river were used a proxy. It is expected that sound levels from an 18 inch pile would be lower (Caltrans 2020).

Pile driving noise has the potential to impact the physical and biological environment; however, the Coast Guard has determined that pile driving noise would not impact the following resources: riverine vegetation, marine vegetation, and insects (Table 3-3). Bottom habitats and sediments, water quality, and air quality are physical resources that would not be impacted by pile driving noise (Table 3-3). No socioeconomic resources would be impacted by pile driving noise (Table 3-3). Section 3.2.1.6.2 provides a general description of temporary and permanent hearing threshold shifts and an evaluation of hearing thresholds for biological resources in the proposed action areas (see also Appendix C and Appendix D). Based on the Coast Guard's analysis, pile driving noise may cause a hearing threshold shift due to the intensity of the sound generated by pile driving. The potential impacts of pile driving noise to biological resources include injury (Section 3.2.1.6.1), hearing threshold shift (Section 3.2.1.6.2), masking (Section 3.2.1.6.3), and behavioral responses (Section 3.2.1.6.5). Potential impacts of pile driving noise to ambient sound are also evaluated (Section 3.3.2).

Table 3-7. Summary of Information Used in Pile Driving Analysis Including Underwater Source Levels for a Single Strike at 10 meters

Pile Characteristics (size; material)	*Installation Method*	*Source Level*		
		dB peak[1]	*dB RMS*[1]	*Single Strike SEL*[2]
12 inch; wood	Impact	182	167	157
	Vibratory[3]	171	155	155
18 inch; hollow steel	Impact[4]	208	187	176
	Impact[4] [Land-based]	198	183	171
	Vibratory	196	158	158
10 inch; Steel H[5]	Impact	190	175	-
	Vibratory	161	147	-
14 inch; concrete [square]	Impact	183	157	146

[1] Measured at 10 m; referenced 1 µPa.

[2] Measured at 10 m; referenced to 1 μPa^2-sec.

[3] Underwater sound levels from vibratory driving of 12 inch wood piles is not available. Coast Guard used noise levels collected during vibratory driving of a 13 inch steel pile as a proxy, though we would expect sound levels from a wood pile to be much lower (Caltrans 2020).

[4] Underwater sound levels from a 20 inch steel pipe driven where water depth was shallow and 20 inch steel pipe driven on land next to a river were used a proxy. It is expected that sound levels from an 18 inch pile would be lower (Caltrans 2020)

[5] While underwater sound levels for ~12 inch steel H pile are available, the Coast Guard used measurements for a 10 inch steel H pile as these were taken at a distance of 10 m and in shallow depths (Caltrans 2020), more similar to the Proposed Action.

3.2.1.6 Conceptual Framework for Assessing Potential Impacts from Activities and Their Associated Acoustic Stressors

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

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

The categories of potential acoustic effects are:

- Injury: Injury to organs or tissues of an animal (Section 3.2.1.6.1).
- Hearing loss or hearing threshold shift: A noise-induced decrease in hearing sensitivity that can be either temporary or permanent and may be limited to a narrow frequency range of hearing (Section 3.2.1.6.2).
- Masking: When the perception of a biologically important sound (i.e., signal) is interfered with by a second sound (i.e., noise) (Section 3.2.1.6.3).
- Physiological stress: An adaptive process that helps an animal cope with changing conditions; although too much stress can result in physiological problems (Section 3.2.1.6.4).
- Behavioral response: A reaction ranging from very minor and brief changes in attentional focus to changes in biologically important behaviors and avoidance of a sound source or area, to aggression or prolonged flight (Section 3.2.1.6.5).

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

The magnitude of the response is based on the characteristics of the acoustic stimuli and the characteristics of the animal (species, susceptibility, life history stage, size, hearing range, duration of exposure, and past experiences). Very high exposure levels close to explosives have the potential to cause injury. High-level, long-duration, or repetitive exposures may potentially cause some hearing loss. All perceived sounds may lead to behavioral responses, physiological stress, and masking. Many sounds, including sounds that are not detectable by the animal, could have no effect. Section 3.2.1.6.2 provides a summary of the metrics and hearing thresholds for biological resources in the proposed action areas.

3.2.1.6.1 Injury

Injury refers to the direct injury of tissues and organs by shock or pressure waves impinging upon or traveling through an animal's body. Injury can be mild and fully recoverable or, in some cases, lead to mortality. Injury includes both auditory and non-auditory injury. Injury may occur as a result of physical impact, such as a strike or entanglement (Section 3.2.2), or may occur as the result of an auditory injury. Aquatic, and particularly 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, but because explosions are not part of the Proposed Action, non-auditory injuries would not be expected. Auditory injury is the direct mechanical injury to hearing-related structures, including tympanic membrane rupture, disarticulation of the middle ear ossicles, and injury to the inner ear structures such as the organ of Corti and the associated hair cells. Auditory injury differs from auditory fatigue in that the latter involves the overstimulation of the auditory system at levels below those capable of causing direct mechanical damage. Auditory injury is always injurious but can be temporary. One of the most common consequences of auditory injury is hearing loss (Section 3.2.1.6.2).

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

3.2.1.6.2 Hearing Loss—Hearing Threshold Shift

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

As more research is conducted on the impacts of pile driving noise on biological resources, criteria have been developed for the different groups of species. While NMFS established criteria for acoustic effects to marine mammals (Table 3-9 and Table 3-10), some of these data are just being gathered for birds, fish, and sea turtles. Table 3-8 describes the thresholds for effects to these species based on the best available data.

Table 3-8. Thresholds for Effects to Non-Marine Mammal Species Groups

Species Group	*Behavioral Threshold*	*Threshold to TTS*	*Threshold to PTS*		*References*
	RMS	*SEL_{cum}*	*DB_{Peak}*	*SEL_{cum}*	
Birds (in air)	--	N/A[1]	125 dBA	--	(Dooling and Popper 2016)
Birds (under water)	150 dB	202 dB		208 dB	(Washington State Department of Transportation 2014)
Fish	150 dB	185 dB	206 dB	187 dB (impact); 220 dB (vibratory)	(Caltrans 2020; Carlson et al. 2007; Popper et al. 2006)
Sea turtles	175 dB	186 dB	>207 dB	210 dB	(McCauley et al. 2000; Popper et al. 2014)

[1] There are no data on TTS in birds caused by impulsive sounds.

While not specific to pile driving, studies on birds and noise have determined that a bird may experience PTS if exposed to a blast noise at an SPL over 140 dB (SPL) or a continuous SPL over 110 dBA re 20 µPa in air (Dooling and Therrien 2012). In addition, continuous noise exposure at levels above 90–95 dBA re 20 µPa can cause TTS (Dooling and Therrien 2012) in bird species. However, it should be noted that these are in air values for continuous noise sources, such as traffic noise, or a blast, which is impulsive but not repetitive like impact pile driving. The Washington State Department of Transportation issued data for the underwater impacts criteria for birds like the ESA-listed marbled murrelet (Washington State Department of Transportation 2014).

In fish, available evidence does not suggest that non-impulsive low-frequency noise, such as ship noise, can injure or kill a fish (Popper 2014). The TTS effect has been demonstrated in several fish species, mainly in response to low-frequency sources, where investigators used exposure to either long term increased background levels (Smith et al. 2004) or short term, intense sounds (Popper et al. 2005). An increased amount of research is being conducted on the impacts of pile driving on fish, including ESA-listed salmonid species. The values in Table 3-8 reflect potential impacts to fish that are hearing generalists (as opposed to hearing specialists like herring or cod) (Caltrans 2020).

There are no data on auditory effects on sea turtles, and the American National Standards Institute Sound Exposure Guidelines do not include numeric sound exposure thresholds for auditory effects on sea turtles (Popper 2014). Sea turtle hearing is most sensitive around 100 to 400 Hz in-water, is limited over 1 kHz, and is much less sensitive than that of any marine mammal. Sea turtles are likely only susceptible to auditory impacts when exposed to very high levels of sound within their limited hearing range. Popper (Popper 2014) advised the use of threshold values for fish to establish criteria for sea turtles (United States Coast Guard 2018).

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 (Table 3-9).

The guidance included a protocol for estimating PTS onset acoustic thresholds for impulsive (e.g., airguns, impact pile drivers) and non-impulsive (e.g., tactical sonar, vibratory pile drivers) sound sources for the following marine mammal hearing groups: low- (LF), mid- (MF), and high- (HF) frequency cetaceans, otariid and non-phocid marine carnivores (OW), and phocid (PW) pinnipeds. NMFS' acoustic guidelines only address effects of noise on marine mammal hearing and do not provide guidance on behavioral disturbance. Thus, the guidance does not represent the entirety of the comprehensive analysis included in this EIS, but serves as a tool to help evaluate the effect during the Proposed Action on marine mammals and to make findings required by the NMFS' various statutes, such as the MMPA. Table 3-9 provides the resultant TTS and PTS onset auditory acoustic thresholds for non-impulsive sounds[18] from NMFS' technical guidance (National Marine Fisheries Service 2016b, 2018a).

Table 3-9. 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, *Cephalorynchus* spp., some *Lagenorhynchus* species *Kogia* spp.	153 dB SEL_{cum}	173 dB SEL
PW (in water)	Harbor, Bearded, Hooded, Common, Spotted, Ringed, Baikal, Caspian, Harp, Ribbon, Gray, Monk, Elephant, Ross, Crabeater, Leopard, and Weddell seals	181 dB SEL_{cum}	201 dB SEL
OW (in water)	Guadalupe fur seal, Northern fur seal, California sea lion, Steller sea lion	199 dB SEL_{cum}	219 dB SEL
Sirenians	Manatee, dugong	186 dB SEL_{cum}	206 dB SEL_{cum}

SEL: Sound Exposure Level

[1] Determined from minimum value of exposure function and the weighting function at its peak

[2] The SEL_{cum} metric accounts for the accumulated exposure (i.e., SEL_{cum} cumulative exposure over the duration of the activity within a 24-hour period)

Reference: NMFS Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (National Marine Fisheries Service 2016b)

Table 3-10 provides the resultant TTS and PTS onset auditory thresholds for impulsive sounds, utilizing NMFS' technical guidance (National Marine Fisheries Service 2016b, 2018a).

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

Table 3-10. Onset of PTS and TTS for All Marine Mammals[1] for Underwater Impulsive Sounds

Group	*Species*	*Physiological Criteria (24 hours)*	
		Weighted Onset TTS[1]	*Onset PTS (received level)*
LF Cetaceans	All mysticetes	168 dB SEL_{cum}[2]	183 dB SEL
MF Cetaceans	Most delphinids, beaked whales, medium and large toothed whales	170 dB SEL_{cum}	185 dB SEL
HF Cetaceans	Porpoises, River dolphins, *Cephalorynchus* spp., some *Lagenorhynchus* species *Kogia* spp.	140 dB SEL_{cum}	155 dB SEL
PW (in water)	Harbor, Bearded, Hooded, Common, Spotted, Ringed, Baikal, Caspian, Harp, Ribbon, Gray, Monk, Elephant, Ross, Crabeater, Leopard, and Weddell seals	170 dB SEL_{cum}	185 dB SEL
OW (in water)	Guadalupe fur seal, Northern fur seal, California sea lion, Steller sea lion	188 dB SEL_{cum}	203 dB SEL
Sirenians	Manatee, dugong	175 dB SEL_{cum}	190 dB SEL_{cum}

SEL: Sound Exposure Level

[1] Determined from minimum value of exposure function and the weighting function at its peak

[2] The SEL_{cum} metric accounts for the accumulated exposure (i.e., SEL_{cum} cumulative exposure over the duration of the activity within a 24-hour period)

Reference: NMFS Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (National Marine Fisheries Service 2016b, 2018a)

NMFS uses generic sound exposure thresholds (e.g., not specific to a particular hearing group) to determine whether an activity produces underwater sounds that might result in disturbance of marine mammals (70 FR 1871; January 11, 2005). Therefore, the Coast Guard uses the following conservative thresholds of underwater SPLs, expressed as RMS, from broadband sounds that can cause behavioral disturbance:

- Impulsive sound (e.g., impact pile driving): 160 dB re 1 μPa_{RMS}
- Non-impulsive sound (e.g., vibratory pile driving): 120 dB re 1 μPa_{RMS}

It should be noted that these behavioral disturbance thresholds, particularly for non-impulsive sounds, are conservative, and in most cases, animals would not be disturbed if exposed at these received levels. For example, Southall et al. (2007a) found that cetaceans were more likely to exhibit a behavioral response starting at levels of greater than or equal to 160 dB re 1 µPa, 40 dB higher than the 120 dB threshold for non-impulsive sound. In the absence of behavioral thresholds for sea turtles, the Coast Guard used the 160 dB re 1 μPa_{RMS} and 120 dB re 1 μPa_{RMS} to determine whether an activity produces underwater sounds that might result in disturbance to sea turtles. Table 3-42 provides the estimated range to effects from impact and vibratory pile driving.

3.2.1.6.3 Masking

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

The impact 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. 2004b; Parks et al. 2011; Southall et al. 2000). In the coastal zone, ambient noise levels vary depending on openness of the area (e.g., a bay versus an inlet or the open coast) and the level of marine traffic and industrial use. Ambient underwater sound levels (dB re 1 µPa) in large marine bays, nearshore, with heavy commercial and recreational boat traffic range from 113 dB_{PEAK} to 156 dB_{PEAK} (Laughlin 2006; O'Neal 1998) (Table 3-12). 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 increasing noise levels. A noise that is just detectable over ambient levels is unlikely to actually cause any substantial masking above that which is already caused by ambient noise levels (NRC 2003, 2005).

Based on the Coast Guard's analysis, masking as a result of the Proposed Action is evaluated in this PEIS for the following biological resources: aquatic invertebrates (Sections 3.4.4.2.1 and 3.4.4.2.2), amphibians (Sections 3.4.5.2.1 through 3.4.5.2.3) birds (Sections 3.4.8.2.1 and 3.4.8.2.2), fish (Sections 3.4.6.2.1 through 3.4.6.2.3), reptiles (Sections 3.4.9.2.1 through 3.4.9.2.4), terrestrial mammals (Sections 3.4.10.2.1 through 3.4.10.2.4), and marine mammals (Sections 3.4.11.2.1 through 3.4.11.2.3).

3.2.1.6.4 Physiological Stress

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 by an animal, a stress response can occur. The severity of the stress response depends on the received sound level by the animal, the details of the sound-producing activity, and the animal's life history stage, and past experience with the stimuli. An animal's life history stage includes its level of physical maturity (i.e., larva, infant, juvenile, sexually mature adult) and the primary activity in which it is engaged (e.g., mating, feeding, or rearing/caring for young). An animal's life history stage is an important factor to consider when predicting whether a stress response is likely. Prior experience with a stressor may be of particular importance because repeated experience with a stressor may dull the stress response via acclimation (St. Aubin and Dierauf 2001) or increase the response via sensitization. If an animal suffers injury (Section 3.2.1.6.1) or hearing loss (Section 3.2.1.6.2), 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 responses may be characterized by the release of either or both catecholamines and glucocorticoid hormones. Regardless of the physiological changes that make up the stress response, the stress response may contribute to an animal's decision to alter its behavior.

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

Frequent physiological stress responses may accumulate over time, increasing an animal's chronic stress level. Elevated chronic stress levels are usually a result of a prolonged or repeated disturbance. Chronic elevations in the stress levels (e.g., cortisol levels) may produce long term health consequences (Section 3.2.1.6.6) that can reduce lifetime reproductive success.

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

3.2.1.6.5 Behavioral Responses

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

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

Based on the Coast Guard's analysis, behavioral responses as a result of the Proposed Action are evaluated in this PEIS for the following biological resources: aquatic invertebrates (Section 3.4.4.2.1 and 3.4.4.2.2), amphibians (Sections 3.4.5.2.1 through 3.4.5.2.3, and 3.4.5.2.8), birds (Sections 3.4.8.2.1 and 3.4.8.2.2), fish (Sections 3.4.6.2.1 through 3.4.6.2.3, and 3.4.6.2.6), reptiles (Sections 3.4.9.2.1 through 3.4.9.2.6, and Section 3.4.9.2.8), terrestrial mammals (Sections 3.4.10.2.1 through 3.4.10.2.5), and marine mammals (Sections 3.4.11.2.1 through 3.4.11.2.6).

3.2.1.6.6 Long Term Consequences

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

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

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

3.2.2 Physical Stressors

Physical stressors associated with the Proposed Action that may impact the environment include vessel movement, bottom devices, construction, brushing, pile driving, unrecovered jet cone moorings, and ATON retrieval devices and tow lines. Each stressor is discussed in detail below.

3.2.2.1 Vessel Movement

Vessels associated with the Proposed Action are the three classes of WCCs and smaller support vessels, the cutter small boats. The operational speeds of these vessels (Section 2.2.1) vary depending on the activity and water depth. Vessels would not be operating at their maximum speeds unless involved in an emergency situation. While Coast Guard trains and prepares to respond to emergency situations, the emergency response itself is not part of the Proposed Action; therefore, maximum speeds are not expected as part of the Proposed Action.

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

Vessel movement has the potential to impact the physical and biological environment; however, the Coast Guard has determined that vessel movement would not impact the following resources: ambient sound and terrestrial mammals (Table 3-3). No socioeconomic resources would be impacted by vessel movement (Table 3-3).

3.2.2.2 Bottom Devices

Impacts from bottom devices include disturbance, temporary and localized disruption of sediment, and mortality. WCC operations use bottom devices such as ATON sinkers, chains, spuds, and anchors. These may impact exposed substrate, sediments, and bottom habitat within and just outside of the footprint of these devices. ATON retrieval devices are discussed separately in Section 3.2.2.7.

During the establishment of floating ATON, concrete sinkers are commonly deployed from the existing inland tender fleet to secure floating ATON to the riverbed or the seafloor. The sinker and attached mooring chain moves quickly through the water column from the vessel and settles on the bottom. Similar to the existing inland tender fleet, WCCs would also deploy concrete sinkers. Therefore, settling of the sinker and chain could impact resources by creating localized disturbance on the bottom of the river or coastal area in the footprint of the sinker. Chains from floating ATON also move in a circle beneath the water and create a “circle of scour” or scour area on the seafloor. The chain portion of a floating ATON may crush and displace organisms that settle in the scour radius surrounding the sinker.

A jet pipe may also be used to establish floating ATON. The force of the water pressure used to insert the jet cone mooring into the soft bottom could impact resources within the footprint of the jet cone and may cause some elevated levels of turbidity in the vicinity of the device. Discontinuance of ATON may also impact resources by creating localized disturbance from the removal of the sinker from the river bottom or seafloor.

Due to the dynamic nature of the proposed action areas and the variability of water levels, floating ATON could be repositioned in order to maintain a safe and navigable channel, requiring the WCC to drag the ATON a short distance, rather than recovering and redeploying it. This may cause some disturbance, scour, and displacement of sediment along the path the sinker is dragged and may cause some increase in turbidity. Dragging of ATON would typically occur on mud-bottomed rivers and would avoid sensitive rocky substrate or coral.

Throughout these evolutions, the WCC would either be anchored or spudded down to secure itself. When deployed, the anchor and chain would move quickly through the water column from the vessel and settle on the bottom. Settling of the anchor and chain could impact resources by creating a localized disturbance and scour area on the bottom in the footprint of the anchor and attached chain. Anchoring would only occur in soft-bottom sediment such as mud, sand, or clay and would avoid hard rock and coral. Impacts to soft-bottom habitats would be short term, as sediments are constantly moving and shifting. Spudding requires steel beams to be lowered from the vessel to the riverbed or seabed in order temporarily secure it in place. Although there may be increases in turbidity from spudding, it is expected to quickly subside (i.e., within hours) following completion of ATON activity. Any sediments that do not immediately settle to the seafloor are expected to be swept away in currents and/or tidal flow and diluted to undetectable levels. Similar to anchoring, spudding would also only occur in soft-bottom sediment in the proposed action areas.

Bottom devices have the potential to impact the physical and biological environment; however, the Coast Guard has determined that bottom devices would not impact the following resources: insects, birds, and terrestrial mammals (Table 3-3). Air quality and ambient sound are physical resources that would not be impacted by bottom devices (Table 3-3). No socioeconomic resources would be impacted by bottom devices (Table 3-1).

3.2.2.3 Construction

Impacts from construction (excluding pile driving, Section 3.2.2.5) include terrestrial disturbance, bottom disturbance, and the removal of vegetation (Section 3.2.2.4). WCC construction and maintenance operations of fixed ATON structures may impact exposed substrate, sediments, and vegetation within and in the vicinity of the footprint of the ATON.

During the construction of fixed ATON structures ashore, metal towers (e.g., Triangle or Rohn) would be secured to concrete foundations and supported by guy wires. These structures would be transported to the construction sites via a WCC and installed by the crew. Establishment of these towers may require some clearing of vegetation and disturbance to sediment in order to access the desired location, construct the foundation, and install and maintain the towers. Any impacts would be localized to the footprint of the fixed ATON structure, a small area around the ATON, and potentially a pathway leading to the ATON.

Construction has the potential to impact the physical and biological environment; however, the Coast Guard has determined that construction would not impact the following resources: fish, EFH, and marine mammals (Table 3-3). Air quality and ambient sound are physical resources that would not be impacted by bottom devices (Table 3-3). No socioeconomic resources would be impacted by construction (Table 3-1).

3.2.2.4 Brushing

Impacts from brushing include terrestrial disturbance, the removal of vegetation, and the use of chemicals, such as pesticides or herbicides. Brushing occurs when vegetation that obscures or endangers a beacon and reduces the operational range of an ATON must be cleared. To ensure visibility, WCCs would deploy crews that would manually remove any brush or trees surrounding fixed shoreside ATON structures. Crews would conduct surveys (both prior to arrival and once onsite) to verify what kinds of vegetation and other biological resources may be present. Leaving the brush as it lies after clearing may be appropriate; however, complete removal of cleared brush may be necessary depending on the location.

ATON brushing operations fall under the CATEX for ATON operations (Section 2.2.2.2). The impacts of brushing would be minimal, as ESA-listed species would not be disturbed by these activities and brush removal would be selective, and ATON areas would not be clear-cut (U.S. Coast Guard 2017a). Brushing would only occur at a limited number of fixed shoreside ATON sites in each proposed action area. The numbers of total fixed shoreside ATON structures in each proposed action area are listed in Table 2-3.

Although brushing operations fall under a CATEX, common situations that might preclude the use of the CATEX (Section 2.2.2.2) may occur as a result of WCC proposed action activities. Therefore, brushing has the potential to impact the physical and biological environment; however, the Coast Guard has determined that brushing would not impact marine mammals (Table 3-3). Air quality and ambient sound are physical resources that would not be impacted by brushing (Table 3-3). No socioeconomic resources would be impacted by brushing (Table 3-3).

3.2.2.5 Pile Driving

Impacts from pile driving include bottom or habitat disturbance, vibrations, strike, injury, mortality, or behavioral response. Temporary and localized disruption of sediment would also occur while pile driving. Pile driving operations conducted by a WCC may impact exposed substrate, sediments, and individual organisms within and just outside of the footprint of the pile. Pile driving for fixed ATON may crush individual sessile benthic organisms within the footprint of the new piling. The increased turbidity may temporarily interfere with the visibility or foraging success of some animals in the immediate vicinity. Pile driving would occur in all proposed action areas, but varies throughout each proposed action area in terms of intensity (number of piles driven per year). Potential pile driving frequency for each proposed action area is detailed in Table 2-4.

Pile driving has the potential to impact the physical and biological environment; however, the Coast Guard has determined that pile driving would not impact insects, birds, and terrestrial mammals (Table 3-3). Air quality and ambient sound are physical resources that would not be impacted by pile driving (Table 3-3). No socioeconomic resources would be impacted by pile driving (Table 3-3).

3.2.2.6 Unrecovered Jet Cone Moorings

Potential impacts from unrecovered jet cone moorings include disturbing the bottom (including covering habitat or species) and degradation. In most cases, if an ATON secured with a jet cone mooring needs to be retrieved, the jet cone mooring would not be recovered due its strong hold in the riverbed. If necessary, the wire mooring would be cut using bolt cutters, a saw, or an oxyacetylene torch and then left behind. If jet cone moorings are not recovered, they would remain buried in the riverbed sediments.

Unrecovered jet cone moorings have the potential to impact the physical and biological environment; however, the Coast Guard has determined that unrecovered jet cone moorings would not impact marine vegetation, insects, birds, reptiles, terrestrial mammals, and marine mammals (Table 3-3). Air quality and ambient sound are physical resources that would not be impacted by unrecovered jet cone moorings (Table 3-3). No socioeconomic resources would be impacted by unrecovered jet cone moorings (Table 3-3).

3.2.2.7 ATON Retrieval Devices

The impacts from ATON retrieval devices (i.e., grappling hooks and sweeping wires) would be bottom disturbance or entanglement with species within the proposed action areas. Retrieval devices would be used to recover ATON for maintenance (Section 2.2.2.1.2) or after wreckage (Section 2.2.2.5), or to discontinue ATON permanently (Section 2.2.2.1.3). In the event that an ATON needs to be recovered due to its destruction or dislodging, the WCC would slowly drag a grapnel hook along the bottom to hook onto and recover the buoy and mooring. A sweeping method may also be used, where a wire would sweep across the bottom to recover the wreckage.

ATON retrieval devices have the potential to impact the physical and biological environment; however, the Coast Guard has determined that ATON retrieval devices would not impact insects and terrestrial mammals (Table 3-3). Air quality and ambient sound are physical resources that would not be impacted by ATON retrieval devices (Table 3-3). No socioeconomic resources would be impacted by ATON retrieval devices (Table 3-3).

3.2.2.8 Tow Lines

All WCCs would be capable of towing another vessel. The Seamanship TTP details the SOPs for vessel tow (U.S. Coast Guard 2018). These include the constant monitoring of the tow, including the line and all connection points. As towing another vessel requires that the line be under strain, no loops or slack would be present in the line during towing. A catenary would be maintained while towing to act as a natural shock absorber between the two connected vessels.

Tow lines have the potential to impact the biological environment; however, the Coast Guard has determined that tow lines would not impact insects and terrestrial mammals (Table 3-3). Air quality, ambient sound, bottom habitats and sediment, and water quality are physical resources that would not be impacted by tow lines (Table 3-3). No socioeconomic resources would be impacted by tow lines (Table 3-3).

3.3 Physical Environment

The Proposed Action would occur on the surface of the water, underwater, and on land in the footprint of fixed ATON structures within the proposed action areas. Protocols and equipment incidental to the normal operation of a Coast Guard vessel would follow all regulations in order to comply with state and federal laws regarding pollution of air and water. With the exception of debris from ATON that is unable to be recovered (Section 3.2.2.6), no foreign substances or materials would be released into the air or water as part of the Proposed Action. Air quality, ambient sound, bottom habitat and sediments, and water quality in the proposed action areas, as well as potential impacts to these resources as a result of the Proposed Action are discussed in Sections 3.3.1 through 3.3.5.

3.3.1 Air Quality

3.3.1.1 Affected Environment

Under the Clean Air Act (CAA), the EPA established National Ambient Air Quality Standards (NAAQS; 40 CFR part 50). The WCCs are exempt from emission requirements of the Clean Air Act (CAA) under the EPA's National Security Exemption regulation at 40 C.F.R. § 1068.225. Coast Guard requires the WCC engine be Tier 3 compliant in the specifications. The WCC is currently in initial design phase with an Operational Requirement Document (ORD) outlining desired operational performance and parameters. The first WCC would not be operational until 2025 and features, including the specific engine that will be installed, would be determined during the design and build of the vessel. Once these details have been determined, any new information could be included in a tiered NEPA analysis to this PEIS if the engine or fuel used would require additional analysis. For a discussion of criteria pollutants and NAAQS, see Appendix A (under the Clean Air Act [CAA]) and the full list of NAAQS in Appendix F.

The CAA regulates all new and in-use vessels flagged in the United States that contain marine diesel engines, as well as the emissions from these engines and the sulfur content of marine fuel used. The EPA's strategy to address emissions from all ships that affect U.S. air quality includes enforcement of CAA standards, as well as implementation and enforcement of the international standards for marine engines and their fuels contained in Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL) Appendix A under the authority of the Act to Prevent Pollution from Ships.

The CAA applies to vessel emissions created in coastal waters within 3 nm of shore. Per the CAA, each state must have an EPA-approved State Implementation Plan (SIP). The SIP sets forth the regulations for maintaining compliance with the NAAQS. Coastal waters within 3 nm (6 km) of the coast are under the same air quality jurisdiction as the contiguous land area. The proposed action areas for the WCCs include waterways which may or may not be in attainment of NAAQS, depending on the state in consideration (Table 3-11). WCC operations would not be equal amongst the states in the proposed action areas, so air emissions would not be equally distributed amongst those states. WCC transit into and out of homeports would occur in coastal areas (within 3 nm [6 km] from shore). WCC homeport[19] vicinities would be areas with the most consistent WCC presence. Since some states contain more waterways and ATON that require servicing when compared to other states, operations would be more concentrated in states with greater numbers of ATON.

Table 3-11 lists the states within each proposed action area with counties that are not in attainment of the NAAQS for ozone, particulate matter (PM), lead (Pb), or sulfur dioxide (SO_2). As of 2010, all states are either unclassifiable or are in attainment of NAAQS for nitrogen dioxide. In addition, as of 2010 all states are in attainment of NAAQS for carbon monoxide.

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

Table 3-11. States Within the Proposed Action Areas in NonAttainment of the NAAQS

State	Ozone Attainment?	Lead Attainment?	PM Attainment?	SO_2 Attainment?
USEC-MidATL Proposed Action Area				
Delaware	N	Y	Y	Y
District of Columbia	N	Y	Y	Y
Maryland	N	Y	N	N
New Jersey	N	Y	Y	Y
North Carolina	Y	Y	Y	Y
Pennsylvania (eastern)[1]	N	Y	Y	Y
Virginia	N	Y	Y	Y
USEC-South Proposed Action Area				
Florida	Y	Y	Y	Y
Georgia	Y	Y	Y	Y
South Carolina	Y	Y	Y	Y
Great Lakes Proposed Action Area				
Michigan	Y	Y	Y	Y
GoMEX and Mississippi River Proposed Action Area				
Alabama	Y	Y	Y	Y
Arkansas	Y	Y	Y	Y
Illinois	N	Y	Y	N
Indiana	N	Y	Y	N
Iowa	Y	Y	Y	N
Kansas	Y	Y	Y	N
Kentucky	N	Y	Y	N
Louisiana	Y	Y	Y	N
Minnesota	Y	N	Y	Y
Mississippi	Y	Y	Y	Y
Missouri	N	N	Y	N
Nebraska	Y	Y	Y	Y
Ohio	N	N	Y	N
Oklahoma	Y	Y	Y	Y
Pennsylvania (western)[1]	Y	N	N	N
Tennessee	Y	Y	Y	Y
Texas	N	Y	Y	Y
West Virginia	Y	Y	Y	N
Wisconsin	Y	Y	Y	Y
PNW Proposed Action Area				
Oregon	Y	Y	Y	Y
Washington	Y	Y	Y	Y
SEAK Proposed Action Area				
Alaska	Y	Y	Y	Y

[1] Pennsylvania is divided east to west. The western part of Pennsylvania is in the GoMEX and Mississippi River proposed action area while the eastern part is in the USEC-MidATL proposed action area.

3.3.1.2 Environmental Consequences to Air Quality

Impacts to air quality would potentially result from vessel operations (i.e., emissions) associated with the Proposed Action. There would be no impacts to air quality from fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, pile driving noise, vessel movement, bottom devices, construction, brushing, pile driving, unrecovered jet cone moorings, ATON retrieval devices, or tow lines associated with the Proposed Action. Therefore, these are not discussed further in this PEIS.

Criteria air pollutants are generated by the combustion of fuel by surface vessels. Pollutants in the air are cumulative in nature, and the thresholds of these pollutants in the air are set by the EPA in the NAAQS (Appendix F). The vessels, including WCCs and cutter small boats, are considered non-road mobile sources of emissions, which include CO, nitrogen oxide (NOX), PM, SO2, and volatile organic compounds (VOCs). Emissions from vessels transiting in coastal waters of the proposed action areas could be carried ashore by winds, and most vessel operations would occur within 3 nm (6 km) of the coast or on inland rivers.

3.3.1.2.1 Climate Change

Emissions from vessels (including WCCs and cutter small boats) would contribute to global emissions, greenhouse gases, and the concentration of particulate matter. Within the proposed action areas, most counties are in designated attainment areas. Because of the Proposed Action, estimated emissions (of criteria pollutants, carbon dioxide [CO_2], and Hazardous Air Pollutants [HAPs]) would be minor. Vessels are the only emission sources present, and operations of these would occur over a very large area. The air pollutants suspected to be emitted (HAPs, Greenhouse gases [GHGs], and criteria pollutants) would not have a measurable impact on ambient air quality in the proposed action areas due to the widespread and intermittent operations of a small number of vessels (i.e., 30 WCCs and cutter small boats). Because of the Proposed Action, estimated emissions (of criteria pollutants, CO_2, and HAPs) would be minor.

An increase in the atmospheric concentrations of greenhouse gases produces a positive climate forcing, or warming effect. Within the proposed action areas, global shipping contributes to climate change through the emissions of Black Carbon produced by combustion of marine fuels. Thus, CO_2 is the primary greenhouse gas emitted from marine shipping; however small amounts of methane and NO_X are also emitted. Global aviation (including domestic and international; passenger and freight) accounts for 1.9 percent of greenhouse gas emissions, 2.5% of CO_2 emissions, and 3.5 percent of "effective radiative forcing" (a closer measure of its impact on global warming) (Lee et al. 2021). According to the EPA, aggregate greenhouse gas emissions in 2019 were 12.1 percent above emissions in 1990 and from 1990 to 2019, the total warming effect from greenhouse gases by humans to the Earth's atmosphere increased by 45 percent (EPA 2021b). In 2019, all U.S. military aviation jet fuel consumption, when compared to the total from U.S. and foreign carriers, was 3.7 percent. In addition, all U.S. military fuels (e.g., Navy) consumption, when compared to total marine fuels for international transport, was 6.8 percent in 2019. However, while all of the Coast Guard's vessels and aircraft are included in the EPA's 2019 data presented above (EPA 2021b), the Coast Guard only accounts for a small portion of the total contribution to greenhouse gas emissions. Although, vessels are emission sources associated with the Proposed Action, their contribution to climate change is considered negligible.

3.3.1.2.2 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, the majority of the states within the proposed action areas are in attainment of the criteria pollutants; therefore, the General Conformity Rule does not apply. In those states which are not in attainment of the NAAQS (i.e., Delaware, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Minnesota, Missouri, New Jersey, Ohio, Pennsylvania, Texas, Virginia, Washington DC, and West Virginia), air pollutant emissions under Alternative 1 would not result in violations of state or federal air quality standards because they would not have a measurable impact on air quality. Because vessels would be replaced with new, more efficient WCC vessels, there would be no change to baseline air quality conditions as a result of the Proposed Action. Therefore, there would be no significant impact to air quality as a result of Alternative 1.

3.3.1.2.3 Impacts Under Alternatives 2–3

Under Alternatives 2–3, the majority of the states within the proposed action areas are in attainment of the criteria pollutants; therefore, the General Conformity Rule does not apply. In those states which are not in attainment of the NAAQS (i.e., Delaware, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Minnesota, Missouri, New Jersey, Ohio, Pennsylvania, Texas, Virginia, Washington DC, and West Virginia), air pollutant emissions under Alternatives 2–3 would not result in violations of state or federal air quality standards because they would not have a measurable impact on air quality. Because existing vessels would be replaced with new, more efficient WCC vessels, there would be no change to baseline air quality conditions as a result of the Proposed Action. Therefore, there would be no significant impact to air quality as a result of Alternatives 2–3.

3.3.1.2.4 Impacts Under the No Action Alternative

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

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

3.3.2 Ambient Sound

3.3.2.1 Affected Environment

Biological, abiotic, and anthropogenic (manmade) sounds make up the existing ambient sound environment. Each of the proposed action areas includes different combinations of sources that create the in-air and in-water ambient sound environments. Different sources of sound produce varying noise levels and frequency ranges throughout the proposed action areas. The proposed action areas cover a large geographical area. In lieu of actual ambient sound measurements in each location, Table 3-12 provides representative ambient sound levels for various habitats, including those in the coastal zone and in freshwater habitats. These values are reported ambient underwater sound levels (expressed in dB re 1 µPa) measured at various open water locations in the western United States (Caltrans 2020) and examples of freshwater locations in Austria (Amoser and Ladich 2005b; Wysocki et al. 2007).

Table 3-12. Ambient Sound Level Data for Various Environmental Settings

Environment Description	*Ambient Sound Level*	*Actual Location Where Measurement was Taken*	*Resource*
Large marine bay, heavy industrial use, and boat traffic	120–155 dB_{PEAK}, 133 dB_{RMS}	San Francisco Bay - Oakland outer harbor	(Strategic Environmental Consulting 2004)
Large marine bay and heavy commercial boat traffic	147–156 dB_{PEAK}, 132–143 dB_{RMS}	Elliot Bay – Puget Sound, Washington	(Laughlin 2006)
Large marine inlet and some recreational boat traffic	115–135 dB_{RMS}	Hood Canal, Washington	(Carlson et al. 2005)
Open ocean	74–100 dB_{PEAK}	Central California coast	(Heathershaw et al. 2001)
Large marine bay, nearshore, heavy commercial, and recreational boat traffic	113 dB_{PEAK}	Monterey Bay, California	(O'Neal 1998)
Large marine bay, offshore, heavy commercial, and recreational boat traffic	116 dB_{PEAK}	Monterey Bay, California	(O'Neal 1998)
Marine surf	138 dB_{PEAK}	Fort Ord Beach, California	(Wilson et al. 1997)
Lakes (ranging in size from 0.3–124 mi^2 [0.7–321 km^2]) and a pond	79–99 dB	Lakes Lunz, Mondsee, and Neusiedl in Austria	(Amoser and Ladich 2005b; Wysocki et al. 2007)
Shallow (1.6–3.3 ft [0.5–1.0 m) river backwaters	88–99 dB	Backwater of the Danube River in Danube Floodplain National Park in Austria	(Amoser and Ladich 2005b; Wysocki et al. 2007)
Creeks and rivers with various levels of flow/current velocities and/or human activity	109–135 dB	Parts of the Danube River and alpine creeks of Austria	(Amoser and Ladich 2005b; Wysocki et al. 2007)

In the coastal zone, ambient underwater noise levels largely depend on the flow of water in these areas, as well as the level of human activity, such as vessel presence (Amoser and Ladich 2005b; Wysocki et al. 2007). Ambient sound levels in freshwater habitats 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). Typically, in the open ocean, ambient noise levels are between about 60 and 80 dB re 1 μPa, especially at lower frequencies (below 100 Hz) (NRC 2003). Ambient sound sources in the ocean generally consist of noise from vessels and wind related noise generated at the surface (Eller and Cavanagh 2000). In the frequency band 5–500 Hz, the most common sources of sound in the ocean are seismic events, whales, ships, and wind-generated breaking waves (Curtis et al. 1999).

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. The brook/creek habitats had the highest levels and pond/lake habitats had the lowest levels at frequencies below 500 Hz. River habitats had the highest levels at all higher frequency bands (Rountree et al. 2020).

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

Depending on the habitat, biological sound sources in air (on land) may include communications of songbirds, insects, amphibians, and mammals. These species may make sounds to establish territorial boundaries or for courtship or mating (Appendix E), contributing to the ambient soundscape. Birds hear best in the range of their species-specific vocalizations (with the exception of some nocturnal predators), which would be between 1–6 kHz (Dooling 1982; Dooling and Popper 2007). Most insect sounds range from 4–20 kHz, though one moth produces sound up to 120 kHz and typical fruit fly songs have frequencies of 200–450 Hz (Bennet-Clark 1998; Ewing and Bennet-Clark 1968). Amphibians, such as frogs and toads, produce a rich variety of sounds, calls, and songs during mating rituals (Appendix E), which contribute to ambient sound. Calls are often through air, but other mediums (e.g., water) have aso been discovered and some also use ultrasound. In addition, the audible frequency range in terrestrial mammals is highly diverse (Fay and Wilber 1989; Ladich 2019) (Appendix E), contributing to the ambient soundscape.

3.3.2.2 Environmental Consequences to Ambient Sound

Impacts to the underwater ambient sound environment would potentially result from fathometer and Doppler speed log noise, vessel noise, and pile driving noise associated with the Proposed Action. Impacts to the in air ambient sound environment would potentially result from vessel noise and pile driving noise associated with the Proposed Action. ATON signal testing noise and tool noise would be brief, intermittent, and would not reach a level that would change the ambient sound level in any proposed action area; therefore these stressors are only discussed in Table 3-3 and are not further analyzed in this PEIS. There would be no impact to ambient sound from physical stressors including vessel movement, bottom devices, construction and brushing, pile driving, unrecovered jet moorings, ATON retrieval devices, or tow lines associated with the Proposed Action (Table 3-3). Therefore, these are not discussed further in this PEIS.

3.3.2.2.1 Fathometer and Doppler Speed Log Noise (Underwater)

Fathometer and Doppler speed log noise may temporarily increase ambient sound levels in aquatic environments in the proposed action areas. However, an increase in ambient noise levels resulting from vessels in a given proposed action area is not likely because of the transient and temporary nature of the Proposed Action. WCCs and cutter small boats would move throughout a large area during operations, with locations varying depending on the needs and duties of the vessels.

WCC assets would not be expected to alter current ambient sound levels, particularly as the WCC fleet would replace the aging existing inland tender fleet. Therefore, ambient sound would be similar to what is currently present.

3.3.2.2.2 Vessel Noise (Underwater and In Air)

Vessel noise may temporarily increase ambient sound levels underwater and in air within the proposed action areas. Underwater sound from vessels is generally at relatively low frequencies, usually between 5 and 500 Hz (Hildebrand 2009; NRC 2003; Urick 1983; Wenz 1962). However, 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). Anthropogenic sources of sound in the proposed action areas include smaller vessels such as skiffs, larger vessels for pulling barges, and vessels for tourism and scientific research, which all produce varying noise levels and frequency ranges. Such vessels may be found widely distributed throughout the proposed action areas and may overlap with WCC vessels. It would be expected that the operation of WCC vessels (and their resulting noise) associated with the Proposed Action would be similar to the noise from other vessels in the proposed action areas.

3.3.2.2.3 Pile Driving Noise (Underwater and In Air)

Pile driving noise may temporarily increase ambient sound levels underwater and in air within the proposed action areas. Impact pile driving noise consists of a series of peak events and is generally reported at maximum levels. The loudest in-air noise from impact pile driving results from the impact of the hammer dropping on the pile. When conducting an in-air noise assessment involving impact driving of hollow steel piles, the USFWS currently recommends assuming a noise level of 115 dBA L_{max} at 50 ft (15 m) for 30-inch piles (Washington State Department of Transportation 2014) as a worst-case scenario, where L_{max} is the maximum value of a noise level that occurs during a single event. As discussed in Section 3.2.1.5, the noise level resulting from impact pile driving varies depending on the size and material of pile used. Typical in-air ambient sound levels in a metropolitan, urbanized area varies from 60-70 dB and can be as high as 80 dB or greater, whereas quiet suburban neighborhoods experience ambient noise levels approximately 45-50 dB (Pennsylvania State University 2018). The range of underwater pile driving noise is presented in Table 3-7. Overall, the maximum values for impact pile driving of any material or size would be a peak SPL of 208 dB, a RMS of 187 dB, and a single strike SEL of 176 dB at 10 m. The maximum values for vibratory pile driving of any material or size would be a peak SPL of 196 dB, a RMS of 158 dB, and a single strike SEL of 158 dB at 10 m. Typical underwater ambient sound levels encountered throughout the proposed action areas are presented in Table 3-12, and range from 74 dB_{PEAK} to 156 dB_{PEAK} (Table 3-12).While pile driving would be expected to increase ambient sound levels, Coast Guard pile driving events only last, at most, a few hours. For example, the vast majority of Coast Guard structures that require pile driving have four or fewer piles and a typical pile only takes approximately 20 minutes to drive.

Though the sound level, both in air and underwater, would increase temporarily, the duration of most pile driving is short, and would only continue for the duration of the number of strikes it takes to drive the pile into position. For most piles, this is 20 minutes. In addition, not all ATON in every proposed action area require pile driving. Therefore, given the limited duration of Coast Guard pile driving events in the vast geographic proposed action areas and limited number of ATON that may require pile driving, ambient sound levels would only be impacted by the Proposed Action infrequently.

3.3.2.2.4 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, ambient sound within the proposed action areas would be similar to what is currently present because the new WCC fleet would replace the capabilities of the existing inland tender fleet. In addition, WCC assets would not be expected to alter current levels of ambient sound because noise created by the Proposed Action would occur intermittently (occur for the duration that the sound is active) in any given location and would be spread over a very large very large proposed action areas. Because the existing inland tender fleet would be replaced with new, more efficient vessels (overall fewer WCCs than the existing inland tender fleet) that have been built to modern stringent noise and vibration standards, there would be no change to baseline ambient sound conditions as a result of the Proposed Action. Similarly, pile driving noise would be brief in duration and occur intermittently and only when necessary to establish or discontinue ATON or replace piles at the end of their service life across all proposed action areas. Therefore, there would be no significant impact to ambient sound as a result of Alternative 1.

3.3.2.2.5 Impacts Under Alternatives 2–3

Under Alternatives 2–3, ambient sound within the proposed action areas would be similar to what is currently present because ship platforms would replace the capabilities of the existing inland tender fleet. In addition, ship platforms and their assets would not be expected to alter current levels of ambient sound because noise created by the Proposed Action would occur intermittently (occur for the duration that the sound is active) in any given location and would be spread over a very large area. Because the existing inland tender fleet would be replaced with a combination of new, more efficient vessels that have been built to modern stringent noise and vibration standards, there would be no change to baseline ambient sound conditions as a result of the Proposed Action. Similarly, pile driving noise would be brief in duration and occur intermittently and only when necessary to establish or discontinue ATON or replace piles at the end of their service life across all proposed action areas. Therefore, there would be no significant impact to ambient sound as a result of Alternatives 2–3.

3.3.2.2.6 Impacts Under the No Action Alternative

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

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

3.3.3 Bottom Habitat and Sediments

3.3.3.1 Affected Environment

Sediments consist of solid fragments of organic and inorganic matter forming the bottom of bodies of water, often referred to as substrate. Blott and Pye (2012) reviewed commonly used historical classification systems and offered a refined system that is adopted for describing sediments in this section. Sediments are grouped into five size classes: boulders, gravel, sand, silt, and clay. Sands range in size from 0.063 mm (very fine sands) to 2 mm (very coarse sands). Sediment types smaller than sand are silts (0.002 to 0.063 mm in diameter) and clays (particles less than 0.02 mm diameter). Sediments larger than sands are various types of gravel ranging in size from 2 mm (granules) to 64 mm (cobbles). Sediments greater than 64 mm in diameter are defined as boulders and range up to 2,048 mm (Blott and Pye 2012; U.S. Department of Agriculture 1993).

3.3.3.1.1 Marine Sediments

Sediments in the marine environment are either terrigenous (originated from land) or biogenic (formed from the remains of marine organisms). Terrigenous sediments come from the weathering of rock and other land-based substrates and are transported by water, wind, and ice (glaciers) to the seafloor. Biogenic sediments are produced in the oceans by the skeletal remains of single-celled benthic and planktonic organisms (e.g., foraminiferans and diatoms). When an organism dies, its remains are deposited on the seafloor. The remains are composed primarily of either calcium carbonate (e.g., a shell) or silica, and mixed with clays, forming either a calcareous or siliceous ooze (Chester 2003). Sediments in nearshore waters and on the continental shelf contain more sands that are primarily terrigenous, and sediments farther from shore, such as in deep ocean basins, are primarily biogenic.

In general, waves are the dominant process affecting the sea bottom in coastal waters. As the continental shelf is shallow, waves have a large impact on the bottom in comparison to the deep ocean. Breaking waves affect the shoreline, and remove and suspend all the fine sediment into the water. Only medium and coarse sand and gravel can be deposited on the beach and in the nearshore zone. Bottom energy induced by waves decreases with depth, which causes a decreasing grain size with distance offshore. At temperate latitudes of the proposed action areas, the continental shelves are covered with terrigenous deposits transported by river outflow.

Based on the characteristics of the substrate, two benthic communities are determined: 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. Without topographic relief, the only apparent difference from one place to another is the grain size and composition of the substrate. Subtidal hard substrates, on the other hand, may have considerable relief with many potential habitats. 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 are more likely to promote growth of seaweeds. The subtidal continental shelf region can be divided into four major habitats: open, unvegetated sedimentary environments (the most common in terms of area); rocky subtidal communities (hard substrates dominated by low-encrusting plants and animals); kelp beds and forests; and seagrass beds.

3.3.3.1.1.1 Open, Unvegetated Sedimentary Environments

Unvegetated marine sediments are the most abundant marine benthic habitat in the world. On the continental shelf areas of the world's oceans, there are general latitudinal differences in the composition of the open sedimentary environments. Temperate zones tend to have more sand in the sediments, while tropical zones have more mud, and polar zones more gravel. Four taxonomic groups of dominant macrofauna are present in sublittoral soft bottoms: class Polychaeta, subphylum Crustacea, phylum Echinodermata, and phylum Mollusca. These groups are further discussed in Section 3.4.4. Because the Great Lakes and PNW proposed action areas are not oceanic, open, unvegetated sedimentary marine environments would not be expected.

3.3.3.1.1.2 Rocky Subtidal Communities

Rocky subtidal communities are not as abundant throughout the world as are sedimentary substrates, but they are common in some areas. On rocky subtidal surfaces, the floral and faunal composition of the communities is determined in large part by the slope and type of rock present. Within the lighted area of the upper sublittoral region in the temperate zone, macroalgae dominate the horizontal and gently sloping substrates, while the vertical rock faces are dominated by various epifaunal invertebrates. Species presence in the proposed action areas will be more specifically discussed in Section 3.4.4. Below the level of sufficient light for photosynthesis (approximately 98 ft [30 m]), various invertebrates dominate all the rock surfaces. Because the Great Lakes and PNW proposed action areas are not oceanic, rocky subtidal communities would not be expected.

Based on studies done primarily in Massachusetts (Sebens 1985, 1986), Maine (Witman 1987), and Australia (Fletcher 1987), the organization and persistence of communities in the rocky subtidal areas, as well as the co-occurrence of many species, are explained by a combination of biological and physical factors that include disturbance from storms, competition for space, grazing, recruitment, and mutualism. In the areas studied, all of which are in cold or warm temperate seas, the communities of hard substrates are dominated by: encrusting communities of coralline algae, ascidians, or sponges that compete for space among themselves by overgrowth; beds of mussels forming large clumps; or kelps (Fletcher 1987; Sebens 1985, 1986; Witman 1985, 1987; Witman and Cooper 1983; Witman and Sebens 1988). Although farther north than the USEC-MidATL proposed action area, a study in the Gulf of Maine found that in rocky subtidal surfaces, deeper surfaces (36-59 ft [11-18 m]) were dominated by the mussel (*Modiolus modiolus*) while shallower areas (13-26 ft [4-8 m]) were dominated by the kelps *Laminaria digitata* and *L. saccharina* (Witman 1987). In general, the range in variation in physical factors decreases with depth. One such physical factors is sedimentation, which increases with depth due to decreases in water movement with depth; therefore, in the rocky subtidal zone the deeper areas are subject to greater sedimentation. According to Witman and Sebens (1988), this sedimentation may be the cause of the decline in suspension-feeding organisms at depths below 164 ft (50 m) in their Maine study area.

3.3.3.1.1.3 Kelp Beds and Forests

Throughout a large part of the cold temperate regions of the world, hard substrates are inhabited by a community dominated by very large, dense groupings of brown algae known collectively as kelps. As described in Section 3.4.2, kelp beds and forests can be found throughout the PNW and SEAK proposed action areas. Kelps are attached to the hard substrate by a structure called a holdfast, rather than by true roots. Kelp forests form in shallow open waters and are rarely found deeper than 49 to 131 ft (15 to 40 m) (National Oceanic and Atmospheric Administration 2019b). In contrast to the relatively level landscapes of soft-bottom or subtidal rock surfaces, kelps can form an extensive three-dimensional habitat composed of several vertical layers; as a result, a large number of potential habitats are available and the variety of life is greater. Because the Great Lakes and PNW proposed action areas are not oceanic, kelp beds and forests would not be expected.

3.3.3.1.1.4 Seagrass Communities

Many areas of the shallow sea bottom are covered with seagrasses—a lush growth of aquatic flowering plants adapted to live submerged in seawater. Seagrass beds form dense carpets of as many as 4,000 blades per square meter over extensive areas of the bottom, making them one of the most conspicuous communities of the shallow waters of temperate and tropical seas. As described in Section 3.4.2, seagrasses occur from the mid-intertidal region to depths of 164 to 197 ft (50 to 60 m). Unlike kelps, seagrasses are rooted into the benthic substrate. Seagrasses stabilize the soft bottoms on which most species grow, primarily through their dense, matted root systems. Seagrass beds may also trap sediment and, therefore, build up the bottom. Seagrass communities can be found in oceanic waters of all of the proposed action areas. Because the Great Lakes and PNW proposed action areas are not oceanic, seagrass communities would not be expected.

3.3.3.1.2 Estuarine Sediments

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). Estuarine sediment composition is also heavily dependent on the dominant source of sediment, which is either alluvial (deposited by surface water) or marine. Independent of the estuary type, sediment composition in an estuarine environment varies axially and laterally, as well as vertically (Nichols and Biggs 1985).

The substrate in estuaries is highly variable and dependent on both the geological history of a habitat and contemporaneous sediment transport process. Fjord estuaries that have been carved out of rock by receding glaciers, such as those in the SEAK proposed action area, have a bedrock substrate with a sediment cover that is dependent on the sediment supplied by the adjacent watershed. Estuaries in which receding glaciers left cobble deposits, such as Puget Sound (in the PNW proposed action area), typically have a cobble substrate covered to varying degrees by sediments. To at least some degree, most estuaries have soft, muddy substrates derived from sediments carried into the estuary by both seawater and freshwater. In the case of freshwater, rivers and streams carry silt particles in suspension. When these suspended particles reach and mix with seawater in the estuary, the presence of the various ions in the seawater causes the particles to merge, creating larger, heavier particles that then settle out, forming the characteristic mud bottom. The relative importance of freshwater-borne or marine-borne particles to the development of the muddy substrate varies both from estuary to estuary and geographically in general.

Particle deposition is further controlled by currents and particle size. Large particles settle out faster than small particles, and strong currents keep particles in suspension longer than weak currents. Where strong currents prevail, the substrate will be coarse (sand or gravel), as only large particles settle out; however, where waters are calm and currents weak, fine silt will settle out. Therefore, seawater will drop coarse sediments first at the mouth of the estuary, and freshwater will drop coarse sediments at the upper reaches of the river itself. The area where the two waters mix is dominated by fine silt (mud), resulting from decreased water movement and the intermixing of the two water masses.

Estuaries in coastal plains (such as those along the East Coast of the United States) favor development of salt marshes and mangroves, with the subsequent infill of biological matter. Ocean waves drive sands toward the mouth of the estuary, where complex systems of sandbars, spits, or barrier beaches may form. In the central parts of the estuaries, fine-grained sediments may be found, consisting of submerged muds with abundant plant debris, or possibly fluid muds. The head of the estuary is characterized by fluvial sediment deposits (from rivers) with abundant plant debris and some brackish fauna (Folger 1972). A common theme among the estuarine areas in the USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas is that the deeper central parts of bays and channels are comprised of fine sediments, and more coarse sediments exist nearer to the margins of bays and channels. Estuaries in the PNW proposed action area are predominantly sandy, with some coarser material along the margins (Folger 1972). The SEAK proposed action area is comprised of salt water surrounding islands, with minimal estuarine areas. The area is comprised of fjords formed primarily by glacial action. Bedrock underlies these SEAK proposed action area estuaries; in Deep Inlet, nearshore areas are covered by poorly sorted gravel and sand, with silt, clay, and minor amounts of plant debris and shell and rock fragments covering the bottom of central bays.

3.3.3.1.3 Riverine Sediments

Fluvial processes control the depositional environment on the streambed and across the floodplain. Flow in rivers suspends sediment in the water and transports it downstream. 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.

Riverine substrate may be inorganic, consisting of geological material from the catchment area such as boulders, pebbles, gravel, sand or silt, or it may be organic, including fine particles, leaves, wood, moss and plants. Substrate is generally not permanent and is subject to large changes during flooding events. Plants are most successful in slower currents. Some plants such as mosses attach themselves to solid objects.

All of the proposed action areas, except the SEAK proposed action area, are comprised of or include riverine habitats. Therefore, the benthic habitats described above are present in the USEC-MidATL, USEC-South, Great Lakes, GoMEX and Mississippi River, and PNW proposed action areas.

3.3.3.2 Environmental Consequences to Bottom Habitat and Sediments

Impacts to bottom habitat and sediments would potentially result from vessel movement, bottom devices, construction, brushing, pile driving, unrecovered jet cone moorings, and ATON retrieval devices associated with the Proposed Action. Vessel movement would be impact the bottom habitat and sediments only if operating in very shallow water at slow speeds. Bottom disturbance as a result of this vessel movement may result, but would be limited to the suspension of some sediment off the bottom, which would resettle after the vessel has left the area. Impacts from the degradation of unrecovered jet cones used for mooring ATON, would be undetectable due to the low density of debris left behind during ATON recovery. Similarly, levels of herbicides and pesticides in bottom habitat and sediments would be undetectable due to the infrequent nature of brushing activities and the limited amount of these chemicals used; therefore, these stressors are only discussed in Table 3-3 and are not analyzed further in this PEIS. There would be no impact to bottom habitat and sediments from fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, pile driving noise, or tow lines associated with the Proposed Action. Therefore, these are not discussed further in this PEIS.

3.3.3.2.1 Bottom Devices and ATON Retrieval Devices

Bottom disturbance, scouring, and the resuspension of contaminants has the potential to impact bottom habitat and sediments. Bottom disturbance and scouring caused by the establishment, maintenance, and discontinuance of floating ATON, as well as spudding, anchoring, and wreckage recovery performed by the WCC may potentially impact bottom habitat and sediments through disturbance and alteration of habitat. ATON operations and wreckage recovery have the potential to cause sediment disturbance and habitat alterations within the proposed action areas. ATON operations and wreckage recovery may cause disturbance as the sinker or jet cone moorings are established and discontinued, while dragging an ATON to relocate it, or the use of a grapnel hook or wire sweeping method of recovery. As waters surrounding floating ATON move with the tides and currents, the chain holding the ATON to the sinker circles the sinker, scouring the surrounding substrate. In order to minimize chain scour, SOPs have been put in place for installation (Appendix B). These include using the shortest length chain possible at installation and not placing floating ATON within sensitive habitats, such as coral or seagrass, if at all possible.

Bottom devices and ATON retrieval devices may cause sediment to become suspended and may settle out of the water and cover features of the bottom habitat. However, soft sediments would be expected to shift back as they normally would following a disturbance. In rocky, hard bottom areas, ATON retrieval devices may disturb or break features along the bottom. Prolonged increases in turbidity can degrade water quality, lower dissolved oxygen levels, potentially release chemical contaminants bound to the sediments, reduce visibility in the water column, and cause stress to marine species. However, if bottom sediments contain contaminants, most contaminants are tightly bound in the sediments and are not easily released during short term resuspension. Streams, rivers, and coastal areas that are characterized as nondepositional environments (e.g., due to high flows and currents) are less likely to be impacted by contaminated sediments (Burton and Johnston 2010). Birdwell et al. (2007) state that there is currently no tool to predict the release rates of organic contaminants from particulates during a resuspension event (Burton and Johnston 2010).

The potential impact of bottom devices and ATON retrieval devices would be temporary and localized due to the large size of the proposed action areas and the small footprint of these devices. Habitat may be altered during ATON operations and wreckage recovery; however, these operations are isolated and only occur in a small area compared to the size of the proposed action areas. Soft sediments would be expected to shift back as they normally would following a disturbance. No long term increases in turbidity would be anticipated as a result of the Proposed Action. Most bottom devices are intended for use (and would be placed) in soft bottom habitats and therefore would not likely be used in areas of rocky, hard-bottom substrate.

3.3.3.2.2 Construction

Construction has the potential to impact bottom habitat and sediments. The construction and maintenance of fixed ATON, both in shallow water or ashore, may impact exposed substrate, sediments, and habitat within and in a small area around the footprint of the ATON. Sediment may be suspended and may settle out of the water and cover features of the bottom habitat. However, soft sediments would be expected to shift back as they normally would following a disturbance. In addition, the potential impact of the Proposed Action would be localized due to the small footprint of the fixed ATON structures and the large size of the proposed action areas. No long term increases in turbidity would be anticipated as a result of the Proposed Action.

3.3.3.2.3 Brushing

Benthic habitats and sediments close to shore where brushing would take place could be directly impacted by the chemicals used in brushing, such as herbicides or pesticides. The removal of brush could also cause an increase in erosion of sediments in areas where vegetation is removed. As discussed in Section 2.2.2.2, Coast Guard personnel may need to obtain a license or certification by the state in which they are applying the chemical (i.e., herbicides, insecticides, fungicides and other products intended to prevent, destroy, repel or mitigate a pest and substances intended for use as a plant regulator, defoliant or desiccant). According to the Coast Guard brushing TTP (U.S. Coast Guard 2017a), the removal of plants and spraying of chemicals would occur in a selective manner as a best management practice. Brushing would be completed in a manner to return the ATON to an operable state, including visibility and access by personnel. Brushing operations are covered by Coast Guard CATEX L38.

As a result of Coast Guard SOPs (Appendix B), brushing would not be expected to cause a drastic increase in suspended sediments or cause contamination of sediments in terrestrial areas where brushing has occurred or in waterways adjacent to these terrestrial areas.

3.3.3.2.4 Pile Driving

Pile driving has the potential to impact bottom habitat and sediments. Pile driving would be conducted to establish and sometimes discontinue fixed ATON. During pile driving, the vibrations from the impact or vibratory hammer liquefy the surrounding sediments and the combined weight of the hammer and pile cause it to sink to the desired depth in the bottom. The removal of piles would disturb and suspend sediment also. The size of the sediment particles and currents would typically be correlated with the duration of sediment suspension in the water column. Larger particles, such as sand and gravel, settle rapidly, but silt and very fine sediment may be suspended for several hours. Prolonged increases in turbidity can degrade water quality, lower dissolved oxygen levels, potentially release chemical contaminants bound to the sediments, reduce visibility in the water column, and cause stress to marine species. However, if bottom sediments contain contaminants, most contaminants are tightly bound in the sediments and are not easily released during short term resuspension. Streams, rivers, and coastal areas that are characterized as nondepositional environments (e.g., due to high flows and currents) are less likely to be impacted by contaminated sediments (Burton and Johnston 2010). Birdwell et al. (2007) state that there is currently no tool to predict the release rates of organic contaminants from particulates during a resuspension event (Burton and Johnston 2010). Most fixed ATON consist of a single pile, which would require a short duration of pile driving activity to either place or remove. As a result, the area where pile driving would occur would not remain disturbed for long, or lead to long term impacts, such as discoloring the water, reducing light penetration and visibility, or changing the chemical characteristics of the water.

Pile driving may impact exposed substrate, sediments, and bottom habitat within the footprint of the pile and may temporarily suspend sediments just outside of the footprint of the pile. The potential impact of the Proposed Action would be temporary and localized due to the large size of the proposed action areas, the small footprint of the pile, the infrequency of pile driving activities. Soft sediments would be expected to shift back as they normally would following any disturbance. No long term increases in turbidity would be anticipated as a result of the Proposed Action.

3.3.3.2.5 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, impacts to bottom habitat and sediments within the proposed action areas would be similar to what is currently present because the new WCC fleet would replace the capabilities of the existing inland tender fleet. In addition, WCC assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include bottom devices, construction and brushing, pile driving, unrecovered jet cone moorings, and ATON retrieval devices. There would be no change to baseline bottom habitat and sediment conditions as a result of the Proposed Action. Bottom habitat and sediment disturbance from the Proposed Action would be limited to small areas around ATON, and the disruption would be intermittent and brief in duration. Therefore, there would be no significant impact to bottom habitat and sediments as a result of Alternative 1.

3.3.3.2.6 Impacts Under Alternatives 2–3

Under Alternatives 2–3, impacts to bottom habitat and sediments within the proposed action areas would be similar to what is currently present because ship platforms would replace the capabilities of the existing inland tender fleet. In addition, ship platforms would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include bottom devices, construction and brushing, pile driving, unrecovered jet cone moorings, and ATON retrieval devices. There would be no change to baseline bottom habitat and sediment conditions as a result of the Proposed Action. Bottom habitat and sediment disturbance from the Proposed Action would be limited to small areas around ATON, and the disruption would be intermittent and brief in duration. Therefore, there would be no significant impact to bottom habitat and sediments as a result of Alternatives 2–3.

3.3.3.2.7 Impacts Under the No Action Alternative

Any change to bottom habitat and sediments under the No Action Alternative would be immeasurable when compared to the mission conducted by the existing inland tender fleet. However, as each inland tender is removed from service over time (and capabilities are not replaced), ATON maintenance would likely slow, decreasing the overall disturbance to bottom habitat and sediments.

Under the No Action Alternative, there would be no change to baseline conditions that may impact bottom habitat and sediments. Therefore, no significant impacts to bottom habitat and sediments would occur with implementation of the No Action Alternative.

3.3.4 Water Quality

3.3.4.1 Affected Environment

In nature, water, especially in surface water like rivers, has color and some extent of dissolved and suspended material, usually suspended sediment. Suspended sediment is an important factor in determining the quality of water. A wide range of activities can affect water quality in aquatic habitats. Organisms in the proposed action areas may be impacted by changes in water quality.

In the coastal zone and inland waters (e.g., lakes, marshes) turbidity is a good indicator of the water quality and can play an important role in understanding the physical, geochemical, and biological processes of the coastal ecosystem. Turbidity in the coastal zone is dynamic and closely related to conditions in the atmosphere, ocean, and land variability. High-turbidity waters with a large concentration of suspended solids in the coastal zone can affect processes such as primary productivity (May et al. 2003), nutrient dynamics (Mayer et al. 1998), and river dynamics (Nezlin and DiGiacomo 2005).

In the USEC-MidATL proposed action area, waters are most turbid during the winter and least turbid during the summer. This is not a particularly turbid region, but the coast is more turbid than open ocean waters, as is the case in most regions. The coastal waters of the SEAK proposed action area are not known to be particularly turbid, as the area includes many islands protecting the waters and does not include any riverine inputs (Figure 2-8).

The waters of the Mississippi River are known to be turbid (National Research Council 2008) with several reports on the water quality and ecological integrity of the Mississippi River listing sediment or siltation as a priority concern (e.g., (Headwaters Group 2005; UMRBA 2004; USGS 1999)). As the old meanders and floodplains of the Mississippi have been modified for agriculture or urbanization, the wetlands, riparian areas, and adjacent streams and tributaries along the Mississippi River have been disconnected from the river by levees and other engineering modifications (EPA 2021c). Because of natural patterns and differences along the river's length, water quality conditions (including turbidity) that exist in the headwaters can never be realized in the far downstream reaches (National Research Council 2008).

When the water from the Mississippi River reaches the estuarine regions along the coast of the Gulf of Mexico, velocities decrease and sediment settles out of the water. Thus, nutrients are supplied to the Gulf of Mexico where waters are no longer turbid, so light is able to penetrate the water, creating algal blooms and, potentially, eutrophic conditions (Antweiler et al. 1995).

In the Great Lakes, water turbidity values are overall the highest in Lake Erie, moderate in Lake Ontario, and relatively low in Lakes Superior, Michigan, and Huron (Son and Wang 2019). The Great Lakes proposed action area is comprised of the waters connecting Lakes Superior and Michigan (Figure 2-4), so these would be considered areas of low turbidity.

The Columbia River, in the PNW proposed action area, contains more than 30 dams and dozens of smaller flow control structures used for the purposes of hydropower, flood control, irrigation, and transportation. Changes in the natural river flow from these structures include a reduction in the annual flow, reduced spring floods, and altered timing of flows. Turbidity in the Columbia River estuary is high (Haertel et al. 1969), limiting light for photosynthesis and creating low rates of primary productivity. Within the estuary, most of the turbidity is due to estuarine organic matter, which is in the form of detritus delivered from the adjacent river and ocean (Simenstad et al. 1990). As a result, the Columbia River estuary is commonly considered a detritus-based ecosystem, which is rare amongst the large estuaries of North America (Herfort et al. 2011). The Columbia River estuary is most turbid in winter and spring (Hudson and Talke 2014).

The Clean Water Act requires the EPA to develop criteria for surface water quality that accurately reflects the latest scientific knowledge on the impacts of pollutants on human health and the environment. These criteria, which are guidelines, are provided in Appendix A.

3.3.4.2 Environmental Consequences to Water Quality

Impacts to water quality would potentially result from bottom devices, construction, brushing, and pile driving associated with the Proposed Action. Impacts to water quality from vessel operations would not occur because Coast Guard SOPs (Appendix B) would ensure all vessel discharges would be in compliance with state and federal regulations and policies. Chemicals leaching from the degradation of unrecovered jet cone moorings would be undetectable because of the low density of jet cones that are unable to be recovered; therefore, these stressors are only discussed in Table 3-3 and are not analyzed further in this PEIS. There would be no impact to water quality from acoustic stressors including fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, or pile driving noise. Additionally, there would be no impacts to water quality from tow lines associated with the Proposed Action. Therefore, these are not discussed further in this PEIS.

3.3.4.2.1 Bottom Devices and ATON Retrieval Devices

As discussed in Section 3.3.3.2.1, bottom disturbance has the potential to suspend sediment, which in turn may impact water quality. Bottom disturbance caused by the establishment, maintenance, and discontinuence of floating ATON, as well as spudding, anchoring, and wreckage recovery performed by the WCC may potentially impact water quality through an increase in turbidity within the water column. However, soft sediments would be expected to shift back as they normally would following a disturbance. Prolonged increases in turbidity can degrade water quality, lower dissolved oxygen levels, potentially release chemical contaminants bound to the sediments, reduce visibility in the water column, and cause stress to marine species. However, if bottom sediments contain contaminants, most contaminants are tightly bound in the sediments and are not easily released to the water column during short term resuspension. Streams, rivers, and coastal areas that are characterized as nondepositional environments (e.g., due to high flows and currents) are less likely to be impacted by contaminated sediments (Burton and Johnston 2010). Birdwell et al. (2007) state that there is currently no tool to predict the release rates of organic contaminants from particulates during a resuspension event (Burton and Johnston 2010).

The potential impact of bottom devices and ATON retrieval devices would be temporary and localized due to the large size of the proposed action areas and the small footprint of these devices. No long term increases in turbidity would be anticipated as a result of the Proposed Action. In areas of rocky, hard-bottom substrate, there would not likely be an increase in turbidity if devices are used in these locations.

3.3.4.2.2 Construction

As discussed in Section 3.3.3.2.2, bottom disturbance has the potential to suspend sediment, which in turn may impact water quality. Impacts as a result of construction would be limited, as most construction activities would occur on shore or some type of platform. The potential impact of construction would be temporary and localized due to the large size of the proposed action areas and the small footprint of fixed ATON. No long term increases in turbidity would be anticipated as a result of the Proposed Action.

3.3.4.2.3 Brushing

Water quality close to shore where brushing would take place could be directly impacted by the chemicals used in brushing, such as herbicides or pesticides. As discussed in Section 2.2.2.2, Coast Guard personnel may need to obtain a license or certification by the state in which they are applying the chemical (i.e., herbicides, insecticides, fungicides and other products intended to prevent, destroy, repel or mitigate a pest and substances intended for use as a plant regulator, defoliant, or desiccant).

According to the Coast Guard brushing TTP (U.S. Coast Guard 2017a), the removal of plants and spraying of chemicals would occur in a selective manner as a best management practice. Brushing would be completed in a manner to return the ATON to an operable state, including visibility and access by personnel. Brushing operations are covered by Coast Guard CATEX L38.

3.3.4.2.4 Pile Driving

As discussed in Section 3.3.3.2.3, pile driving (bottom disturbance) has the potential to suspend sediment, which in turn may impact water quality. Pile driving may occur in order to establish or discontinue fixed ATON. The size of the sediment particles and currents would typically be correlated with the duration of sediment suspension in the water column, with larger particles settling rapidly and fine sediment remaining suspended for several hours. Most fixed ATON consist of a single pile, which would require a short duration of pile driving activity to either place or remove. As a result, the area where pile driving would occur would not remain disturbed for long, or lead to long term impacts, such as discoloring the water, reducing light penetration and visibility, or changing the chemical characteristics of the water.

Pile driving temporarily suspend sediments just outside of the footprint of the pile. The potential impact of the Proposed Action would be temporary and localized due to the large size of the proposed action areas, the small footprint of the pile, the infrequency of pile driving activities. Soft sediments would be expected to shift back as they normally would following any disturbance. No long term increases in turbidity, and therefore water quality, would be anticipated as a result of the Proposed Action.

3.3.4.2.5 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, impacts to water quality within the proposed action areas would be similar to what is currently present because the new WCC fleet would replace the capabilities of the existing inland tender fleet. In addition, WCC assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include bottom devices, construction and brushing, and pile driving. There would be no change to baseline water quality conditions as a result of the Proposed Action. Impacts to water quality from the Proposed Action would be limited to small areas around ATON, and the increase in suspended sediment and turbidity would be intermittent and brief in duration. Therefore, there would be no significant impact to water quality as a result of Alternative 1.

3.3.4.2.6 Impacts Under Alternatives 2–3

Under Alternatives 2–3, impacts to water quality within the proposed action areas would be similar to what is currently present because ship platforms would replace the capabilities of the existing inland tender fleet. In addition, WCC assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include bottom devices, construction and brushing, and pile driving. There would be no change to baseline water quality conditions as a result of the Proposed Action. Impacts to water quality from the Proposed Action would be limited to small areas around ATON, and the increase in suspended sediment and turbidity would be intermittent and brief in duration. Therefore, there would be no significant impact to water quality as a result of Alternatives 2–3.

3.3.4.2.7 Impacts Under the No Action Alternative

Any change to water quality under the No Action Alternative would be immeasurable when compared to the mission conducted by the existing inland tender fleet. However, as each inland tender is removed from service over time (and capabilities are not replaced), ATON maintenance would likely slow, decreasing the disturbance to bottom habitat and sediments (and therefore, potential alteration of water quality).

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

3.3.5 Summary of Impacts to the Physical Environment

Impacts to the physical environment would be from fathometer and Doppler speed log noise, vessel noise, and pile driving noise.

WCCs would move through large geographic areas during operations and training supporting Coast Guard missions in the proposed action areas. Their presence could potentially impact air quality, increase ambient sound levels, disturb bottom habitat and sediments, and impact water quality. However, WCCs would operate and conduct ATON maintenance intermittently and across very large proposed action areas.

3.3.5.1 Impacts Under Alternative 1 (Preferred Alternative)

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

3.3.5.2 Impacts Under Alternatives 2–3

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

3.3.5.3 Impacts Under the No Action Alternative

Any change to air quality, ambient sound, bottom habitat and sediments, and water quality under the No Action Alternative would be immeasurable when compared to the existing inland tender fleet. However, as each inland tender is removed from service over time, ATON maintenance would likely slow, decreasing the overall emissions, generated noise levels, and disturbance to bottom habitat and sediments (and therefore, any potential alteration of water quality).

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

3.4 Biological Environment

The Proposed Action would occur on the surface of the water, underwater, and on land in the footprint of fixed ATON structures within the proposed action areas. Protocols and equipment incidental to the normal operation of a Coast Guard vessel would follow all regulations in order to comply with state and federal laws regarding species and habitat protection. Included in the biological environment of the proposed action areas are riverine vegetation, marine vegetation, insects, aquatic invertebrates, amphibians, fish, EFH, birds, reptiles, terrestrial mammals, and marine mammals. ESA-listed species and federally-designated critical habitat are also discussed. The affected environment resources, as well as impacts to these resources as a result of the Proposed Action, are discussed in Sections 3.4.1 through 3.4.14.

3.4.1 Riverine Vegetation

3.4.1.1 Affected Environment

Riverine vegetation consists of large and small plants that grow in streams and rivers. The banks of streams and rivers are known as riparian areas, and the plants that grow there are called riparian vegetation. Riverine and riparian vegetation contribute to the balance of oxygen, nutrients, and sediment in waterways. Plants produce oxygen, stabilize temperature and light, recycle nutrients, control turbidity, and provide food, spawning substrate, and habitat for invertebrates and fish. Riparian plants protect shorelines from erosion, provide a buffer between the riparian zone and open water, and stabilize bottom sediments with their root systems. Riparian vegetation also provides habitat.

3.4.1.1.1 Major Groups of Riverine Vegetation within the Proposed Action Areas

Within the waterway, aquatic plants and algae grow. These types of plants include free-floating freshwater algae and rooted plants. Some rooted plants may have floating structures, others may be emergent, and some would be completely submerged. Submerged aquatic plants in freshwater systems include grasses and pondweed. Riparian vegetation grows along banks of a waterway extending to the edge of the floodplain (i.e., the riparian zone). This vegetation includes the emergent aquatic plants growing at the edge of the waterway as well as shrubs and trees within the riparian zone. Riparian vegetation often shows zonation because the plant species may be present permanently or seasonally in aquatic habitats. Zones may include those in the waterway and floodplain wetlands, those in frequently flooded areas along the banks or close to the waterway, and those in drier habitats at the edge of the floodplain. Palustrine moss-lichen wetlands, emergent wetlands, scrub-shrub wetlands, and forested wetlands may occur on the floodplain adjacent to the riverine system.

While multiple rivers empty into the ocean in the USEC-MidATL, USEC-South, and SEAK proposed action areas, these are largely marine, rather than riverine, and are discussed in Section 3.4.2. The PNW, GoMEX and Mississippi River, and Great Lakes proposed action areas contain mainly riparian vegetation, which is described in Table 3-13.

Table 3-13. Examples of Riverine and Riparian Vegetation by Zone

Wetland Zone or Type of Wetland	*Description*	*Representative Species Present*
Zone: Unconsolidated Bottom	Characterized by the lack of large stable surfaces for plant attachment. Vegetated cover is less than 30 percent.	Floating surface plants include duckweed (*Lemna, Spirodela*), water lettuce (*Pistia stratiotes*), water hyacinth (*Eichhornia crassipes*), water nut (*Trapa natans*), water fern (*Salvinia spp.*), and mosquito fern (*Azolla*). Plants floating below the surface include bladderworts (*Utricularia*), coontails (*Ceratophyllum*), and watermeals (*Wolffia*).
Zone: Aquatic Bed	A diverse group of plant communities that require surface water for optimum growth and reproduction. Wetlands and aquatic habitats dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. The plants are either attached to the substrate or float freely in the water above the bottom or on the surface.	Aquatic moss (*Fissidens, Drepanocladus*, and *Fontinalis*) and aquatic liverworts (*Marsupella*). Rooted vascular genera include pondweeds, horned pondweed (*Zannichellia palustris*), ditch grasses (*Ruppia*), wild celery (*Vallisneria*), and waterweed (*Elodea*). Riverweed (*Postostemum ceratophyllum*) may be attached to rocks. Emergent plants include water lilies (*Nymphaea, Nuphar*), floating-leaf pondweed (*Potamogeton natans*), and water shield (*Brasenia schreberi*). Yellow water lily (*Nuphar luteum*) and water smartweed (*Polygonum amphibium*) may be considered either emergents or rooted vascular aquatic plants. Floating surface plants and plants floating below the surface could also be present in this zone.
Zone: Vegetated Streambed	Streambeds that are exposed long enough to be colonized by herbaceous annuals or pioneer plants. This vegetation is usually killed by rising water levels or sudden flooding.	Witchgrass (*Panicum capillare*) or other common pioneer plants would dominate.
Zone: Rocky Shore	Characterized by bedrock, stones, or boulders which singly or in combination cover 75 percent of the area or more and vegetation area coverage of less than 30 percent.	Lichens (e.g., *Verrucaria* and *Dermatocarpon fluviatile*), aquatic liverworts (e.g., *Marsupella emarginata var. aquatica*), mosses (e.g., *Fissidens julianus*) as well as blue-green algae.

Wetland Zone or Type of Wetland	*Description*	*Representative Species Present*
Zone: Unconsolidated Shore	Includes all wetland habitats with unconsolidated substrates covering 75 percent of the area or less and vegetation other than pioneering plants covering less than 30 percent of the area. Plants in this zone are killed by rising water levels and may be gone before the beginning of the next growing season.	Pioneer plants such as cocklebur (*Xanthium strumarium*) and barnyard grass (*Echinochloa crusgalli).*
Moss-Lichen Wetland	Includes areas where moss or lichen cover substrates other than rock and where emergent plants, shrubs, or trees make up less than 30 percent of the areal cover. The only water regime is saturated. Moss-lichen wetlands occur most frequently in the northern U.S. but are not common.	Areas covered with peat mosses (*Sphagnum* spp.) are usually called bogs. Peat moss and other mosses (*Campylium stellatum, Aulacomnium palustre,* and *Oncophorus wahlenbergii*) are typical of wet soil in Alaska. Reindeer moss (*Cladina rangiferina*) is dominant in lichen wetlands.
Emergent Wetland: Persistent	Characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. Persistent emergent wetlands are dominated by species that normally remain standing at least until the beginning of the next growing season.	Southern wild rice (*Zizaniopsis miliacea*); grasslike plants such as cattails (*Typha* spp.), bulrushes (*Scirpus* spp.), saw grass (*Cladium jamaicense*), sedges (*Carex* spp.); and true grasses such as reed (*Phragmites australis*), manna grasses (*Glyceria* spp.), slough grass (*Beckmannia syzigachne*), and whitetop (*Scolochloa festucacea*).
Emergent Wetlands: Non-persistent	Wetlands dominated by plants which fall to the surface of the substrate or below the surface of the water at the end of the growing season so that, at certain seasons of the year, there is no obvious sign of emergent vegetation. Movement of ice may remove all traces of emergent vegetation during the winter.	Arrow arum (*Peltandra virginica*), pickerelweed (*Pontederia cordata*), and arrowheads (*Sagittaria* spp.).
Scrub-Shrub Wetland	Areas dominated by woody vegetation less than 20 ft (6 m) tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions.	Broad-leaved deciduous (BLD) plants: alders (*Alnus* spp.), willows (*Salix* spp.), buttonbush (*Cephalanthus occidentalis*), red osier dogwood (*Cornus stolonifera*), honeycup (*Zenobia pulverulenta*), spirea (*Spiraea douglasii*), bog birch (*Betula pumila*), and young trees of species such as red maple (*Acer rubrum*) or black spruce (*Picea mariana*). Needle-leaved deciduous (NLD): tamarack or bald cypress (*Taxodium distichum).* Broad-leaved evergreen (BLE): Northern representatives are labrador tea (Ledum

Wetland Zone or Type of Wetland	***Description***	***Representative Species Present***
		groenlandicum), bog rosemary (Andromeda glaucophylla), bog laurel (Kalmia polifolia), and the semi-evergreen leatherleaf (Chamaedaphne calyculata). In the south, fetterbush (Lyonia lucida), coastal sweetbells (Leucothoe axillaris), inkberry (Ilex glabra), and the semi-evergreen black ti-ti (Cyrilla racemiflora). Needle-leaved evergreen (NLE): black spruce or pond pine (*Pinus serotina*) Dead: woody plants less than 19.7 ft (6 m) tall produced by a prolonged rise in the water table
Forested Wetland	Characterized by woody vegetation that is 20 ft (6 m) tall or greater. Most common in the eastern U.S. and in those sections of the west where moisture is relatively abundant.	Categories same as above. Includes mangrove forests (e.g., Florida) BLD: red maple, American elm (*Ulmus americana*), ashes (*Fraxinus pennsylvanica* and *F. nigra*), black gum (*Nyssa sylvatica*), tupelo gum (*N. aquatica*), swamp white oak (*Quercus bicolor*), overcup oak (*Q. lyrata*), and basket oak (*Q. michauxii*). NLD: bald cypress (*Taxodium distichum*) BLE: Red bay (*Persea borbonia*), loblolly bay (*Gordonia lasianthus*), and sweet bay (*Magnolia virginiana*) are prevalent, especially on organic soils. Also includes red mangrove, black mangrove (*Avicennia germinans*), and white mangrove (*Languncularia racemosa*), which are adapted to varying levels of salinity. NLE: black spruce is common on nutrient-poor soils, Northern white cedar (*Thuja occidentalis*) dominates northern wetlands. Along the Atlantic Coast, Atlantic white cedar (*Chamaecyparis thyoides*).

Classifications and examples are from (Cowardin et al. 1979).
BLD = broad-leaved deciduous; NLD = needle-leaved deciduous; BLE = broad-leaved evergreen; NLE = needle-leaved evergreen

3.4.1.1.2 ESA-Listed Riverine Vegetation

ESA-listed riparian vegetation may be found on the banks of rivers within the PNW, Great Lakes, and GoMEX and Mississippi River proposed action areas (Table 3-14). Short's bladderpod is the only riparian plant with critical habitat potentially located within the proposed action areas close to waterways. Critical habitat overlaps with the GoMEX and Mississippi River proposed action area and is discussed in detail in Section 3.4.12.

Table 3-14. ESA-Listed Riverine Vegetation

Common Name (Scientific Name)	***ESA Listing Status***	***Distribution***	***Proposed Action Area Occurrence***	***Critical Habitat in Proposed Action Areas***
Black lace cactus (*Echinocereus reichenbachii var. albertii*)	Endangered (44 FR 61918; October 26, 1979)	Occurs in coastal grasslands and openings in dense scrublands and woodlands along the Gulf Coastal Plain	GoMEX and Mississippi River	N/A
Bradshaw's desert parsley (*Lomatium bradshawii*)	Endangered (53 FR 38448; September 30, 1988); proposed for de-listing in 2019	By creeks and rivers in Clarks County, Washington	PNW	N/A
Decurrent false aster (*Boltonia decurrens*)	Threatened (53 FR 45858; November 14, 1988)	Occurs on moist, sandy, floodplains and prairie wetlands along the Illinois River	GoMEX and Mississippi River	N/A
Dwarf lake iris (*Iris lacustris*)	Threatened (53 FR 37972; September 28, 1988)	Grows around the Great Lakes, near the northern shores of Lakes Huron and Michigan	Great Lakes	N/A
Eastern prairie fringed orchid *(Platanthera leucophaea)*	Threatened (54 FR 39857; September 28, 1989)	Occurs in a wide variety of habitats, from mesic prairie to wetlands such as sedge meadows, marsh edges, even bogs	GoMEX and Mississippi River	N/A
Green pitcher plant (*Sarracenia oreophila*)	Endangered (44 FR 54922; September 21, 1979)	Occurs in moist upland areas and seepage bogs to boggy stream banks; historically, occurred in Alabama, Georgia, North Carolina, and Tennessee	GoMEX and Mississippi River	N/A
Houghton's goldenrod (*Solidago houghtonii*)	Threatened (53 FR 27134; July 18, 1988)	Found along the northern shores of Lakes Michigan and Huron on moist sandy beaches	Great Lakes	N/A
Lakeside daisy (*Tetraneuris herbacea*)	Threatened (53 FR 23742; June 23, 1988)	Occurs on dolomite prairies and gravel prairies, gravelly hill prairies, sand-gravel terraces along major rivers, ledges along cliffs, and limestone quarries in Ohio and Illinois	GoMEX and Mississippi River	N/A
Leafy prairie clover (*Dalea foliosa*)	Endangered (56 FR 19953; May 1, 1991)	Found in prairie remnants and rocky riverbanks along the Des Plains River in Illinois; may occur in thin soils over limestone substrate	GoMEX and Mississippi River	N/A

Common Name (Scientific Name)	*ESA Listing Status*	*Distribution*	*Proposed Action Area Occurrence*	*Critical Habitat in Proposed Action Areas*
MacFarlane's four o'clock (*Mirabilis macfarlanei*)	Threatened (44 FR 61912; October 26, 1979)	Located in Snake River Canyon in Oregon	PNW	N/A
Michigan monkey-flower (*Mimulus michiganensis*)	Endangered (55 FR 25596; June 21, 1990)	Found near Sault Ste Marie, Michigan; is semi-aquatic and forms mats over mucky soil and sand saturated or covered by cold, flowing spring water	Great Lakes	N/A
Nelson's checker-mallow (*Sidalcea nelsoniana*)	Threatened (58 FR 8235; February 12, 1993)	Range includes the Willamette Valley in Oregon	PNW	N/A
Northern wild monkshood (*Aconitum noveboracense*)	Threatened (43 FR 17910; April 26, 1978)	Found on shaded to partially shaded cliffs, rocky slopes, or on cool, streamside sites; found in Iowa, Wisconsin, Ohio, and New York	GoMEX and Mississippi River	N/A
Pitcher's thistle (*Cirsium pitcheri*)	Threatened 53 FR 27137; July 18, 1988)	Found near Sault Ste Marie, Michigan; range is on beaches and grassland dunes along the shorelines of Lakes Michigan, Superior, and Huron	Great Lakes	N/A
Sand flax (*Linum arenicola*)	Endangered (81 FR 66842; September 29, 2016)	Occurs in pine rockland, marl prairie, and adjacent disturbed areas	GoMEX and Mississippi River	N/A
Seabeach amaranth (*Amaranthus pumilus*)	Threatened (58 FR 18035; April 7, 1993)	Occurs on barrier beaches	GoMEX and Mississippi River	N/A
Short's bladderpod (*Physaria globosa*)	Endangered (79 FR 44712; August 1, 2014)	Occurs on steep, rocky wooded slopes, along cliff tops, bases, and ledges. Found adjacent to rivers or streams and on south to west facing slopes in Kentucky and Tennessee.	GoMEX and Mississippi River	Yes (79 FR 50989; August 26, 2014)
Telephus spurge (*Euphorbia telephioides*)	Threatened (57 FR 19813; May 8, 1992)	Longleaf pine savannas, scrubby and mesic flatwoods, and coastal scrub on low sand ridges near the Gulf of Mexico	GoMEX and Mississippi River	N/A
Tiny polygala (*Polygala smallii*)	Endangered (50 FR 29345; July 18, 1985)	Occurs in pine rockland, scrub, high pine, and open coastal spoil	GoMEX and Mississippi River	N/A
Virginia spiraea (*Spiraea virginiana*)	Threatened (55 FR 24241; June 15, 1990)	Occurs along rivers and streams and relies on periodic disturbances	GoMEX and Mississippi River	N/A

Common Name (Scientific Name)	*ESA Listing Status*	*Distribution*	*Proposed Action Area Occurrence*	*Critical Habitat in Proposed Action Areas*
White bluffs bladderpod (*Physaria douglasii tuplashensis*)	Threatened (78 FR 23983; April 23, 2013)	Range includes the Hanford Reach of the Columbia River in Washington	PNW	No

N/A = no critical habitat has been designated.

Each of these ESA-listed plant species (and critical habitat, if any has been designated) would be located close to, but not within, waterways of the PNW, Great Lakes, and GoMEX and Mississippi River proposed action areas.

3.4.1.2 Environmental Consequences to Riverine Vegetation

Impacts to riverine vegetation would potentially result from vessel movement, bottom devices, construction, brushing, pile driving, ATON retrieval devices, and tow lines associated with the Proposed Action. Potential impacts to riverine vegetation from vessel movement, bottom devices, unrecovered jet cone moorings, ATON retrieval devices, and tow lines are discussed in Table 3-3, and are not further analyzed in this PEIS, as these stressors would entail a minimal amount of disturbance to riverine vegetation. There would be no impacts to riverine vegetation from fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, and pile driving noise associated with the Proposed Action.

Only land-based activities associated with the Proposed Action would likely affect ESA-listed riverine vegetation, as all species are potentially located on the banks of waterways, but not within them. Therefore, effects to ESA-listed riverine vegetation would mainly be from construction or brushing activities that occur on shore. There would be no effect to ESA-listed riverine vegetation as a result of vessel movement, bottom devices, pile driving, unrecovered jet cone moorings, ATON retrieval devices, or tow lines. Potential effects to ESA-listed riverine vegetation from construction and brushing are discussed below.

3.4.1.2.1 Bottom Devices, Pile Driving, and ATON Retrieval Devices

Bottom disturbance and scouring from bottom devices, pile driving, and ATON retrieval devices has the potential to physically remove (e.g., uproot) or crush individual plants, or cover vegetation in the water with suspended sediment. Bottom disturbance may occur in order to maintain, establish, or discontinue fixed ATON. Particles of sediment may become suspended as a result of bottom disturbance. The size of the sediment particles and currents would typically be correlated with the duration of sediment suspension in the water column, with larger particles settling rapidly and fine sediment remaining suspended for several hours. However, WCC maintenance, including pile driving, is dispersed across the proposed action areas. The footprint of bottom impacted by fixed or floating ATON or in retrieving ATON is very small compared to the overall size of the proposed action areas. Vegetation that may be crushed during WCC operations would have the potential to regrow and bottom disturbance would only impact a small percentage of the overall vegetative population. WCC operations may also cause an increase in turbidity. However, the impact to riverine vegetation from increased turbidity is unlikely to cause injury or mortality to individuals, and impacts to populations would be inconsequential due to the short term increases in turbidity and the large size of the proposed action areas. Suspended sediments caused by these operations are anticipated to resettle quickly and would not be expected to cover individual plants for a long duration of time. As waters surrounding floating ATON move with the tides and currents, the chain holding the ATON to the sinker circles the sinker, scouring the surrounding substrate. Scouring by bottom devices may also uproot or crush vegetation. SOPs have been put in place for installation (Appendix B) in order to minimize chain scour in areas containing sensitive vegetation. These SOPs include using the shortest length chain possible at installation and not establishing floating ATON within sensitive habitats, if at all possible. Most sensitive vegetation is marine rather than riverine. Due to the large size of the proposed action areas, and the small footprint of the piles driven during these operations, no long term population level impacts to riverine vegetation would be expected.

3.4.1.2.2 Construction

Riverine vegetation where a fixed ATON may be constructed on shore could be impacted by being physically removed (e.g., uprooted), crushed, or cut down. WCC construction operations are dispersed across the proposed action areas and the footprint in which fixed ATON structures undergo construction is very small compared to the overall size of the proposed action areas. Riverine vegetation that may be impacted during ATON construction would have the potential to regrow and construction would only impact a small percentage of the overall vegetative population. It is also a best management practice, per the brushing TTP manual (U.S. Coast Guard 2017a), to know about any potential ESA-listed plants that may be on site prior to arrival and to avoid damaging these species during ATON operational activities.

Due to the large size of the proposed action area, the small footprint of the fixed ATON structures, and the Coast Guard's best management practices (Appendix B), no long term population level impacts to riverine vegetation would be expected.

3.4.1.2.3 Brushing

Riverine vegetation where brushing would occur could be impacted by being physically removed (e.g., uprooted), crushed, cut down, or sprayed with herbicides. The application of herbicides can affect the productivity of the aquatic habitat by altering the composition of algal communities in the waterways. Aquatic plants are important primary producers in aquatic habitats (Minshall 1978; Murphy 1998; Vannote et al. 1980). Herbicides can directly kill algal populations at acute levels or indirectly promote algal production by increasing solar radiation reaching waterways by the disruption of vegetative growth. However, according to the Coast Guard brushing TTP (U.S. Coast Guard 2017a), the removal of plants and spraying of chemicals would occur in a selective manner as a best management practice. Brushing would be completed in a manner to return the ATON to an operable state, including visibility and access by personnel. Therefore, significant amounts of runoff would not be expected to enter waterways and alter plant community composition.

ATON brushing operations fall under the Coast Guard CATEX L38. The Coast Guard follows best management practices (U.S. Coast Guard 2017a) when conducting brushing operations, such as site surveys prior to arrival and commencing work. Riverine vegetation that may be impacted during WCC operations would have the potential to regrow and would only impact a small percentage of the overall vegetative population. It is also a best management practice (U.S. Coast Guard 2017a), for the crew to be informed of any potential ESA-listed plants that may be on site prior to arrival and to avoid damaging these species during brushing activities.

Due to the large size of the proposed action area, the small footprint of the fixed ATON structures, and the Coast Guard's best management practices (Appendix B), no long term population level impacts to riverine vegetation would be expected.

3.4.1.2.4 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, impacts to riverine vegetation within the proposed action areas would be similar to what is currently present because the new WCC fleet would replace the capabilities of the existing inland tender fleet. In addition, WCC assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include pile driving, construction, brushing, and ATON retrieval. There would be no change to baseline riverine vegetation conditions as a result of the Proposed Action. Impacts to riverine vegetation from the Proposed Action would be limited to small areas around ATON, and the in-water increase in suspended sediment and turbidity would be intermittent and brief in duration. Therefore, there would be no significant impact to riverine vegetation as a result of Alternative 1.

Pursuant to the ESA, there would be no effect to (Table 3-14) to ESA-listed riverine vegetation as a result of vessel movement, bottom devices, pile driving, unrecovered jet moorings, ATON retrieval devices, or tow lines. Only land-based activities associated with the Proposed Action (construction and brushing) may affect, but are not likely to adversely affect ESA-listed riverine vegetation (Table 3-14) under Alternative 1, as all species are potentially located on the banks of waterways, but not within them. Additionally, Alternative 1 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed riverine vegetation (Section 3.4.12.2.1).

3.4.1.2.5 Impacts Under Alternatives 2–3

Under Alternatives 2–3, impacts to riverine vegetation within the proposed action areas would be similar to what is currently present because ship platforms would replace the capabilities of the existing inland tender fleet. In addition, ship platforms and their assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include pile driving, construction and brushing, and ATON retrieval. There would be no change to baseline riverine vegetation conditions as a result of the Proposed Action. Impacts to riverine vegetation from the Proposed Action would be limited to small areas around ATON, and the in-water increase in suspended sediment and turbidity would be intermittent and brief in duration. Therefore, there would be no significant impact to riverine vegetation as a result of Alternatives 2–3.

As discussed in Section 3.4.1.2.4, pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect ESA-listed riverine vegetation (Table 3-14). Additionally, Alternatives 2–3 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed riverine vegetation (Section 3.4.12.2.1).

3.4.1.2.6 Impacts Under the No Action Alternative

Under the No Action Alternative, as the existing inland tender fleet is decommissioned and not replaced, the physical and acoustic stressors associated with the Proposed Action would not be introduced into the environment. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impact to riverine vegetation with implementation of the No Action Alternative.

3.4.2 Marine Vegetation

3.4.2.1 Affected Environment

3.4.2.1.1 Major Groups of Marine Vegetation within the Proposed Action Areas

Marine vegetation in the proposed action area includes diverse taxonomic/ecological groups of marine algae. The basic taxonomic groupings of vegetation include microalgae (e.g., phytoplankton), macroalgae (e.g., seaweed), submerged marine vegetation (e.g., seagrass and benthic macroalgae), and emergent marine wetlands (e.g., cordgrass). Table 3-15 lists the major taxonomic groups of vegetation that may be encountered within the action area.

Table 3-15. Major Groups of Marine Vegetation

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

Similar to riparian vegetation (Section 3.4.1), the plant species found in and around marine waters may be found in zones. The zones of marine areas, such as oceans, estuaries, and salt marshes are the similar to those in Table 3-13. Species present in marine zones are detailed in Table 3-16.

Table 3-16. Examples of Marine Vegetation by Zone

Zone or Wetland Type	*Species Present*
Rock Bottom	Attached brown, green, and red seaweeds as well as free-floating seaweeds would be present in this zone.
Unconsolidated Bottom	Floating surface seaweeds that may be present in this zone include blue-green algae, coccolithophores, diatoms, dinoflagellates, and Sargassum.
Aquatic Bed	Algae may occur in both subtidal and intertidal areas. Algae may grow in areas as deep as 30 m (98 feet). Attached brown, green, and red seaweeds, as well as rooted vascular plants (such as the seagrasses) and free-floating seaweeds would be present in this zone.
Reef	Coral Reefs are widely distributed in shallow waters of warm seas, mainly in the USEC-South proposed action area. Blue-green algae live in a symbiotic relationship with many corals. Encrusting and coralline algae are also common in coral reef systems.
Rocky Shore	Attached brown, green, and red seaweeds would be present in this zone.
Unconsolidated Shore	Encrusting algae and diatoms may establish a presence here briefly.
Emergent Wetland: Persistent	Saltmarsh cordgrass (*Spartina alterniflora*), big cordgrass (*S. cynosuroides*), black needlerush (*Juncus roemerianus*), saltmarsh bulrush (*Bolboschoenus robustus*), hairgrass (*Deschampsia*), narrow-leaved cattail (*Typha angustifolia*) and the reed (*Phragmites australis*).
Emergent Wetlands: Non-persistent	Saltmeadow hay (*S. patens*), sea lavender (*Limonium carolinianum*), salt marsh aster (*Symphyotrichum tenuifolium*), groundsel bush (*Baccharis halimifolia*), beach sandwort (*Honckenya peploides*), Lyngbye's sedge (*Carex lyngbyaei*), and marsh elder (*Iva frutescens*).

Classifications and examples are from (Cowardin et al. 1979).

3.4.2.1.2 ESA-Listed Marine Vegetation

ESA-listed marine vegetation may be found on coasts within the SEAK, GoMEX and Mississippi River, USEC-South, and USEC-MidATL proposed action areas. These are detailed in Table 3-17.

Table 3-17. ESA-Listed Marine Vegetation in the Proposed Action Areas

Common Name (Scientific Name)	*ESA Listing Status*	*Distribution*	*Proposed Action Area Occurrence*	*Critical Habitat in Proposed Action Areas*
Aboriginal prickly apple (*Harrisia aboriginum*)	Endangered (October 24, 2013; 78 FR 63795)	Occurs in coastal berm, coastal strand, coastal grassland, and maritime hammock	USEC-South	Yes (January 22, 2016; 81 FR 3865)
Beach jacquemontia (*Jacquemontia reclinata*)	Endangered (58 FR 62046; November 24, 1993)	Occurs on beach coastal strand and maritime hammock	USEC-South	N/A
Black lace cactus	Endangered (44 FR 61918;	Occurs in coastal grasslands and openings in dense	GoMEX and Mississippi River	N/A

Common Name (Scientific Name)	ESA Listing Status	Distribution	Proposed Action Area Occurrence	Critical Habitat in Proposed Action Areas
(*Echinocereus reichenbachii var. albertii*)	October 26, 1979)	scrublands and woodlands along the Gulf Coastal Plain		
Cape sable thoroughwort (*Chromolaena frustrata*)	Endangered (October 24, 2013; 78 FR 63795)	Grows in open canopy habitats, including coastal berms and rock barrens, and in semi-open to close canopy habitats, including buttonwood forests, coastal hardwood and rockland hammocks	USEC-South	Yes (January 8, 2014; 79 FR 1551)
Carter's mustard (*Warea carteri*)	Endangered (52 FR 2227; January 21, 1987)	Occurs in xeric, shrub-dominated habitats on the Lake Wales Ridge of central Florida	USEC-South	N/A
Crenulate lead-plant (*Amorpha crenulata*)	Endangered (50 FR 29345; July 18, 1985)	Occurs in wet pinelands, transverse glades, and hammock edges	USEC-South	N/A
Florida golden aster (*Chrysopsis floridana*)	Endangered (51 FR 17974; May 16, 1986)	Occurs in sand pine-evergreen oak scrub vegetation on excessively-drained fine white sand; historically, also occurred on beach dunes	USEC-South	N/A
Florida perforate cladonia (*Cladonia perforata*)	Endangered (58 FR 25746; April 27, 1993)	Occurs on the high sand dune ridges of Florida's peninsula, including the Atlantic Coastal and the Lake Wales Ridges	USEC-South	N/A
Florida prairie clover (*Dalea carthagenensis*)	Endangered (82 FR 46691; October 6, 2017)	Grows in pine rockland, rockland hammock, marl prairie, and coastal berm	USEC-South	N/A
Florida semaphore cactus (*Consolea corallicola*)	Endangered (October 24, 2013; 78 FR 63795)	Occurs in rockland hammocks, coastal berm, and buttonwood forests	USEC-South	Yes (January 22, 2016; 81 FR 3865)
Garber's spurge (*Euphorbia garberi*)	Threatened (50 FR 29345; July 18, 1985)	Occurs on pine rocklands, coastal flats, coastal grasslands, and beach ridges	USEC-South	N/A
Godfrey's butterwort (*Pinguicula ionantha*)	Threatened (58 FR 37432; July 12, 1993)	Occurs on seepage slopes, in bogs, transition zones between flatwoods/wet prairies and cypress stringers, roadside ditches, and depressions in wet pine flatwoods and wet prairies	USEC-South	N/A
Harperella (*Harperella nodosa*)	Endangered (53 FR 37978; September 28, 1988)	Occurs in wet soil near a body of water and can survive periodic, moderate flooding; occurs on rocky or gravel	USEC-MidATL	N/A

Common Name (Scientific Name)	*ESA Listing Status*	*Distribution*	*Proposed Action Area Occurrence*	*Critical Habitat in Proposed Action Areas*
		shoals and sandbars and along the margins of clear, swift-flowing stream sections		
Knieskern's beaked rush (*Rhynchospora knieskernii*)	Threatened (56 FR 32978; July 18, 1991)	Occurs in early successional wetland habitats, often on bog-iron substrates adjacent to slow-moving streams in the Pinelands region of New Jersey	USEC-MidATL	N/A
Sand flax (*Linum arenicola*)	Endangered (81 FR 66842; September 29, 2016)	Occurs in pine rockland, marl prairie, and adjacent disturbed areas	USEC-South	N/A
Seabeach amaranth (*Amaranthus pumilus*)	Threatened (58 FR 18035; April 7, 1993)	Occurs on barrier beaches	USEC-South	N/A
Sensitive joint-vetch (*Aeschynomene virginica*)	Threatened (57 FR 21569; May 20, 1992)	Occurs in the intertidal zone of coastal marshes where plants are flooded twice daily	USEC-MidATL	N/A
Telephus spurge (*Euphorbia telephioides*)	Threatened (57 FR 19813; May 8, 1992)	Longleaf pine savannas, scrubby and mesic flatwoods, and coastal scrub on low sand ridges near the Gulf of Mexico	USEC-South	N/A
Tiny polygala (*Polygala smallii*)	Endangered (50 FR 29345; July 18, 1985)	Occurs in pine rockland, scrub, high pine, and open coastal spoil	USEC-South	N/A

N/A = no critical habitat has been designated.

The only ESA-listed marine vegetation species that grows in water is Johnson's seagrass (*Halophila johnsonii*), which is known to only occur within the proposed action area in lagoons along 124 mi (200 km) of the southeast coast of Florida. It is discussed in detail below. Critical habitat for Johnson's seagrass has been designated in the USEC-South proposed action area and is discussed in Section 3.4.12.1.2.

3.4.2.1.2.1 Johnson's Seagrass

Johnson's seagrass is listed as threatened throughout its range (58 FR 48326; September 15, 1993), which includes the USEC-South proposed action area. Critical habitat for Johnson's seagrass was designated in 2000 (65 FR 17786; April 5, 2000), within the USEC-South proposed action area. Critical habitat for Johnson's seagrass is discussed further in Section 3.4.12.1.2.

The distributional range of Johnson's seagrass is limited to the east coast of Florida from central Biscayne Bay to Sebastian Inlet. There have been no reports of healthy populations of this species outside the presently known range. Johnson's seagrass grows opportunistically in a patchy, disjunct distribution from the intertidal zone down to depths of approximately 10-13 ft (3-4 m) in a wide range of conditions.

Johnson's seagrass has been observed growing perennially near the mouths of freshwater discharge canals (Gallegos and Kenworthy 1996), in deeper turbid waters of the Indian River Lagoon (Kenworthy 2000; Virnstein and Morris 2007), and in clear water associated with the high energy environments inside ocean inlets (Heidelbaugh et al. 2000; Kenworthy 1993, 1997; Virnstein and Morris 2007; Virnstein et al. 1997). Manatees, sea turtles, herbivorous fish, and invertebrates may feed on Johnson's seagrass.

3.4.2.2 Environmental Consequences to Marine Vegetation

Impacts to marine vegetation would potentially result from vessel movement, bottom devices, construction, brushing, pile driving, ATON retrieval devices, and tow lines associated with the Proposed Action. Potential impacts to marine vegetation from vessel movement, bottom devices, ATON retrieval devices, and tow lines are discussed Table 3-3, and are not further analyzed in this PEIS, as these stressors would entail a minimal amount of disturbance to marine vegetation. There would be no impacts to marine vegetation from fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, pile driving noise, and unrecovered jet cone moorings associated with the Proposed Action.

Only land-based activities associated with the Proposed Action would affect most ESA-listed marine vegetation (Table 3-17), excluding Johnson's seagrass, as these species are potentially located on the coast, but not within the ocean. Therefore, effects to ESA-listed marine vegetation would mainly be from construction and brushing activities that occur on shore. There would be no effect to ESA-listed marine vegetation listed in Table 3-17 as a result of vessel movement, bottom devices, pile driving, unrecovered jet cone moorings, ATON retrieval devices, or tow lines. Potential effects to ESA-listed marine vegetation from construction and brushing are discussed below.

3.4.2.2.1 Bottom Devices, Pile Driving, and ATON Retrieval Devices

Bottom disturbance and scouring from bottom devices, pile driving, and ATON retrieval devices has the potential to physically remove (e.g., uproot or detach) or crush individual plants (Spalding et al. 2003), or cover vegetation in the water with suspended sediment. Bottom disturbance may occur in order to maintain, establish, or discontinue fixed ATON. Particles of sediment may become suspended as a result of bottom disturbance. The size of the sediment particles and currents would typically be correlated with the duration of sediment suspension in the water column, with larger particles settling rapidly and fine sediment remaining suspended for several hours. However, WCC maintenance, including pile driving, is dispersed across the proposed action areas. The footprint of bottom impacted by fixed or floating ATON or in retrieving ATON is very small compared to the overall size of the proposed action areas. Vegetation that may be crushed during WCC operations would have the potential to regrow and bottom disturbance would only impact a small percentage of the overall vegetative population. WCC operations may also cause an increase in turbidity. However, the impact to marine vegetation from increased turbidity is unlikely to cause injury or mortality to individuals, and impacts to populations would be inconsequential due to the short term increases in turbidity and the large size of the proposed action areas. Suspended sediments caused by these operations are anticipated to resettle quickly and would not be expected to cover individual plants for a long duration of time. As waters surrounding floating ATON move with the tides and currents, the chain holding the ATON to the sinker circles the sinker, scouring the surrounding substrate. Scouring by bottom devices may also uproot or crush vegetation. SOPs have been put in place for installation (Appendix B) in order to minimize chain scour in areas containing sensitive vegetation. These SOPs include using the shortest length chain possible at installation and not establishing floating ATON within sensitive habitats, such seagrass or kelp beds, if at all possible. Due to the large size of the proposed action areas, and the small footprint of the piles driven during these operations, no long term population level impacts to marine vegetation would be expected. In addition, Coast Guard would conduct activities consistent with the Biological Opinion issued by NMFS in 2018[20], including measures to avoid impacts from bottom devices, pile driving, and ATON retrieval devices to Johnson's seagrass and corals.

3.4.2.2.2 Construction

Marine vegetation where a fixed ATON may be constructed could be impacted by being physically removed (e.g., uprooted), crushed, or cut down. WCC construction operations are dispersed across the proposed action areas and the footprint in which fixed ATON structures undergo construction is very small compared to the overall size of the proposed action areas. Marine vegetation that may be impacted during ATON construction would have the potential to regrow and construction would only impact a small percentage of the overall vegetative population. It is also a best management practice, per the brushing TTP (U.S. Coast Guard 2017a) , to know about any potential ESA-listed plants that may be on site prior to arrival and to avoid damaging these species during ATON operational activities.

Due to the large size of the proposed action area, the small footprint of the fixed ATON structures, and the Coast Guard's best management practices (Appendix B), no long term population level impacts to marine vegetation would be expected.

3.4.2.2.3 Brushing

Marine vegetation located on shore where brushing would take place could be impacted by being physically removed (e.g., uprooted), crushed, cut down, or sprayed with herbicides. The application of herbicides on shore can affect the productivity of the marine habitat by altering the composition of algal communities in the water. Algae are important primary producers in aquatic habitats (Minshall 1978; Murphy 1998; Vannote et al. 1980). Herbicides can kill algal populations at acute levels or indirectly promote algal production by increasing solar radiation reaching the water by the disruption of vegetative growth. However, according to the Coast Guard brushing TTP (U.S. Coast Guard 2017a), the removal of plants and spraying of chemicals would occur in a selective manner as a best management practice. Brushing would be completed in a manner to return the ATON to an operable state, including visibility and access by personnel. Therefore, significant amounts of runoff would not be expected to enter waterways and alter plant community composition.

ATON brushing operations fall under the Coast Guard CATEX L38. The Coast Guard follows best management practices (U.S. Coast Guard 2017a) when conducting brushing operations, such as site surveys prior to arrival and commencing work. Marine vegetation that may be impacted during WCC operations would have the potential to regrow and would only impact a small percentage of the overall vegetative population. It is also a best management practice (U.S. Coast Guard 2017a) to know about any potential ESA-listed plants that may be on site prior to arrival and to avoid damaging these species during brushing activities.

Due to the large size of the proposed action area, the small footprint of the fixed ATON structures, and the Coast Guard's best management practices (Appendix B), no long term population level impacts to riverine vegetation would be expected.

[20] The Coast Guard completed an ESA Section 7 and Essential Fish Habitat consultation with NMFS on U.S. Coast Guard Federal Aids to Navigation Program, finalized on April 19, 2018. Any information provided in this PEIS includes WCC support of ATONs, only as it pertains to the Proposed Action.

3.4.2.2.4 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, impacts to marine vegetation within the proposed action areas would be similar to what is currently present because the new WCC fleet would replace the capabilities of the existing inland tender fleet. In addition, WCC assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include pile driving, construction, brushing, and ATON retrieval. There would be no change to baseline marine vegetation conditions as a result of the Proposed Action. Impacts to marine vegetation from the Proposed Action would be limited to small areas around ATON, and the in-water increase in suspended sediment and turbidity would be intermittent and brief in duration. Therefore, there would be no significant impact to marine vegetation as a result of Alternative 1.

Pursuant to the ESA there would be no effect to ESA-listed marine vegetation as a result of vessel movement, bottom devices, pile driving, unrecovered jet moorings, ATON retrieval devices, or tow lines. Only land-based activities associated with the Proposed Action may affect, but is not likely to adversely affect most ESA-listed marine vegetation Table 3-17, excluding Johnson's seagrass, as these species are potentially located on the coast, but not within the ocean. Additionally, Alternative 1 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed marine vegetation (Section 3.4.12.1.2).

3.4.2.2.5 Impacts Under Alternatives 2–3

Under Alternatives 2–3, impacts to marine vegetation within the proposed action areas would be similar to what is currently present because ship platforms would replace the capabilities of the existing inland tender fleet. In addition, ship platforms and their assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include pile driving, construction and brushing, and ATON retrieval. There would be no change to baseline marine vegetation conditions as a result of the Proposed Action. Impacts to marine vegetation from the Proposed Action would be limited to small areas around ATON, and the in-water increase in suspended sediment and turbidity would be intermittent and brief in duration. Therefore, there would be no significant impact to marine vegetation as a result of Alternatives 2–3.

As discussed in Section 3.4.2.2.4, pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect ESA-listed marine vegetation (Table 3-17). Additionally, Alternatives 2–3 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed marine vegetation (Section 3.4.12.1.2).

3.4.2.2.6 Impacts Under the No Action Alternative

Under the No Action Alternative, as the existing inland tender fleet is decommissioned and not replaced, the physical and acoustic stressors associated with the Proposed Action would not be introduced into the environment. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas Therefore, there would be no significant impacts to marine vegetation with implementation of the No Action Alternative.

3.4.3 Insects

3.4.3.1 Affected Environment

In general, insect populations are large and in any given area there is a great variety of insects present. The lifespan of some insects can be up to 50 years, while others live only for a few hours. Insects are typically small with high rates of reproduction and an abundance of suitable food sources. While some insects feed only in the immature or larval stage and go without food during an extremely short adult life, other insects feed during all life stages. Those that are associated with aquatic ecosystems typically live within freshwater waterbodies during early life stages and in more upland terrestrial habitats as adults (Resh and Carde 2003). Insects have adapted to every land and freshwater habitat where food is available.

The Proposed Action has the potential to impact insect species that inhabit, reproduce, and forage in the coastal and riverine habitats within the proposed action areas. As such, the following discussions focus on the insect orders and ESA-listed species known to occur in these areas.

Insect species that may be present within the proposed action area largely fall into two groups: those that are distributed mainly on land near marine or fresh water, or those that are distributed in aquatic habitats where they also forage. Major groups of insects are discussed below in Section 3.4.3.1.1 and ESA-listed insect species are discussed in Section 3.4.3.1.2.

3.4.3.1.1 Major Groups of Insects within the Proposed Action Areas

There are nine orders of insects that may occur within the proposed action area (Table 3-18). The sections below describe the major orders of insects expected to be present in the proposed action areas.

Table 3-18. Major Groups of Insects in the Proposed Action Areas

Taxonomic Order	*Representative Species Present*	*Habitat Within or Near the Proposed Action Area*	*Habitat*		*Foraging Behavior*
			Aquatic	*Terrestrial*	
Coleoptera	Beetles	Inhabit a variety of terrestrial and freshwater environments.	x	x	Herbivores, predators, and scavengers, depending on the species.
Diptera	Flies and mosquitos	Abundant worldwide and live in freshwater aquatic, semi-aquatic or moist terrestrial environments.	x	x	Most feed on dead organic matter or parasitize other animals.
Ephemeroptera	Mayflies	Common in freshwater habitats.	x	x	Most species are herbivores, feeding on algae and other aquatic plant life. Adults do not feed.

Taxonomic Order	*Representative Species Present*	*Habitat Within or Near the Proposed Action Area*	*Habitat*		*Foraging Behavior*
			Aquatic	*Terrestrial*	
Hemiptera: Suborder Heteroptera	True bugs	Found in most terrestrial and freshwater habitats worldwide.	x	x	Most species are predators, feeding on a variety of aquatic species.
Lepidoptera	Butterflies and moths	May occur in riverine and coastal areas worldwide.		x	Adults primarily feed on nectar and sap. Larvae are herbivores, feeding on foliage and other plant structures.
Megaloptera	Dobsonflies and alderflies	Frequent inhabitants of streams and rivers when immature and remain near water as adults.	x	x	Larvae feed on aphids, mites, and scale insects. Adults rarely feed.
Odonata	Dragonflies	Common in freshwater habitats, with eggs laid in water where juveniles remain.	x		Feed on small, flying insects as adults. Feed opportunistically on mayflies, small crustaceans, mollusks, small fish, and tadpoles as juveniles.
Plecoptera	Stoneflies	Juveniles are found in fast-moving streams and rivers, with adults found on the banks of the streams and rivers they developed in. More abundant in cool, temperate climates.	x	x	Feed on algae and submerged vegetation as juveniles. Adults feed on algae and lichen.
Trichoptera	Caddisflies	Adults hide in vegetation along river banks during the day. Larvae live in aquatic environments in freshwater.	x	x	Larvae are herbivores, predators, and scavengers, depending on species. Adults have reduced or vestigial mouthparts and are rarely observed feeding.

3.4.3.1.1.1 Coleoptera

Order Coleoptera contains species of beetles. Coleoptera are the largest order of insects, consisting of 112 families in North America and over 350,000 species of beetles worldwide (Meyer 2020; Whitfield and Purcell 2013). Due to such high diversity, Coleoptera inhabit a wide variety of environments across the United States. Most are terrestrial, but both larvae and adults can be found in freshwater and marine environments, such as the families Dytiscidae and Gyrinidae. Coleoptera also exhibit a variety of feeding styles. While most are herbivores that feed on leaves, roots, stems, and other plant parts, some species are predators, scavengers, or parasites. Non-herbivorous Coleoptera feed on invertebrates, dead organic matter, or parasitize ants, termites, and mammals (Meyer 2020; Whitfield and Purcell 2013). Eggs are typically laid on or near leaves, trees, flowers, and other plants to allow for proper development and access to food once the larvae hatch. Depending on the species, eggs can be laid singly or in smaller groups and large masses (Whitfield and Purcell 2013).

3.4.3.1.1.2 Diptera

Order Diptera contains species of true flies. Diptera are considered one of the more dominant orders of insects due to their extreme abundance worldwide (Whitfield and Purcell 2013). While adult Diptera are terrestrial, larvae are often aquatic, semi-aquatic, or terrestrial, but prefer moist environments (Meyer 2020; Whitfield and Purcell 2013). Most adults feed primarily on nectar, plant and animal fluids, and blood, as their mouthparts generally limit them to liquid forms of food. Larvae feed primarily on dead organic matter and may also parasitize vertebrates, mollusks, and other arthropods (Meyer 2020). Eggs are laid either singly or in groups of about 250 and are usually deposited directly into decaying material in or near water (Oldroyd 2018).

3.4.3.1.1.3 Ephemeroptera

Order Ephemeroptera contains species of mayflies. Ephemeroptera are exceedingly abundant in nearly all permanent freshwater habitats, such as lakes and streams (Whitfield and Purcell 2013). Nymphal Ephemeroptera are always aquatic, feeding primarily on diatoms, algae, and detritus (Barber-James et al. 2007; Leonard 2020). Leaving their aquatic environment, nymphs molt to a winged, sexually immature form called the subimago, which will molt again into a mature adult. Ephemeroptera never feed after the nymphal stage. Males swarm at night in order to mate, dying soon after. Females will lay their clutch of eggs within hours of mating and usually die soon after laying the eggs (Barber-James et al. 2007; Meyer 2020).

3.4.3.1.1.4 Hemiptera: Suborder Heteroptera

Hemiptera of the suborder Heteroptera contains species of true bugs. True bugs are defined by their distinctive front wings and piercing-sucking mouthpart, or proboscis (Meyer 2020). Heteroptera may not rely on atmospheric oxygen and therefore habitats range from exclusively terrestrial to semi-aquatic to exclusively aquatic. Terrestrial species are more abundant, inhabiting a variety of environments such as on leaves or flowers, or under foliage, rocks, or logs. Heteroptera species are primarily herbivores, feeding on plant tissue or seeds. Semi-aquatic species can walk across the surface of the water, typically living on land in close proximity to the water and along shorelines. Aquatic species live completely submerged throughout the year, obtaining oxygen through specialized methods or structures such as breathing tubes, air chambers, or from dissolved oxygen in the water (Froeschner 2019). Semi-aquatic and aquatic species are predators, preying on all suitably sized organisms within their habitat (Whitfield and Purcell 2013), including small fish, tadpoles, and frogs (Froeschner 2019). Eggs can be laid singly or in clusters, as well as on land or in water (Froeschner 2019).

3.4.3.1.1.5 Lepidoptera

Order Lepidoptera contains species of moths and butterflies. The second largest order of insects, Lepidoptera are widely dispersed across the globe and are found on every continent except Antarctica. Many species have adapted for life in relatively small ecological niches and tend to live in one type of habitat. These environments include deserts, mountains, rainforests, and marshes (Culin 2018). Larvae of this order are commonly known as caterpillars and are primarily herbivores, feeding on leaves, roots, bark, fruits, and other plant structures. Adults feed on nectar, sap, and honeydew using their tube-like mouth structure called a proboscis (Whitfield and Purcell 2013). Eggs are typically laid singly or in large masses on or near the larval food source, such as leaves (Culin 2018; Whitfield and Purcell 2013).

3.4.3.1.1.6 Megaloptera

Order Megaloptera contains species of dobsonflies and alderflies. Megaloptera are found primarily in temperate regions worldwide and are common in and near streams during various life stages. While adults do not feed, larvae are predaceous, feeding on any aquatic organism that is small enough to catch. A single female may produce thousands of eggs, depositing them on vegetation that overhangs the water. Adult Megaloptera typically do not stray far from the water, as they are weak fliers (Whitfield and Purcell 2013; Wise 2013).

3.4.3.1.1.7 Odonata

Order Odonata contains species of dragonflies and damselflies. Distributed across the globe, Odonata are commonly associated with aquatic habitats such as streams, lakes, ponds, and estuaries (Corbet 2013; Whitfield and Purcell 2013). Both larvae and adults are predatory, feeding primarily on smaller organisms. For larvae, prey includes a variety of aquatic organisms, but adults will also feed on flying insects such as mosquitos. Odonata are an important natural control agent of mosquito populations (Whitfield and Purcell 2013). Eggs are laid in or very close to water (Corbet 2013).

3.4.3.1.1.8 Plecoptera

Order Plecoptera contains species of stoneflies. With about 700 species found in North America, Plecoptera are most abundant in cooler, temperate regions (Whitfield and Purcell 2013). They are commonly associated with freshwater streams and lakes, as nymphs are aquatic, and terrestrial adults usually remain near where they emerged from the water. Nymphs are primarily herbivorous, feeding on submerged leaves, algae, and diatoms. Some adult species do not have functional mouthparts, therefore they do not feed and are generally short-lived. Those that do feed are primarily herbivorous (Meyer 2020; Whitfield and Purcell 2013). Eggs are deposited in the water in batches numbering anywhere from a few hundred to a few thousand, then scatter in the water column until they attach to the substrate (Whitfield and Purcell 2013).

3.4.3.1.1.9 Trichoptera

Distributed across the world, Trichoptera are abundant in a variety of freshwater habitats. Larvae, which inhabit ponds, streams, lakes, and rivers of various currents, feed primarily on aquatic plants, algae, and diatoms. Adult Trichoptera are generally weak fliers, spending the majority of the day concealed in vegetation near water and becoming more active at night (Whitfield and Purcell 2013; Wise 2018). Most adults have vestigial mouthparts and do not feed (Meyer 2020). Eggs are laid in the water in batches of about 100 to over 1,000, hatching within a few days (Meyer 2020; Wise 2018). Once development is complete, the young adult emerges from the water and takes flight or crawls onto vegetation (Whitfield and Purcell 2013; Wise 2018).

3.4.3.1.2 ESA-Listed Insects

Only ESA-listed insect species that inhabit coastal, riverine, and terrestrial environments in close proximity to navigable waterways are addressed in this document. Currently, there are seven insects listed as threatened or endangered under the ESA that may occur within the proposed action areas. These species, their ESA status, and distribution are outlined in Table 3-19 and discussed in the sections below. Critical habitat for ESA-listed insects is discussed in Section 3.4.12.1.3.

Table 3-19. ESA-Listed Insects in the Proposed Action Areas

Common Name (Scientific Name)	*ESA Listing Status*	*Distribution*	*Proposed Action Area Occurrence*	*Critical Habitat in the Proposed Action Areas*
American burying beetle (*Nicrophorus americanus*)	Endangered (54 FR 29652; July 13, 1989)	Not limited by vegetation type as long as there is sufficient food, shelter, and moisture. Not found in areas that are permanently inundated, but may use areas with moist soil near water.	GoMEX and Mississippi River	N/A
Bartram's hairstreak butterfly (*Strymon acis bartrami*)	Endangered (79 FR 47221; August 12, 2014)	Endemic to pineland croton of south Florida and the Florida Keys.	USEC-South	Yes (79 FR 47179; August 12, 2014)
Hine's emerald dragonfly (*Somatochlora hineana*)	Endangered (60 FR 5267; January 26, 1995)	Found along the edges of marshes and sedge meadows in Wisconsin, Illinois, Michigan and Missouri.	Great Lakes; GoMEX and Mississippi River	Yes (75 FR 21394; April 23, 2010)
Miami blue butterfly (Cyclargus thomasi bethunebakeri)	Endangered (77 FR 20948; April 6, 2012)	Coastal; occurs in openings and around the edges of broad-leaved evergreen forests of southern Florida.	USEC-South	N/A
Northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*)	Threatened (55 FR 32088; August 7, 1990)	Found on natural and wide beaches on the east coast of the United States.	USEC-MidATL	N/A
Puritan tiger beetle (*Cicindela puritana*)	Threatened (55 FR 32088; August 7, 1990)	Narrow sandy beaches with well-developed bluffs of sand and clay on the east coast of the United States.	USEC-MidATL	N/A
Rusty patched bumble bee (*Bombus affinis*)	Endangered (82 FR 3186; January 11, 2017)	Primarily inland with some potential overlap with the proposed action area in grasslands, prairies, marshes, parks, and gardens.	GoMEX and Mississippi River	N/A
Schaus swallowtail butterfly (Heraclides aristodemus ponceanus)	Endangered (41 FR 17736; April 28, 1976)	Occur exclusively in hardwood hammocks of southeastern Florida and the Florida Keys.	USEC-South	N/A

N/A = no critical habitat has been designated.

3.4.3.1.2.1 American Burying Beetle

The American burying beetle (*Nicrophorus americanus*) was listed as endangered under the ESA in 1989 (54 FR 29652; July 13, 1989). It is listed as a non-essential, experimental population in Cedar, St. Clair, Bates, and Vernon County, Missouri, outside of the proposed action area (77 FR 16712; March 22, 2012). There is currently no critical habitat designated for this species. The species has been proposed for downlisting to threatened in 2019 (84 FR 19013; May 3, 2019). The species may be found within the GoMEX and Mississippi River proposed action area.

American burying beetles are generalists in terms of suitable vegetation types where they are found. These include wet meadows, forests, shrub land, grasslands, lightly grazed pasture, and riparian zones (U.S. Fish and Wildlife Service 2019). They prefer moist soils where they can burrow in order to shelter themselves and hibernate. Currently, American burying beetles are found in portions of Arkansas, Kansas, Oklahoma, Nebraska, South Dakota, Texas, Rhode Island, and Massachusetts. The only overlap between known habitat and the proposed action area is along the Arkansas River in northeastern Arkansas and eastern Oklahoma. Due to the lack of information on population abundance of the species, surveys are conducted within analysis areas in areas where the American burying beetle is found. In the Arkansas River analysis area, which encompasses the proposed action area, 26 percent of surveys conducted from 2001–2015 showed positive captures of American burying beetles (U.S. Fish and Wildlife Service 2019).

Reproductive activity typically begins in May to June and lasts until August, as they emerge from hibernation and begin to look for a mate and a proper-sized vertebrate carcass to bury. Reproduction occurs once per year, with brood sizes typically ranging from 12–18 larvae (U.S. Fish and Wildlife Service 2019). As carrion beetles, the vertebrate carcass provides food for both adults and larvae. American burying beetles have been shown to be attracted to mammal, bird, and reptile and amphibian carcasses, as well as some live insects and fly larvae (U.S. Fish and Wildlife Service 2019).

3.4.3.1.2.2 Bartram's Hairstreak Butterfly

The Bartram's hairstreak butterfly (*Strymon acis bartrami*) was listed as endangered under the ESA in 2014 (79 FR 47221; August 12, 2014). Critical habitat was designated in 2014 (79 FR 47179; August 12, 2014) and contains units that overlap with the USEC-South proposed action area, as discussed in Section 3.4.12.1.3.

Dependent upon pineland croton (*Croton linearis*), the Bartram's hairstreak butterfly is endemic to south Florida and the Florida Keys. Three metapopulations for the butterfly exist in Long Pine Key in Everglades National Park, pineland fragments in Miami-Dade county, and Big Pine Key in the National Key Deer Refuge in the Florida Keys (Anderson 2015). Adults are rarely encountered more than a few meters away from pineland croton as they actively visit their flowers (Salvato 2005).

The ability to switch reproductive activity on and off, known as reproductive diapause, is known to occur in Bartram's hairstreaks. This behavior coincides with the health and abundance of pineland croton due to the importance of the plant to the life cycle of the butterfly. Factors such as rainfall and temperature have been linked to higher abundance of butterflies (Salvato 2005).

3.4.3.1.2.3 Hine's Emerald Dragonfly

The Hine's emerald dragonfly (*Somatochlora hineana*) was listed as endangered under the ESA in 1995 (60 FR 5267; January 26, 1995). Critical habitat was designated in 2010 (75 FR 21394; April 23, 2010) and contains a unit that overlaps with the GoMEX and Mississippi River proposed action area, as discussed in Section 3.4.12.1.3.

Hine's emerald dragonflies inhabit calcareous (high in calcium carbonate) spring-fed marshes and sedge meadows overlaying dolomite bedrock. These habitats are characterized by the presence of slowly flowing water and nearby or adjacent forest edges (U.S. Fish & Wildlife Service 2001b). Current populations exist in Wisconsin, Illinois, Michigan, and Missouri.

Hine's emerald dragonflies, like most dragonflies, go through the following life cycle stages: aquatic egg, aquatic larva, and terrestrial/aerial adult (U.S. Fish & Wildlife Service 2001b). Once an egg hatches, the larvae will spend 2–4 years in small streamlets, foraging and molting as they grow. After completing their larval development, the larvae begin to emerge as adults as early as May and as late as June and continue to emerge throughout the summer. Adults live up to 4 to 6 weeks (U.S. Fish & Wildlife Service 2001b).

3.4.3.1.2.4 Miami Blue Butterfly

The Miami blue butterfly (*Cyclargus thomasi bethunebakeri*) was listed as endangered under the ESA in 2012 (77 FR 20948; April 6, 2012). There is currently no critical habitat designated for this species. The species may be found within the USEC-South proposed action area.

The Miami blue butterfly is a coastal butterfly endemic to the southern tip of the Florida peninsula and Florida Keys. Once common across southern Florida and its barrier islands, preferring the edges of hardwood hammocks, coastal berms, dunes, and scrub, the butterfly is now distributed mainly on the Florida Keys within the Key West National Wildlife Refuge (Saarinen 2014). Population size is currently unknown, but is estimated to be in the hundreds (U.S Fish and Wildlife Service 2012a).

The Miami blue butterfly produces multiple generations per year, typically from February to November. Eggs are laid on the stalks of grey nickerbean (*Caesalpina bonduc*), seed pods of balloon vine (*Cardiospermum* spp.), and *Pithecellobium* (Carroll 2006). Adult butterflies feed on a variety of nectar sources, which must be in the vicinity of potential host plants. These plants include species in the Boraginaceae, Asteraceae, Fabaceae, Polygonaceae, and Verbenaceae families (Center for Biological Diversity 2011).

3.4.3.1.2.5 Northeastern Beach Tiger Beetle

The Northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*) was listed as threatened under the ESA in 1990 (55 FR 32088; August 7, 1990). There is currently no critical habitat designated for this species. The species may be found within the USEC-MidATL proposed action area.

Tiger beetles are typically the dominant invertebrate predators in many of the habitats where they occur. These habitats include open sand flats, dunes, water edges, beaches, woodland paths, and sparse grassy areas (Hill 1994). Currently, the Northeastern beach tiger beetle occupies these habitats on the island of Martha's Vineyard in Massachusetts, in Maryland, and on the eastern and western shores of the Chesapeake Bay in Virginia. At Monomoy National Wildlife Refuge on Martha's Vineyard, recent index counts in 2017 and 2018 yielded 4,322 and 2,687 adults, respectively. On Cedar Island in Maryland, numbers of adults have ranged from 1,000–2,000 from 2004 to 2017. The eastern and western shores of the Chesapeake Bay yield significantly higher numbers; 25,488 in 2016 and 7,832 in 2017, respectively (U.S Fish and Wildlife Service 2019c).

Female Northeastern beach tiger beetles oviposit their eggs in burrows in the beach from the upper foreshore to the lower backshore. Larvae hatch and dig small burrows where they develop into adults.

Adults emerge from these burrows in mid-June and begin to decline in August (Fenster 2006). Larvae capture prey such as small arthropods from the mouth of their burrows, while adults will prey on them more actively while also scavenging for dead fish and crabs. They are preyed upon mainly by birds, wolf spiders, and asilid flies (Fenster 2006).

3.4.3.1.2.6 Puritan Tiger Beetle

The Puritan tiger beetle (*Cicindela puritan*) was listed as threatened under the ESA in 1990 (55 FR 32088; August 7, 1990). There is currently no critical habitat designated for this species. The species may be found within the USEC-MidATL proposed action area.

The Puritan tiger beetle is found in similar shoreline habitat as the Northeastern beach tiger beetle (Hill 1993). Currently, the beetle only exists along the Chesapeake Bay in Maryland and along the Connecticut River in New England (U.S Fish and Wildlife Service 2019d). In Calvert County, Maryland the estimated population (averaged from 2013–2018) yielded 5,622 individuals. In the Sassafras River metapopulation, an average of 4,579 individuals were counted over the same time period (U.S Fish and Wildlife Service 2019d).

Similar to the Northeastern beach tiger beetle, the Puritan tiger beetle undergoes a two-year larval period. Eggs are buried in the sand and hatch into larvae, which burrow deeper into the substrate. Adult populations peak in late June and begin to decline in late July (Hill 1993). Larvae feed on insects that wander too close to their burrows, while adults are one of the top insect predators in its habitat (Babione 2003). Predation of adult beetles has been observed by robber flies and jumping spiders, while larval beetles are commonly parasitized by a tiphiid wasp (Hill 1993).

3.4.3.1.2.7 Rusty Patched Bumble Bee

The rusty patched bumble bee (*Bombus affinis*) was listed as endangered under the ESA in 2017 (82 FR 3186; January 11, 2017). There is currently no critical habitat designated for this species. The species may be found within the GoMEX and Mississippi River proposed action area.

The rusty patched bumble bee has been observed in a variety of habitats stretching across the northeastern and Midwestern regions of the United States, such as prairies, woodlands, marshes, agricultural lands, and parks and gardens (U.S Fish and Wildlife Service 2016b). They utilize underground and abandoned rodent cavities or clumps of grasses for their nesting sites, selecting areas where there is sufficient food, undisturbed nesting sites, and overwintering sites (U.S Fish and Wildlife Service 2016b).

Rusty patched bumblebee colonies have an annual cycle. In spring, solitary queens emerge from their hibernation and local nest sites, collect nectar and pollen from flowers, and begin laying eggs, which are fertilized by sperm stored since mating the previous fall. Workers hatch from these first eggs and colonies grow as workers collect food, defend the colony, and care for their young. Queens remain within the nests and continue laying eggs. In late summer, new queens and males will hatch from the eggs. Males then disperse to mate with new queens from other colonies. In fall, founding queens, workers, and males die. Only new queens go into diapause (a form of hibernation) over winter and the cycle begins again in spring (U.S Fish and Wildlife Service 2018d).

Rusty patched bumblebees gather pollen and nectar from various flowering plants. They feed on a diverse supply of nectar constantly between April and September (U.S Fish and Wildlife Service 2018d).

3.4.3.1.2.8 Schaus Swallowtail Butterfly

The Schaus swallowtail butterfly (*Heraclides aristodemus ponceanus*) was listed as endangered under the ESA in 1976 (41 FR 17736; April 28, 1976). There is currently no critical habitat designated for this species. The species may be found within the USEC-South proposed action area.

The range of the Schaus swallowtail butterfly extends from southern Miami-Dade County to the Upper and Middle Florida Keys. They occur exclusively in hardwood hammocks in areas that were once farmed and have now regrown. Although their preferred habitat is mainly inland and away from tidal waters, adults may travel over the ocean for short periods of time (U.S Fish and Wildlife Service 1999d). Population abundance of the Schaus swallowtail butterfly has been studied yearly since 2011. In 2018, 438 individuals were identified in regions within Biscayne National Park and Key Largo (U.S Fish and Wildlife Service 2019e).

Adults are primarily active between April and July, producing only one generation per year. A single female can lay several hundred eggs, depositing them on the leaves of torchwood (Amyris elemifera) and wild lime (Zanthoxylum fagara), and hatching in three to five days (U.S Fish and Wildlife Service 1999d). Larval caterpillars can remain in the chrysalis stage for up to two years before emerging as adults. IN contrast, adults are short-lived, averaging about three days in the wild (U.S Fish and Wildlife Service 1999d).

Larval caterpillars feed primarily on torchwood, while adults feed on nectar from a variety of blossoms from guava (*Psidium guajava*), cheese shrub (*Morinda royoc*), wild coffee (*Psychotria nervosa*), blue porterweed (*Stachytarpheta jamaicensis*), sea grape (*Coccoloba uvifera*), dog's tail (*Heliotropium angiospermum*), lantana (*Lantana involucrata*), and salt-and pepper (*Melanthera nivea*). Although little is known about predation of the Schaus swallowtail butterfly, their main predators are spiders, lizards, and birds (U.S Fish and Wildlife Service 1999d).

3.4.3.2 Environmental Consequences to Insects

Depending on the species of insect, certain life stages may spend all or part of their time in aquatic habitats. Other species may reside near waterways, but never enter them. Impacts to insects would potentially result from construction and brushing associated with the Proposed Action and are discussed in detail below. There would be no impacts to insects from fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, or pile driving noise nor from unrecovered jet cone moorings associated with the Proposed Action. Potential impacts to insects (those species that spend all or part of their time in water) from bottom devices, vessel movement, pile driving, ATON retrieval devices, and tow lines are discussed Table 3-3, and are not further analyzed in this PEIS.

Only land-based activities associated with the Proposed Action would affect most ESA-listed insects (Table 3-19) as these species are potentially located near coastal waters or freshwater areas, but are not within the ocean or waterways themselves. Therefore, effects to ESA-listed insects would mainly be from construction and brushing activities that occur on shore. There would be no effect to ESA-listed insects listed in Table 3-19 as a result of fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, pile driving noise, bottom devices, vessel movement, pile driving, unrecovered jet cone moorings, ATON retrieval devices, or tow lines. Potential effects to ESA-listed insects from vessel movement and construction and brushing are discussed below.

3.4.3.2.1 Construction

Insects inhabiting areas where a fixed ATON may be constructed could be impacted by disturbance, loss of habitat, injury, or mortality. WCC construction operations are dispersed across the proposed action areas and the footprint in which fixed ATON structures undergo construction is very small compared to the overall size of the proposed action areas. Insects that may be impacted during ATON construction would most likely exhibit a behavioral response to disturbance. Construction would only impact a small percentage of the overall insect population, and many insects are mobile enough to leave the area of disturbance in order to avoid injury or mortality. The footprint of a shoreside ATON structure would be small compared to the overall amount of insect habitat available; therefore, habitat loss would be minimal.

It is a best management practice (Appendix B) for the WCC crew to know about any potential ESA-listed species, including insects, that may be on site prior to arrival and to avoid harming these species during ATON operational activities.

Short term behavioral responses to construction would not be expected to result in long term impacts to individuals (such as chronic stress) or populations in the proposed action areas, as fixed ATON structures are diffuse and spread throughout the proposed action areas. Insect avoidance of increased activity during the short duration and small footprint of construction is unlikely to cause abandonment or significant alteration of behavioral patterns. No significant loss of habitat would occur, as construction would only impact a small percentage of available habitat for insects. Although injury or mortality may occur, no long term population level impacts would be anticipated due to the small footprint of disturbance and given the diffuse fixed ATON structures spread throughout the proposed action areas.

3.4.3.2.2 Brushing

Insects located on shore where brushing would take place could be impacted by disturbance, loss of habitat, injury, or mortality. Insects may be disturbed during brushing operations, causing behavioral responses such as fleeing the area. In clearing vegetation away in order to construct or maintain an ATON, a small percentage of habitat may be lost. Insects may also experience injury or mortality due to the use of tools and herbicides to clear away vegetation.

ATON brushing operations fall under the Coast Guard CATEX L38. The Coast Guard follows best management practices (U.S. Coast Guard 2017a) when conducting brushing operations, such as site surveys prior to arrival and commencing work. This includes knowledge about any potential ESA-listed species that may be on site prior to arrival and avoidance of these species during brushing activities.

Short term behavioral responses to brushing would not be expected to result in long term impacts to individuals (such as chronic stress) or populations in the proposed action areas, as fixed ATON structures are diffuse and spread throughout the proposed action areas. Insect avoidance of increased activity during the short duration and small footprint of brushing is unlikely to cause abandonment or significant alteration of behavioral patterns. No significant loss of habitat would occur, as vegetation would have the potential to regrow and brushing would only impact a small percentage of available habitat for insects. Although injury or mortality may occur, no long term population level impacts would be anticipated due to the small footprint of disturbance and given the diffuse fixed ATON structures spread throughout the proposed action areas.

3.4.3.2.3 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, impacts to insects within the proposed action areas would be similar to what is currently present because the new WCC fleet would replace the capabilities of the existing inland tender fleet. In addition, WCC assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include construction and brushing. There would be no change to baseline insect populations or habitat conditions as a result of the Proposed Action. Impacts to insects from the Proposed Action would be limited to small areas around ATON, and the shore-based disturbance to insects and their habitat would be intermittent and brief in duration. Therefore, there would be no significant impact to insects as a result of Alternative 1.

Pursuant to the ESA, there would be no effect to ESA-listed insects as a result of fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, or pile driving noise nor from unrecovered jet cone moorings. Only land-based activities associated with the Proposed Action may affect, but are is not likely to adversely affect, most ESA-listed insects (Table 3-19) under Alternative 1 as these species are potentially located near coastal waters or freshwater areas, but are not within the ocean or waterways themselves. Additionally, Alternative 1 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed insects (Section 3.4.12.1.3).

3.4.3.2.4 Impacts Under Alternatives 2–3

Under Alternatives 2–3, impacts to insects within the proposed action areas would be similar to what is currently present because ship platforms would replace the capabilities of the existing inland tender fleet. In addition, ship platforms and their assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include construction and brushing. There would be no change to baseline insect populations or habitat conditions as a result of the Proposed Action. Impacts to insects from the Proposed Action would be limited to small areas around ATON, and the shore-based disturbance to insects and their habitat would be intermittent and brief in duration. Therefore, there would be no significant impact to insects as a result of Alternatives 2–3.

As discussed in Section 3.4.3.2.3, pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect ESA-listed insects (Table 3-19). Additionally, Alternatives 2–3 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed insects (Section 3.4.12.1.3).

3.4.3.2.5 Impacts Under the No Action Alternative

Under the No Action Alternative, as the existing inland tender fleet is decommissioned and not replaced, the physical and acoustic stressors associated with the Proposed Action would not be introduced into the environment. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impacts to insects with implementation of the No Action Alternative.

3.4.4 Aquatic Invertebrates

3.4.4.1 Affected Environment

Aquatic invertebrates may be categorized as zooplankton (i.e., small floating or weakly swimming organisms that drift with water currents), larger pelagic invertebrates living in the water column, and benthic invertebrates that live on the bottom or in the sediment. ESA-listed invertebrate species are known to occur within the proposed action areas and are discussed in Section 3.4.4.1.2.

3.4.4.1.1 Major Groups of Aquatic Invertebrates within the Proposed Action Areas

Benthic and pelagic invertebrates that are likely to occur in the proposed action areas include single-celled organisms, cnidarians (including hydroids and jellyfish), amphipods, copepods, benthic worms, cephalopods, bivalves, sea snails, moss animals (bryozoans), chitons, crustaceans, echinoderms (urchins and sea cucumbers), sponges, and tunicates. Aquatic invertebrates are classified within major taxonomic groups, each generally referred to as a phyla. Most of these groups may only be present within the marine portions of the proposed action areas, though some groups may be present within fresh water. Invertebrate groups and their distribution in the proposed action areas are presented in Table 3-20. Vertical distribution information is generally shown for adults; the larval stages of most of the species occur in the water column.

Table 3-20. Major Groups of Aquatic Invertebrates in the Proposed Action Areas

Common Name[1] (Taxonomic Group)[2]	*Description*	*Presence in Proposed Action Areas*			
		Vertical Distribution		*Habitat*	
		Pelagic	*Benthic*	*Freshwater*	*Marine*
Foraminifera, radiolarians, ciliates (kingdom Protozoa)	Benthic and planktonic single-celled organisms; shells typically made of calcium carbonate or silica.	x	x		x
Flatworms (phylum Platyhelminthes)	Simplest form of marine worms with a flattened body.		x		x
Ribbon worms (phylum Nemertea)	Worms with a long extension from the mouth (proboscis) that helps capture food.		x		x
Roundworms (phylum Nematoda)	Small worms; many live in close association with other animals (typically as parasites).	x	x		x
Sponges (phylum Porifera)	Large species have calcium carbonate or silica structures embedded in cells to provide structural support.		x		x
Corals, anemones, hydroids, jellyfish (phylum Cnidaria)	Benthic and pelagic animals with stinging cells; sessile corals are main builders of coral reef frameworks.	x	x		x
Segmented worms (phylum Annelida)	Highly mobile marine worms; many tube-dwelling species.		x		x
Bryozoans (phylum Bryozoa)	Lace-like animals that exist as filter feeding colonies. Form either encrusting or bushy tuft-like lacy colonies.		x		x
Cephalopods, bivalves, sea snails, chitons	Mollusks are a diverse group of soft-bodied invertebrates with a specialized layer of tissue called a mantle. Mollusks such as squid are active swimmers and	x	x	x	x

Common Name[1] (Taxonomic Group)[2]	Description	Presence in Proposed Action Areas			
		Vertical Distribution		Habitat	
		Pelagic	Benthic	Freshwater	Marine
(phylum Mollusca)	predators, others such as sea snails are predators or grazers, and clams are filter feeders.				
Shrimp, crabs, crayfish, barnacles, copepods (phylum Arthropoda – Crustacea)	Diverse group of animals, some of which are immobile. Most have an external skeleton. All feeding modes from predator to filter feeder.	x	x	x	x
Sea stars, sea urchins, sea cucumbers (phylum Echinodermata)	Predators and filter feeders with tube feet.		x		x

[1] Major species groups (those with more than 1,000 species) are based on the World Register of Marine Species (World Register of Marine Species Editorial Board 2015) and Catalogue of Life (Roskov et al. 2015).
[2] Classification generally refers to the rank of phylum, although Protozoa is a traditionally recognized group of several phyla of single-celled organisms (e.g., historically referred to as kingdom Protozoa, which is still retained in some references, such as in the Integrated Taxonomic Information System).

3.4.4.1.2 ESA-Listed Aquatic Invertebrates

There are 21 ESA-listed freshwater invertebrate species (Table 3-21) that may occur within the proposed action areas. There are no ESA-listed freshwater invertebrate species in the Great Lakes, PNW, or SEAK proposed action areas. Critical habitat for three freshwater species has been designated and proposed for two species in the proposed action areas. Critical habitat for two coral species has been designated in the USEC-South proposed action area. Critical habitat is discussed in Section 3.4.12.1.4. Appendix I provides a list of ESA-listed species that were analyzed in the NMFS 2018 Biological Opinion[21] and those that are evaluated in this PEIS.

All ESA-listed species within the proposed action areas are bivalves, a group of mollusks that have two shells that can close around their soft bodies. Bivalves are typically found attached to or burrowed into the substrate. Bivalves may have a foot that extends from within the shells to move the mollusk around. While clams tend to move around more, mussels tend to remain in one spot, using threads to hold themselves in place in the sediment or on hard substrate. Bivalves are filter feeders that consume plankton that floats within the water column.

[21] The Coast Guard completed an ESA Section 7 and Essential Fish Habitat consultation with NMFS on U.S. Coast Guard Federal Aids to Navigation Program, finalized on April 19, 2018. Any information provided in this PEIS includes WCC support of ATONs, only as it pertains to the Proposed Action.

Table 3-21. ESA-Listed Freshwater Aquatic Invertebrates (Bivalves) in the Proposed Action Areas

Common Name (Scientific Name)	***ESA Listing Status***	***Distribution***	***Proposed Action Area Occurrence***	***Critical Habitat in the Proposed Action Areas***
Arkansas fatmucket (*Lampsilis powellii*)	Threatened (55 FR 12797; April 5, 1990)	Occurs in the Ouachita, South Fork Ouachita, Saline (and its four forks; Alum, South, Middle, and North Forks), and Caddo Rivers of AR	GoMEX and Mississippi River	N/A
Atlantic pigtoe (*Fusconaia masoni*)	Candidate species: proposed for listing as threatened (83 FR 51570; October 11, 2018)	Found in small creeks to large rivers in the James, Chowan, Roanoke, Tar, Neuse, Cape Fear, Pee Dee, Catawba, Edisto, Savannah, Ogeechee, and Altamaha River basins in Virginia, North Carolina, South Carolina, and Georgia	USEC-MidATL	No
Clubshell (*Pleurobema clava*)	Endangered (58 FR 5638; January 22, 1993)	Found in rivers and streams in IL, IN, KY, MI, MS, NY, OH, PA, and TN including the Tippecanoe River (IN), Green River (KY), Elk River (WV), and Allagheny River (PA).	GoMEX and Mississippi River	N/A
Dwarf wedgemussel (*Alasmidonta heterodon*)	Endangered (55 FR 9447; March 14, 1990)	Found in drainages in and around the Chesapeake Bay, including the Potomac River system (MD/VA), the York River system (VA), the Nottoway River system (VA), the Tar River system (NC), and the Neuse River system (NC).	USEC-MidATL	N/A
Fanshell (*Cyrpogenia stegaria*)	Endangered (55 FR 25591; June 21, 1990)	In medium to large rivers in AL, IL, IN, KY, OH, TN, VA, and WV including the Clinch River (TN), Green River (KY), and Licking River (KY)	GoMEX and Mississippi River	N/A
Fat pocketbook (*Potamilus capax*)	Endangered (41 FR 24062; June 14, 1976)	Found in the lower Ohio and Cumberland Rivers	GoMEX and Mississippi River	N/A
Higgins eye pearlymussel (*Lampsilis higginsii*)	Endangered (41 FR 24062; June 14, 1976)	Found in the upper Mississippi River as well as parts of the St. Croix River (MN/WI), the Wisconsin River (WI), and the Rock River (IL/IA)	GoMEX and Mississippi River	N/A
Inflated heelsplitter (*Potamilus inflatus*)	Threatened (55 FR 39868; September 28, 1990)	Limited to the Amite River in LA and the Tombigbee and Black Warrior Rivers in AL	GoMEX and Mississippi River	N/A

Common Name (Scientific Name)	***ESA Listing Status***	***Distribution***	***Proposed Action Area Occurrence***	***Critical Habitat in the Proposed Action Areas***
Neosho mucket (*Lampsilis rafinesqueana*)	Endangered (78 FR 57056; September 17, 2013)	Found in rivers and streams the Illinois, Neosho, and Verdigris River basins in AR, KS, MS, and OK	GoMEX and Mississippi River	No
Northern riffleshell (*Epioblasma torulosa rangiana*)	Endangered (58 FR 5638; January 22, 1993)	Occurs in short reaches of the Green River (KY); Detroit and Black Rivers (MI); Big Darby Creek (OH); and French Creek, LeBoeuf Creek, and the Allegheny River (PA)	GoMEX and Mississippi River	N/A
Orange pimpleback (*Plethobasus cooperianus*)	Endangered (41 FR 24062; June 14, 1976)	Occurs in the lower Ohio, Tennessee, and Cumberland Rivers in AL, IL, KY, and TN	GoMEX and Mississippi River	N/A
Pink mucket (*Lampsilis orbiculata*)	Endangered (41 FR 24062; June 14, 1976)	Found in mud and sand and in shallow riffles and shoals swept free of silt in major rivers and tributaries; potentially in Cumberland, Tennessee, Clinch, Ohio, Kanawha, and Elk Rivers	GoMEX and Mississippi River	N/A
Purple bankclimber (*Elliptoideus sloatianus*)	Threatened (63 FR 12664; March 16, 1998)	Occurs sporadically in the Apalachicola, Flint, and Ochlockonee Rivers, and from single sites in the Chattahoochee River and a Flint River tributary (in Florida)	USEC-South	No
Rabbitsfoot (*Quadrula cylindrica clylindrica*)	Threatened (78 FR 57056; September 17, 2013)	Found in rivers and streams in AL, AR, GA, KS, KY, IL, IN, LA, MS, MO, OH, OK, PA, TN, and WV	GoMEX and Mississippi River	Yes (80 FR 24691; April 30, 2015)
Rayed bean (*Villosa fabalis*)	Endangered (77 FR 8631; February 14, 2012)	Found in Lake Erie and large to small streams in IN, MI, NY, OH, PA, TN, and WV. Found sporadically in the Ohio River drainages and the Duck and upper Tennessee Rivers.	GoMEX and Mississippi River	N/A
Ring pink (*Obovaria retusa*)	Endangered (54 FR 40109; September 29, 1989)	Occurs in reaches of the Green River (KY), and the Tennessee River (AL, TN, and KY)	GoMEX and Mississippi River	N/A
Rough pigtoe (*Pleurobema plenum*)	Endangered (41 FR 24062; June 14, 1976)	Found in in rivers and streams of the Ohio River system, including the Clinch River (VA), the Tennessee River (AL and TN), Cumberland River (TN), Green and Barren Rivers (KY), and the East Fork of the White River (IN).	GoMEX and Mississippi River	N/A

Common Name (Scientific Name)	***ESA Listing Status***	***Distribution***	***Proposed Action Area Occurrence***	***Critical Habitat in the Proposed Action Areas***
Scaleshell mussel (*Leptodea leptodon*)	Endangered (66 FR 51322; October 9, 2001)	Occurs in 14 scattered populations in medium to large rivers within the Mississippi River basin in AR, MO, and OK	GoMEX and Mississippi River	N/A
Sheepnose mussel (*Plethobasus cyphus*)	Endangered (77 FR 14913; March 13, 2012)	Found in large rivers and streams in AL, IL, IN, IA, KY, MN, MS, MO, OH, PA, TN, VA, WV, WI	GoMEX and Mississippi River	N/A
Snuffbox mussel (*Epioblasma triquetra*)	Endangered (77 FR 8631; February 14, 2012)	Occurs in many small to medium creeks in the Midwest, as well as the larger Tennessee River (AL), the Mississippi and St. Croix Rivers (MN/WI), the Black River (MO), Clinch River (TN), Ohio River (OH), Elk River (AL, TN, WV), and the Allagheny River (PA), amongst others	GoMEX and Mississippi River	N/A
Spectaclecase mussel (*Cumberlandia monodonta*)	Endangered (77 FR 14913; March 13, 2012)	Found in short reaches in the Mississippi, Missouri, and Ohio River basins AL, AR, IL, IA, KY, MN, MS, TN, VA, WV, and WI	GoMEX and Mississippi River	N/A
Yellow lance (*Elliptio lanceolata*)	Threatened (83 FR 14189; April 3, 2018)	In the Patuxent, Rappahannock, York, James, Chowan, Tar, and Neuse River basins in Maryland, Virginia, and North Carolina	USEC-MidATL	No

N/A = no critical habitat has been designated.

Within the coastal portions of the proposed action areas, there are seven ESA-listed coral species which may be present (Table 3-22). These are listed below with a description of their distribution. ESA-listed marine species are only present in the marine portions of the GoMEX and Mississippi River proposed action area and the USEC-South proposed action area, which includes the state of Florida and the Bahamas. No coral species would be present in freshwater portions of the proposed action areas.

All ESA-listed marine species are coral species. Mature coral are sessile (non-motile) invertebrates that inhabit the ocean floor, consuming plankton from the water column. Most corals live colonially in groups of hundreds or thousands of individual coral polyps that have built upon each other, creating large structures. Within these structures, zooanthelle (microscopic algae) grow in symbiosis with the coral polyps.

Table 3-22. ESA-Listed Marine Aquatic Invertebrates (Coral Species) in the Proposed Action Areas

Common Name Scientific Name	*ESA Status*	*Distribution*	*Critical Habitat*
Boulder star coral (*Orbicella franksi*)	Threatened (79 FR 53852; September 10, 2014)	Native to shallow waters in the Caribbean Sea, the Gulf of Mexico, the Bahamas, Bermuda, and Florida.	No
Elkhorn coral (*Acropora palmata*)	Threatened (71 FR 26852; May 9, 2006)	Elkhorn coral is found typically in clear, shallow water (1 to 15 feet) on coral reefs throughout the Bahamas, Florida, and the Caribbean. The northern extent of the range in the Atlantic Ocean is Broward County, Florida, where it is relatively rare (only a few known colonies). Elkhorn coral lives in high-energy zones, with a lot of wave action.	Yes (73 FR 72009; November 26, 2008)
Lobed star coral (*Orbicella annularis*)	Threatened (79 FR 53852; September 10, 2014)	Lives in the western Atlantic Ocean and is the most abundant reef-building coral in the Caribbean.	No
Mountainous star coral (*Orbicella faveolata*)	Threatened (79 FR 53852; September 10, 2014)	Native to the Caribbean Sea and the Gulf of Mexico.	No
Pillar coral (*Dendrogyra cylindrus*)	Threatened (79 FR 53852; September 10, 2014)	Found in the western Atlantic Ocean and the Caribbean Sea.	No
Rough cactus coral (*Mycetophyllia ferox*)	Threatened (79 FR 53852; September 10, 2014)	Found in the Caribbean, southern Gulf of Mexico, Florida, and the Bahamas.	No
Staghorn coral (*Acropora cervicornis*)	Threatened (71 FR 26852; May 9, 2006)	Found typically in clear, shallow water (15 to 60 feet) on coral reefs throughout the Bahamas, Florida, and the Caribbean. The northern extent of the range in the Atlantic Ocean is Palm Beach County, Florida, where it occurs rarely.	Yes (73 FR 72009; November 26, 2008)

3.4.4.2 Environmental Consequences to Aquatic Invertebrates

Impacts to aquatic invertebrates would potentially result from vessel noise, pile driving noise, vessel movement, bottom devices, construction, brushing, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines associated with the Proposed Action. Potential impacts to aquatic invertebrates from vessel movement, brushing, and tow lines are discussed Table 3-3, and are not further analyzed in this PEIS, as these stressors would entail a minimal amount of disturbance to aquatic invertebrates. There would be no impacts to aquatic invertebrates from fathometer and Doppler speed log noise, ATON signal testing noise, or tool noise. Therefore, these will not be discussed further in this PEIS.

Aquatic invertebrates range in levels of complexity. While all species have a nervous system that makes them capable of responding to stimuli, this system is highly developed in cephalopod species, but poorly developed in a mollusk. As a result, some aquatic invertebrates would be capable of responding to a wide range of stimuli in their environment, while others would undergo an innate response to specific stimuli. ESA-listed aquatic invertebrates are categorized as bivalve or coral species. The ability to detect sound in these species is limited. Therefore, there would be no effect to ESA-listed invertebrates as a result of short term, temporary acoustic stressors, including vessel noise and pile driving noise. The potential effects to ESA-listed bivalves and coral species from physical stressors are discussed in Sections 3.4.4.2.3 through 3.4.4.2.6.

3.4.4.2.1 Vessel Noise

As discussed in Appendix E, the hearing capabilities of invertebrates have not been widely studied, although those that are able to detect low-frequency sound (i.e., cephalopods and crustaceans) are not expected to hear sources above 3 kHz (Lovell et al. 2005; Popper 2008). Impacts to invertebrates from vessel noise are not well understood, but it is likely that some species would be able to perceive the low frequency signals (Table 2-5) or particle movement generated by vessels used during the Proposed Action. Vessel noise is not expected to result in more than a temporary behavioral reaction or masking of aquatic invertebrates near the vessel noise. It would be expected that invertebrates would return to their normal behavior shortly after exposure. Vessel noise, if perceived by an aquatic invertebrate, would likely result in temporary behavioral responses, but would not result in any population level impact. In cephalopods or crustaceans, masking of acoustic communication may occur (Staaterman et al. 2011). In addition, 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). Recent research suggests that some invertebrates may experience sub-lethal physiological impacts from prolonged exposure to high amplitude, low frequency sound (Celi et al. 2014; Wale et al. 2013). However, vessel noise associated with the Proposed Action would be short term and temporary as the vessel moves through an area and would therefore be temporary, as most invertebrates are not strong swimmers. Although vessel presence temporarily raises the ambient levels of sound in the ocean (Hildebrand 2009), it would be expected that vessel noise associated with the Proposed Action would be similar to vessel noise from other ships in the proposed action areas and would not be expected to alter current levels of ambient sound, as the new WCC fleet would replace the current, aging WCC fleet.

3.4.4.2.2 Pile Driving Noise

Impacts to invertebrates from pile driving noise are not well understood; however, behavioral responses may occur from either sound detection or vibration (Hawkins et al. 2014; Roberts et al. 2016b). 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). Recent research suggests that some invertebrates may experience sub-lethal physiological impacts from prolonged exposure to high amplitude, low frequency sound (Celi et al. 2014; Wale et al. 2013). However, studies conducted on the potential impacts of seismic energy on snow crabs showed that snow crabs showed no short or long term effects of high-level impulsive sounds, and shrimp showed no behavioral effects from sounds with a source level of 196 dB re 1 µPa (Andriguetto-Filho et al. 2005; Boudreau et al. 2009).

Although the impacts of pile driving noise on invertebrates are not widely studied, it would be expected that pile driving noise associated with the Proposed Action would result in no more than temporary behavioral responses. It would also be expected that invertebrates would return to their normal behavior shortly after exposure. Pile driving noise, if perceived by an invertebrate, would likely result in temporary behavioral responses, but would not result in any population level impact. Pile driving noise would be short term and temporary, diffuse throughout the proposed action areas, and mitigated by SOPs (Appendix B).

3.4.4.2.3 Bottom Devices and ATON Retrieval Devices

For benthic invertebrates within the proposed action areas, bottom disturbance caused by the establishment, maintenance, and discontinuance of floating ATON, as well as spudding, anchoring, and wreckage recovery performed by the WCC may potentially impact species through disturbance, alteration of habitat, injury, and mortality. ATON establishment, maintenance, and discontinuance may impact benthic invertebrates within and just outside the footprint of the bottom device. Establishment of ATON may cause disturbance to aquatic invertebrates as the sinker settles on the riverbed or seafloor or the jet cone is installed, as they would be likely to flee the vicinity (if able). While the likelihood of striking an individual is remote, ATON establishment may cause injury or mortality if struck when deploying the bottom device or ATON retrieval device. However, no population level impacts would be expected.

The movement of a bottom device or ATON retrieval device during ATON maintenance may cause disturbance and alter habitat as it is dragged along the riverbed or seafloor. Dragging would not occur at high speeds and mobile invertebrates would be able to avoid danger. Alteration to bottom sediments would be expected to return to normal as sediments would shift back following a disturbance. During the discontinuance and removal of ATON, sessile or encrusting invertebrates may be present on bottom devices when they are pulled onto the WCC. Any individuals that remain on the device would be removed and placed back into the environment in accordance with Coast Guard policy.

Anchoring and spudding may impact benthic invertebrates within the footprint of the anchor and spuds and may disturb aquatic invertebrates just outside of the footprint of the anchor and spuds. Anchoring and spudding on the riverbed or seafloor would be brief and would only occur on soft-bottom sediments. Therefore, an anchor or spud placed on the riverbed or seafloor is not likely to attract invertebrates or provide temporary attachment points for invertebrates that would then be removed from the environment. Use of ATON retrieval devices, including grapnel hooks or wires, may impact benthic invertebrates along the path that these devices are dragged. Mobile invertebrates would likely flee the area and return once wreckage recovery has completed. Similar to dragging an ATON, wreckage recovery would not occur at high speeds and would only be conducted on soft-bottomed sediment.

ESA-listed bivalves would be unable to avoid bottom devices and ATON retrieval devices. Therefore, those directly within the path of these devices may be disturbed, injured, struck, or suffer mortality. However, due to the low density of these ESA-listed species and the diffuse placement of ATON across the proposed action areas, overlap between these ESA-listed species and ATON requiring establishment, maintenance, and discontinuance would be minimal.

3.4.4.2.4 Construction

Aquatic invertebrates located where a fixed ATON may be constructed could be impacted by through disturbance, alteration of habitat, injury, and mortality. WCC construction operations are dispersed across the proposed action areas and the footprint in which fixed ATON structures undergo construction is very small compared to the overall size of the proposed action areas. The aquatic invertebrates impacted by construction activities are a small percentage of the overall invertebrate population. It is also a best management practice (Appendix B) to know about any potential ESA-listed species that may be on site prior to arrival and to avoid damaging these species during ATON operational activities.

Due to the large size of the proposed action area, the small footprint of the fixed ATON structures, and the Coast Guard's best management practices (Appendix B), no long term population level impacts to aquatic invertebrates would be expected.

3.4.4.2.5 Pile Driving

For aquatic invertebrates within the proposed action areas, pile driving may impact species through bottom or habitat disturbance, vibrations, strike, injury, mortality, or behavioral response. While the likelihood of striking an individual is remote, pile driving may cause injury or mortality if struck when installing a pile if an individual is within its footprint. However, no population level impacts would be expected. Pile driving operations may cause an increase in turbidity. However, the impact to aquatic invertebrates from increased turbidity is unlikely to cause injury or mortality to individuals, and impacts to populations would be inconsequential due to the short term increases in turbidity, the infrequency of pile driving, and the large size of the proposed action areas. It would be anticipated that suspended sediments caused by pile driving operations would resettle quickly.

There is some evidence to suggest that vibrations (substrate-borne energy) from pile driving may adversely impact invertebrates, particularly those that are benthic (Roberts et al. 2016b). It is thought that aquatic invertebrates may use vibrations to detect predators and prey, amongst other things. The potential impacts of this stimuli on invertebrates are unknown, though studies indicate that animals are sensitive to and respond to vibrational stimuli (Roberts et al. 2016b). It would be expected that potential responses would be similar to responses to a predator or noxious stimuli nearby. For the most part, this response would be to withdraw or escape from the area, if able.

In general, invertebrate larvae encounter a variety of physical, chemical, and biological cues in their environments. Their behavioral responses to these cues may directly impact their transport, survival, settlement, and successful recruitment (Wheeler 2016). Therefore, changes in the physical, chemical, and biological properties of their habitats as a result of pile driving could impact their success. However, because pile driving would not occur frequently, nor continue for a long duration of time, there would be no impact to the physical, chemical, and biological properties of aquatic invertebrate habitats. In areas where pile driving would occur, there would be no long term impacts to the success of aquatic invertebrate populations.

3.4.4.2.6 Unrecovered Jet Cone Moorings

For aquatic invertebrates within the proposed action areas, jet cones that are used to moor floating ATON, may impact species through bottom disturbance and increased turbidity during the installation of the jet cone, or strike, injury, mortality, or behavioral response. Many aquatic invertebrates are benthic; therefore, overlap would be expected. However, the density of jet cones would be low. Given the large size of the proposed action area and the small footprint of jet cone moorings, only a small portion of benthic invertebrates would be impacted by their presence.

Impacts from the degradation of unrecovered jet cone moorings, would be undetectable due to the low density of jet cones left behind during ATON recovery. Therefore, there would be no measureable impact to aquatic invertebrates as a result of unrecovered jet cone mooring degradation.

3.4.4.2.7 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, impacts to aquatic invertebrates within the proposed action areas would be similar to what is currently present because the new WCC fleet would replace the capabilities of the existing inland tender fleet. In addition, WCC assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include bottom devices, ATON retrieval devices, pile driving, construction, and brushing activities. There would be no change to baseline aquatic invertebrate populations or habitat conditions as a result of the Proposed Action. Impacts to aquatic invertebrates from the Proposed Action would be limited to small areas around ATON, and the pile driving disturbance to aquatic invertebrates and their habitat would be intermittent and brief in duration. Therefore, there would be no significant impact to aquatic invertebrates as a result of Alternative 1.

Pursuant to the ESA, there would be no effect to ESA-listed aquatic invertebrates as a result of fathometer and Doppler speed log noise, ATON signal testing noise, or tool noise. Vessel noise, pile driving noise, vessel movement, bottom devices, construction, brushing, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines associated with the Proposed Action may affect, but are not likely to adversely affect ESA-listed aquatic invertebrates (Table 3-21 and Table 3-22). Additionally, Alternative 1 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed aquatic invertebrates (Section 3.4.12.2.4).

3.4.4.2.8 Impacts Under Alternatives 2–3

Under Alternatives 2–3, impacts to aquatic invertebrates within the proposed action areas would be similar to what is currently present because ship platforms would replace the capabilities of the existing inland tender fleet. In addition, ship platforms and their assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include bottom devices, ATON retrieval devices, and pile driving. There would be no change to baseline aquatic invertebrate populations or habitat conditions as a result of the Proposed Action. Impacts to aquatic invertebrates from the Proposed Action would be limited to small areas around ATON, and the pile driving disturbance to aquatic invertebrates and their habitat would be intermittent and brief in duration. Therefore, there would be no significant impact to aquatic invertebrates as a result of Alternatives 2–3.

As discussed in Section 3.4.4.2.7, pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect ESA-listed aquatic invertebrates (Table 3-21 and Table 3-22). Additionally, Alternatives 2–3 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed aquatic invertebrates (Section 3.4.12.2.4).

3.4.4.2.9 Impacts Under the No Action Alternative

Under the No Action Alternative, as the existing inland tender fleet is decommissioned and not replaced, the physical and acoustic stressors associated with the Proposed Action would not be introduced into the environment. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impacts to aquatic invertebrates with implementation of the No Action Alternative.

3.4.5 Amphibians

3.4.5.1 Affected Environment

Amphibian orders include Anura (Frogs and Toads) and Caudata (Salamanders and Newts). In general, amphibian populations can be in and near any given freshwater or wetland habitat and there is a great variety of amphibians present throughout the U.S. Most frogs and toads can live for more than 5 years and some salamanders can live more than 10 years (Nature North n.d.). Amphibians lay their eggs in water sources such as ponds, rivers, and lakes in the spring and summer. Some never leave the water and some are never far from a water source (Nature North n.d.).

3.4.5.1.1 Major Groups of Amphibians within the Proposed Action Areas

Both orders of amphibians are present throughout the proposed action areas (Table 3-23) and are discussed in further detail below. All orders of amphibians expected in the proposed action areas inhabit a variety of terrestrial and freshwater environments.

Table 3-23. Major Groups of Amphibians in the Proposed Action Areas

Taxonomic Order	*Examples of Species Present*	*Distribution in the Proposed Action Area(s)*
Anura	Columbia spotted frog (*Rana luteiventris*) American bullfrog (*Lithobates catesbeianus*) American toad (*Anaxyrus americanus*) Cope's gray treefrog (*Hyla chrysoscelis*) Spring peeper (*Pseudacris crucifer*) Pickerel frog (*Rana palustris*) Green frog (*Rana clamitans*)	Juvenile frogs and toads: presence in water Adult frogs: aquatic habitats, forage in water Adult toads: less aquatic habitat use Eggs: moist habitat required, including pools, swamps, and streams (Zug and Duellman 2016). Adhere to underside of submerged vegetation and rocks (Zug et al. 1995). Within the proposed action areas, many rivers may be too large or quickly moving for Anura species to lay their eggs in them.
Caudata	Red-spotted newt (*Notophthalmus viridescens*) Slimy salamander (*Plethodon glutinosuscomplex*) Small-mouthed salamander (*Ambystoma texanum*) Roughskin newt (*Taricha granulosa*)	Adult newts: aquatic habitat Adult salamanders: terrestrial habitat, except for breeding and laying eggs Mudpuppies and sirens: fully aquatic Foraging is mainly terrestrial, though some may feed on small fish and other amphibians (White Jr. and White 2002)

3.4.5.1.1.1 Anura

Order Anura includes frogs and toads. There are many species of frog and toad families in the order Anura known to occur within all of the proposed action areas. Some common representative examples are listed in Table 3-23. As the proposed action areas cover a large portion of the United States, frog and toad species of the Anura family are discussed broadly.

Frogs and toads in the order Anura use diversified habitats including rainforest canopies, mangroves, and sand dune burrows (Bossuyt and Roelants 2009). Due to their morphological and physiological adaptations, frogs and toads are widely distributed, excluding only extremely cold areas at high latitudes and isolated islands (Zug and Duellman 2016). As a result, some species of frogs and toads would be expected throughout the proposed action areas in which they are present. Amphibians absorb water through their skin, rather than drinking it and consume both aquatic and terrestrial prey (Bradford 2015). Species found within the proposed action area are generally opportunistic, feeding on various prey, predominantly insects and invertebrates such as arthropods or worms. Larger species also feed on small rodents and other frogs (Zug et al. 1995). Because frogs spend more time in the water, more of their prey items would be aquatic, while toads consume mainly terrestrial prey.

3.4.5.1.1.2 Caudata

Order Caudata are tailed amphibians that include salamanders, mudpuppies, newts, and sirens. There are many species of salamanders and newts expected within all of the proposed action areas near waterways. Some common representative examples are listed in Table 3-23. Adult newts utilize mainly aquatic habitats while adult salamanders are primarily terrestrial when not breeding or laying eggs. Their habitats include rivers, lakes, ponds, swamps, forests, marshes, and other muddy habitats. Some spend their entire lives in water, while some migrate between water and soil for events such as spawning. Salamanders and newts may be found in and adjacent to waterways. In general, salamanders and newts are nocturnal. During the day, aquatic Caudata hide in ponds or streams (Aartse-Tuyn et al. 2010). For a large portion of salamanders and newts in the order Caudata, their lifecycle is spent as aquatic gilled larvae. Mudpuppies and sirens are entirely aquatic salamanders that continue to live in water as adults, never leaving the water. All salamanders and newts are carnivorous generalists, feeding primarily on insects, spiders, worms, and amphibian eggs. Larger members may also feed on small fish and other amphibians (White Jr. and White 2002). Many newts and salamanders secrete skin toxins, making them unpalatable to predators.

3.4.5.1.2 ESA-Listed Amphibians

There are three ESA-listed amphibians that have the potential for presence within the proposed action area (Table 3-24): the Oregon spotted frog (*Rana pretiosa*), reticulated flatwoods salamander (*Ambystoma bishopi*), and frosted flatwoods salamander (*Ambystoma cingulatum*). There is no critical habitat for ESA-listed amphibians within the proposed action areas. Due to minimal overlap with the proposed action areas, further description of these species may be found in Appendix H.

Table 3-24. ESA-Listed Amphibians in the Proposed Action Areas

Common Name (Scientific Name)	***ESA Listing Status***	***Distribution***	***Proposed Action Area Occurrence***	***Critical Habitat in the Proposed Action Areas***
Oregon spotted frog (*Rana pretiosa*)	Threatened (79 FR 51657; August 29, 2014)	Small area adjacent to the Columbia River	PNW	No
Reticulated flatwoods salamander (*Ambystoma bishopi*)	Endangered (74 FR 7000; February 10, 2009)	Longleaf pine-wiregrass flatwoods and savannas in the southeastern coastal plain; underground crayfish burrows and root channels	USEC-South; GoMEX and Mississippi River	No
Frosted flatwoods salamander (*Ambystoma cingulatum*)	Threatened (64 FR 15691; April 1, 1999)			No

3.4.5.2 Environmental Consequences to Amphibians

Impacts to amphibians may potentially result from vessel noise, ATON signal testing noise, and tool noise, as well as vessel movement, bottom devices, construction, brushing, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines associated with the Proposed Action. As discussed in Table 3-3, it would not be expected that fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, or tool noise would cause PTS or TTS in an amphibian due to the short duration of these sounds. Impacts from brushing activities would be minimal and are discussed in Table X. In addition, there would be a discountable risk of entanglement in ATON retrieval devices or tow lines due to the small size of most amphibians and the unlikely overlap of these devices with amphibians. Therefore, these stressors are not discussed further in this PEIS. There would be no impacts to amphibians from fathometer and Doppler speed log noise or pile driving noise, as these devices are outside of the range of hearing of amphibian species (Appendix E) and therefore are unlikely to cause impacts to amphibian species. Therefore, these stressors will not be discussed further in this PEIS.

3.4.5.2.1 Vessel Noise

Amphibians would be exposed to vessel noise both underwater and in-air, depending on where most of their time is spent. However, amphibian hearing is known to be more effective underwater (Encyclopædia Britannica 2019). Potential impacts to amphibian species from vessel noise would most likely be from masking or behavioral response.

There is a paucity of research on the response of amphibians to vessels; therefore, a study of amphibian's responses to car traffic has been used as a proxy for vessels. In a study using a variety of amphibians, the probability of each species moving in response to an approaching vehicle was observed. Both frogs and salamanders responded to motor noise (Mazerolle et al. 2005). While the exact sensory mechanism warrants further study, frogs and salamanders may respond to the noise vibrations or to the sound of the motor (Mazerolle et al. 2005). In this study, which was done at night with a lighted vehicle, immobility was the most common response to the approach of a car. Other responses could include adopting threat displays or fleeing the area. Vessel noise, if perceived by an amphibian, likely would result in temporary behavioral responses and would not result in any population level impacts.

For anuran amphibians (i.e., frogs and toads), social and reproductive behaviors depend on the animal's ability to hear and identify sound signals amid high levels of background noise in busy acoustic environments (Bee 2012). While anurans use auditory cues in communication, almost all caudata species do not. Therefore, the potential for masking exists with frogs and toads, but likely there would be no potential masking for salamanders, including those species that are ESA-listed (Mazerolle et al. 2005). Frogs and toads are notable for the loud vocalizations males produce to attract females amid the calls of rival males (Gerhardt and Huber 2002; Narins et al. 2007). Frog vocalizations commonly reach peak SPLs of 90 dB to 110 dB re 20 µPa at 1 m (Gerhardt 1975). The most common reaction of frogs and toads in a noisy environment is to adjust their vocal behavior by ceasing calling, calling faster, or modifying the frequency or amplitude of their call (Cunnington and Fahrig 2010; Kaiser and Hammers 2009; Lengagne 2008; Parris et al. 2009; Penna and Zúñiga 2014; Sun and Narins 2005; Vargas-Salinas and Amézquita 2013). However, because vessel noise would be short in duration as the vessel moves through a large proposed action area, it would not be expected that masking would occur for a long period of time. Therefore, masking may cause short term, temporary responses, such as adjusting vocal behavior, but would not likely disrupt normal behaviors such as breeding, feeding, or sheltering.

ESA-listed salamanders may be able to detect vessel noise, but would not likely be affected by masking as a result of vessel noise, as salamanders do not use vocalizations as a primary means of communication. ESA-listed frogs may be affected by masking or behavioral responses to vessel noise. However, due to the low density of these ESA-listed species and the limited distribution of ESA-listed amphibians within any proposed action area, overlap between these ESA-listed amphibians and vessels supporting WCC operations would be minimal. Therefore, masking may cause short term, temporary responses and vessel noise may cause behavioral responses, but these responses would not likely disrupt normal behaviors such as breeding, feeding, or sheltering. Vessel noise would not cause population level impacts to ESA-listed amphibians.

3.4.5.2.2 ATON Signal Testing Noise

Amphibians out of water may be able to detect ATON signal testing noise, which ranges from 300–850 Hz. While some sound signals operate continuously, most would only sound during times of fog, reduced visibility, adverse weather, or when activated by a VHF radio. As a result, ATON signal testing noise would not be expected to occur for a long duration of time, and would be intermittent, due to the regularity with which the signal sounds. At most, impacts to amphibians as a result of ATON signal testing noise would be masking or behavioral responses. These impacts are discussed above, in Section 3.4.5.2.1.

3.4.5.2.3 Tool Noise

Amphibians out of water may be able to detect tool noise, which is broadband and distributed over a wide section of the audible range. Most tools, including drills, saws, or trimmers, would be used continuously for short durations of time. As a result, exposure of amphibians to tool noise would not be expected to occur for a long duration of time. At most, impacts to amphibians as a result of tool noise would be masking or behavioral responses. Once tool use at the site of the ATON is complete, amphibians would be expected to return to normal behavior. Masking and behavioral responses of amphibians would be similar to those discussed in Section 3.4.5.2.1.

3.4.5.2.4 Vessel Movement

Vessel movement has the potential to impact amphibians by causing a behavioral response or causing mortality or serious injury from a collision with the vessel. Relevant research consists of limited studies of amphibian responses to car traffic. While amphibians can detect approaching vehicles, many are known to become immobilized in response to vehicle stimuli (i.e., lights, noise, the vehicle itself) (Mazerolle et al. 2005), and as motion-sensitive predators, it is their response to freeze when approached by ground-level objects (Cooper Jr et al. 2008; Lima et al. 2015). Probability of avoidance of vehicles varies across amphibian species; however, a study by Mazerolle et al. (2005) showed that there was an 82 percent chance of individuals studied of an animal remaining immobile as a vehicle approached. Given the slow speed of a WCC while operating (11.4 knots maximum), it is expected that amphibians would have a behavioral response to a vessel. While cutter small boats could operate at higher speeds than the WCC (15–20 knots), cutter small boats would typically operate at less than 15–20 knots, particularly in support of ATON activities. The likely response to vessels may be to remain immobile, though there is also a potential the animal would flee the area. Although extremely unlikely due to the minimal overlap between amphibians and vessels within the proposed action areas, the potential for minor injury, permanent injury, or mortality (from bleeding/trauma, paralysis and subsequent drowning, infection, or inability to feed) exists if an amphibian were struck by a vessel. In the unlikely event that an amphibian were struck by a vessel associated with the Proposed Action, the slower speed of operating vessels would reduce the likelihood of mortality and potentially the severity of the injury. In the event of a strike, individuals may be impacted, but population level effects would not be expected. Short term behavioral responses to vessels would not be expected to result in long term impacts (such as chronic stress) to individuals or populations in and around the proposed action areas, particularly given the large size of the proposed action areas and the transient nature of WCC vessels.

ESA-listed salamanders would not likely be affected by vessel movement, as salamanders do not use navigable waterways as regular habitat, spending most of their time in underground burrows or moist areas outside of waterways. The ESA-listed Oregon frog may be affected by vessel movement. However, due to the low density of this ESA-listed species and the temporary presence of a vessel within any proposed action area, overlap between the Oregon frog and vessels supporting WCC operations would be minimal. Therefore, vessel movement may cause short term, temporary behavioral responses, but these responses would not likely disrupt normal behaviors such as breeding, feeding, or sheltering. Vessel movement would not cause population level impacts to the Oregon frog.

3.4.5.2.5 Bottom Devices and ATON Retrieval Devices

Bottom disturbance has the potential to impact amphibians in the water. For amphibians within the proposed action areas, bottom disturbance caused by the establishment, maintenance, and discontinuance of floating ATON, as well as spudding, anchoring, and wreckage recovery performed by the WCC may potentially impact species through disturbance, alteration of habitat, injury, and mortality. ATON operations and wreckage recovery may cause disturbance as the sinker or jet cone moorings are established and discontinued, while dragging an ATON to relocate it, or the use of a grapnel hook or wire sweeping method of recovery. Similar to how amphibians would be expected to avoid slow moving vessels, they would have the ability to swim away from the moving devices. Therefore, the likelihood of a collision between any devices and an amphibian would be low. Habitat may be altered during ATON operations and wreckage recovery; however, these operations are isolated and only occur in a small area compared to the size of the proposed action areas. Once operations have completed, amphibians would be expected to return to the area.

The most likely response to the use of bottom devices and ATON retrieval devices would be a behavioral response, which would be expected to be similar to those if a vessel were operating nearby (Section 3.4.5.2.1). It is assumed that amphibians would change their direction of travel or temporarily leave the area before WCC operations begin. Anchoring and spudding may impact amphibians located near the footprint of the devices. Anchor placement and spudding would be brief and only in use during ATON operations. In addition, the impact to amphibians from increased turbidity during ATON operations, anchoring, spudding, and wreckage recovery is unlikely to cause injury or mortality to individuals, as increases would be temporary and suspended sediments would settle quickly.

Short term behavioral responses to the use of bottom devices and ATON retrieval devices would not be expected to result in long term impacts to individuals (such as chronic stress) or populations in the proposed action areas, given the diffuse ATON spread throughout the proposed action areas. Avoidance of increased activity during the short duration and small footprint of bottom disturbance is unlikely to cause abandonment or significant alteration of behavioral patterns. If an ESA-listed amphibian were to encounter the devices in use, any behavioral avoidance displayed would not result in significant disruption of breeding, feeding, or sheltering. Bottom disturbance by bottom devices or ATON retrieval devices would not cause population level impacts to ESA-listed amphibian species.

3.4.5.2.6 Construction

Amphibians located where a fixed ATON may be constructed could be impacted by through disturbance, alteration of habitat, injury, and mortality. WCC construction operations are dispersed across the proposed action areas and the footprint in which fixed ATON structures undergo construction is very small compared to the overall size of the proposed action areas. The amphibians impacted by construction activities are a small percentage of the overall amphibian population. It is also a best management practice (Appendix B) to know about any potential ESA-listed species that may be on site prior to arrival and to avoid damaging these species during ATON operational activities.

The construction of fixed ATON structures has the potential to impact amphibians by causing behavioral responses on land or in the water. Similar to their response to vessel movement, amphibians would likely flee the area as the vessel and crew approach the shoreline and disembark to begin construction activities. In multiple studies, the individual responses of amphibians to human disturbance were consistent with anti-predator behavior optimization theory (Lima and Dill 1990; Ydenberg and Dill 1986), which supposes that animals react to humans as if they were potential predators (Frid and Dill 2002). The common behavioral response of amphibians to predators would be to freeze or flee (often to nearby water, if able). In a study of disturbance of frogs by nearby recreational activities, it was found that the frogs would flee from an approaching human at or before a distance of 2 m (Rodríguez-Prieto and Fernández-Juricic 2005). It was also noted that the time it took for each disturbed frog to resume pre-disturbance activities increased with the number of disturbances (Rodríguez-Prieto and Fernández-Juricic 2005). In another study using three species of frogs, it was noted that as distance to protective cover increased, some frogs increased freezing behavior, some decreased freezing behavior, and other frogs increased flight response (Matich and Schalk 2019). Therefore, it would be expected that amphibians disturbed by construction activities would likely exhibit temporary behavioral responses, such as freezing or fleeing the area. Disturbed amphibians should resume pre-disturbance activities after the period of disturbance has passed. Because construction activities would occur infrequently at each site, it would not be expected that behavioral responses would respond in ways that would significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering.

Due to the large size of the proposed action area, the small footprint of the fixed ATON structures, and the Coast Guard's best management practices (Appendix B), no long term population level impacts to amphibians would be expected.

ESA-listed amphibians may be affected by brushing activities. However, due to the low density of these ESA-listed species and the temporary presence of the team conducting these activities within any proposed action area, overlap between ESA-listed amphibians and brushing would be minimal. Therefore, brushing may cause short term, temporary behavioral responses, but these responses would not likely disrupt normal behaviors such as breeding, feeding, or sheltering. Brushing would not cause population level impacts to ESA-listed amphibians.

3.4.5.2.7 Brushing

Amphibians located at the site of a fixed ATON structure ashore, or close to shore, where brushing would take place could be directly impacted by being disturbed or crushed, or directly or indirectly impacted by chemicals used in brushing, such as herbicides or pesticides. WCC brushing operations are dispersed across the proposed action areas and the footprint in which fixed ATON structures undergo brushing is very small compared to the overall size of the proposed action areas.

ATON brushing operations fall under the Coast Guard CATEX for ATON operations (CATEX L38). The Coast Guard follows best management practices (U.S. Coast Guard 2017a) when conducting brushing operations, such as site surveys prior to arrival and commencing work. WCC operations would only impact a small percentage of the overall habitat available to amphibians. It is also a best management practice, per the brushing manual, to know about any potential ESA-listed amphibians that may be on site prior to arrival and to avoid damaging these species during brushing activities. Due to the large size of the proposed action area, the small footprint of the fixed ATON structures, and the Coast Guard's best management practices (Appendix B), no long term population level impacts to amphibians would be expected.

The brushing of fixed ATON structures has the potential to impact amphibians by causing behavioral responses on land or in the water. These would be similar to those described in Section 3.4.5.2.6. Because brushing activities would occur infrequently at each site, it would not be expected that behavioral responses would respond in ways that would significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering.

ESA-listed amphibians may be affected by brushing activities. However, due to the low density of these ESA-listed species and the temporary presence of the team conducting these activities within any proposed action area, overlap between ESA-listed amphibians and brushing would be minimal. Therefore, brushing may cause short term, temporary behavioral responses, but these responses would not likely disrupt normal behaviors such as breeding, feeding, or sheltering. Brushing would not cause population level impacts to ESA-listed amphibians.

3.4.5.2.8 Pile Driving

For amphibians within the proposed action areas, pile driving may impact species through bottom or habitat disturbance, vibrations, strike, injury, mortality, or behavioral response. While the likelihood of striking an individual is remote, pile driving may cause injury or mortality if struck when installing a pile if an individual is within its footprint. However, no population level impacts to amphibians would be expected. Pile driving operations may cause an increase in turbidity. However, the impact to amphibians from increased turbidity is unlikely to cause injury or mortality to individuals, and impacts to populations would be inconsequential due to the short term increases in turbidity, the infrequency of pile driving, and the large size of the proposed action areas. It would be anticipated that suspended sediments caused by pile driving operations would resettle quickly.

There is some evidence to suggest that vibrations from pile driving may adversely impact amphibians. Amphibians are the terrestrial vertebrates that are most sensitive to vibrations, which are part of their communication. For amphibians, communication is crucial to their survival and reproduction (Caorsi et al. 2019). A potential impact of vibrations on frogs and toads would be that they change their acoustic responses when intense vibrations are present in their environment. Changes may be in the call rate, call duration, or dominant frequency (Caorsi et al. 2019). With regular occurrence, vibrational disturbance could alter the reproductive success of amphibians. However, pile driving would not occur regularly in any proposed action area—only when it is required to establish, maintain, or discontinue a fixed ATON, which are dispersed widely throughout the proposed action areas. When pile driving needed to occur for these reasons, it would not be a long enough duration to impact communication amongst amphibians.

In general, changes in the physical, chemical, and biological properties of amphibian habitats as a result of pile driving could impact their success. However, because pile driving would not occur frequently, nor continue for a long duration of time, there would be no impact to the physical, chemical, and biological properties of amphibian habitats. In areas where pile driving would occur, there would be no long term impacts to the success of amphibian populations.

In multiple studies, the individual responses of amphibians to human disturbance were consistent with anti-predator behavior optimization theory (Lima and Dill 1990; Ydenberg and Dill 1986), which supposes that animals react to humans as if they were potential predators (Frid and Dill 2002). The common behavioral response of amphibians to predators would be to freeze or flee (often to nearby water, if able). In a study of disturbance of frogs by nearby recreational activities, it was found that the frogs would flee from an approaching human at or before a distance of 2 m (Rodríguez-Prieto and Fernández-Juricic 2005). It was also noted that the time it took for each disturbed frog to resume pre-disturbance activities increased with the number of disturbances (Rodríguez-Prieto and Fernández-Juricic 2005). In another study using three species of frogs, it was noted that as distance to protective cover increased, some frogs increased freezing behavior, some decreased freezing behavior, and other frogs increased flight response (Matich and Schalk 2019). Therefore, it would be expected that amphibians disturbed by pile driving would likely exhibit temporary behavioral responses, such as freezing or fleeing the area. Disturbed amphibians should resume pre-disturbance activities after the period of disturbance has passed. Because pile driving would occur infrequently at each site, it would not be expected that behavioral responses would occur in ways that would significantly disrupt normal behavior patterns which include, but are not limited to breeding, feeding, or sheltering.

3.4.5.2.9 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, impacts to amphibians within the proposed action areas would be similar to what is currently present because the new WCC fleet replace the capabilities of the existing inland tender fleet. In addition, WCC assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include construction and brushing and pile driving activities. There would be no change to baseline amphibian populations or habitat conditions as a result of the Proposed Action. Impacts to amphibians from the Proposed Action would be limited to small areas around fixed ATON, and the pile driving disturbance to amphibians and their habitat would be intermittent and brief in duration. Therefore, there would be no significant impact to amphibians as a result of Alternative 1.

Pursuant to the ESA, there would be no effect to ESA-listed amphibians as a result of fathometer and Doppler speed log noise or pile driving noise, as these devices are outside of the range of hearing of amphibian species (Appendix E) and therefore are unlikely to cause impacts to amphibian species. Vessel noise, ATON signal testing noise, and tool noise, as well as vessel movement, bottom devices, construction, brushing, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines associated with the Proposed Action may affect, but are not likely to adversely affect ESA-listed amphibians (Table 3-24). There is no critical habitat for ESA-listed amphibians within the proposed action areas.

3.4.5.2.10 Impacts Under Alternatives 2–3

Under Alternatives 2–3, impacts to amphibians within the proposed action areas would be similar to what is currently present because ship platforms would replace the capabilities of the existing inland tender fleet. In addition, ship platforms and their assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include construction and brushing and pile driving activities. There would be no change to baseline amphibian populations or habitat conditions as a result of the Proposed Action. Impacts to amphibians from the Proposed Action would be limited to small areas around fixed ATON, and the pile driving disturbance to amphibians and their habitat would be intermittent and brief in duration. Therefore, there would be no significant impact to amphibians as a result of Alternatives 2–3.

As discussed in Section 3.4.5.2.9, pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect ESA-listed amphibians (Table 3-24). There is no critical habitat for ESA-listed amphibians within the proposed action areas.

3.4.5.2.11 Impacts Under the No Action Alternative

Under the No Action Alternative, as the existing inland tender fleet is decommissioned and not replaced, the physical and acoustic stressors associated with the Proposed Action would not be introduced into the environment. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impacts to amphibians with implementation of the No Action Alternative.

3.4.6 Fish

3.4.6.1 Affected Environment

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

3.4.6.1.1 Major Groups of Fish within the Proposed Action Areas

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

The fish communities within the proposed action areas are diverse and variable, as would be expected given the diversity of climates and habitats in these areas. A brief survey of the various fish communities is discussed below. Appendix H lists the orders of fish that would not be expected within portions of the proposed action areas impacted by the Proposed Action. Although it is theoretically possible for an extralimital occurrence of a fish from these groups to occur within the proposed action areas, the probability of encountering an individual fish from these groups during the Proposed Action activities is exceptionally low, and thus, these fish groups will not be discussed further. Table 3-25 lists major fish groups that would be expected in the proposed action areas.

Table 3-25. Major Groups of Fish in the Proposed Action Areas

Taxonomic Order	*Representative Species or Groups*	*Distribution in the Water Column*		*Habitat*			*Preferred Habitat*
		Demersal	*Pelagic*	*Freshwater*	*Estuarine*	*Marine*	
Sharks							
Carcharhiniformes	Scalloped hammerhead shark (*Sphyrna lewini*), dusky smooth-hound shark (*Mustelus canis*)	x	x	x		x	Most species spend at least some time on the bottom, which may be sandy, muddy, or rocky.
Hexanchiformes	Sharpnose sevengill shark (*Heptranchias perlo*), bluntnose sixgill shark (*Hexanchus griseus*)	x				x	Demersal sharks typically found along the outer continental shelf and slope that occasionally travel into coastal waters.
Lamniformes	Bigeye thresher shark (*Alopias superciliosus*), shortfin mako shark (*Isurus oxyrinchus*)	x	x		x	x	Most species are strong swimming, pelagic hunters. May occur in coastal or open-ocean waters.
Orectolobiformes	Nurse shark (Ginglymostoma cirratum), whale shark (Rhincodon typus)	x	x			x	Nurse sharks (*Ginglymostoma cirratum*) prefer coral reefs or rocky or sandy bottom. Found from continental shelf to open ocean.
Squaliformes	Spiny dogfish (Squalus acanthias), bramble shark	x			x	x	Smaller sharks that occur along the continental shelf and slope, some deep water species.

Taxonomic Order	***Representative Species or Groups***	***Distribution in the Water Column***		***Habitat***			***Preferred Habitat***
		Demersal	***Pelagic***	***Freshwater***	***Estuarine***	***Marine***	
	(Echinorhinus brucus)						
Squatiniformes	Atlantic angel shark (*Squatina dumeril*)	x				x	Prefers to burrow in soft sediment of the continental shelf and slope.
Skates and Rays							
Myliobatiformes	Roughtail stingrays (*Bathytoshia centroura*), cownose rays (*Rhinoptera bonasus*)	x	x	x	x	x	Only occasionally in fresh water. All species feed along the bottom. Occur on the continental shelf and in offshore waters.
Pristiformes	Sawfish	x	x	x	x	x	Coastal rays that capture benthic prey. All species are endangered.
Rajiformes	Spinose skate (*Breviraja spinosa*), leaf-nose leg skate (*Springeria folirostris*)	x			x	x	Found along the outer continental shelf and slope, but favor deep waters.
Torpediniformes	Electric ray, Brazilian electric ray (*Narcine brasiliensis*)	x				x	Prefer to burrow in soft sediment for at least one life stage. Occur on the continental shelf and slope.
Epipelagic Bony Fish							
Atheriniformes	Silversides		x	x		x	Coastal pelagic planktivores common in temperate and tropical waters worldwide. Few freshwater species.
Beloniformes	Needlefish, flyingfish	eggs	x		x	x	Most species inhabit warmer coastal waters. Flyingfish are open ocean pelagic and can emerge from the water's surface and glide through the air for extensive distances.

Taxonomic Order	*Representative Species or Groups*	*Distribution in the Water Column*		*Habitat*			*Preferred Habitat*
		Demersal	*Pelagic*	*Freshwater*	*Estuarine*	*Marine*	
Elopiformes	Tarpon, ladyfish		x			x	Primarily coastal fish, the ladyfish (*Elops saurus*) is known to spawn offshore.
Mugiliformes	Mullets, smelts		x	x	x	x	Cosmopolitan schooling fish that typically remain in coastal areas. May spawn offshore.
Demersal Bony Fish							
Acipenseriformes	Sturgeon, paddlefish	x		x	x	x	Some species exclusively freshwater fish, others coastal marine and/or anadromous
Albuliformes	Bonefishes	x			x	x	Coastal tropical and subtropical species common in mangroves and sandy flats.
Anguilliformes	Cutthroat eel, moray eel, American eel (*Anguilla rostrata*)	x		x	x	x	Some species are catadromous. Moray eels are marine and often associated with reefs.
Batrachoidiformes	Toadfishes	x				x	Prefer sandy or muddy bottom or coral reef habitat on the continental shelf.
Beryciformes	Squirrelfish, soldierfish, orange roughy (*Hoplostethus atlanticus*)	x				x	Many species common on reefs and rocky outcrops. A few pelagic species in deeper waters.
Gobiesociformes	Clingfishes	x		x	x	x	Only occasionally brackish and freshwater. Typically small, slim coastal fishes associated with complex demersal habitats (reefs, seagrass). Restricted to the Gulf of Mexico.
Lophiiformes	Batfishes, frogfishes	x				x	Batfishes prefer mud or sand bottoms of the continental shelf and slope.

Taxonomic Order	*Representative Species or Groups*	*Distribution in the Water Column*		*Habitat*			*Preferred Habitat*
		Demersal	*Pelagic*	*Freshwater*	*Estuarine*	*Marine*	
Myxiniformes	Hagfish	x				x	May occur along the continental shelf, but more common in deep waters.
Ophidiiformes	Cusk-eels, pearlfish, brotulas	x		x		x	Only some species limited to freshwater. May inhabit invertebrate hosts, including bivalves, holothurians, and asteroids. Occur from the continental shelf to the abyssal plain.
Pleuronectiformes	Gulf stream flounder (Citharichthyes arctifrons), deepwater dab (Poecilopsetta beanii)	x (adult)	x (juvenile)	x	x	x	Primarily marine and estuarine. Adults prefer soft bottom habitats in estuaries and along the continental shelf and slope.
Polymixiiformes	Beardfish	x				x	Prefer soft bottoms of the continental shelf and slope.
Scorpaeniformes	Searobins, sculpins, scorpionfish	x		x		x	Only a few freshwater species. Prefer soft sand and mud bottoms, although some species are associated with coral or rocky reefs. Occur along the continental shelf and slope.
Cosmopolitan Bony Fish							
Aulopiformes	Barracudinas, greeneyes, lizardfishes	x	x		x	x	Demersal species prefer mud and clay bottoms. Lancetfish (*Alepisaurus ferox*) are pelagic. Coastal marine and estuarine out to continental slope.
Gadiformes	Grenadiers, hake, cod	x	x			x	Primarily demersal. Some species prefer soft bottom, while others are abundant on banks and reefs. Coastal to continental slope.
Gasterosteiformes	Sticklebacks, tube snouts	x	x	x	x	x	Found in diverse coastal marine and freshwater environments. Small and varied body forms.

Taxonomic Order	*Representative Species or Groups*	*Distribution in the Water Column*		*Habitat*			*Preferred Habitat*
		Demersal	*Pelagic*	*Freshwater*	*Estuarine*	*Marine*	
	(*Aulorhynchus flavidus*)						
Perciformes	Tuna, snapper, bass	x	x	x	x	x	The most diverse and largest order of bony fish. Contains species of varied shape and size found in all freshwater and marine waters.
Syngnathiformes	Seahorses, pipefish	x	x		x	x	Most common in tropical and subtropical coastal waters. Many species are habitat associated.
Tetraodontiformes	Filefish, trunkfish, ocean sunfish (*Mola mola*)	x	x	x		x	Primarily marine. Widespread, but commonly associated with reefs and rocky habitats, including offshore reefs.
Anadromous and Catadromous Bony Fish							
Clupeiformes	Alewife (Alosa pseudoharengus), Pacific sardine (Sardinops sagax)		x	x		x	Schooling fish found along the continental shelf. Some anadromous species.
Osmeriformes	Eulachon (Thaleichthys pacificus), smelt	x	x	x	x	x	Most species anadromous. Common small, silvery schooling fish abundant throughout coastal rivers, estuaries, and nearshore pelagic environments.
Salmoniformes	Salmon, trout	x	x	x	x	x	Some species freshwater or landlocked populations of anadromous species. Marine species more common in Pacific.
Freshwater Bony Fish							
Amiiformes	Bowfin	x		x	x		*Amia calva* is only extant species. Common in lakes and backwaters.
Characiformes	Piranhas, tetras	x	x	x	x	x	Primarily freshwater. Abundant in freshwater lakes and rivers. Most common in tropical and subtropical waters.

Taxonomic Order	*Representative Species or Groups*	*Distribution in the Water Column*		*Habitat*			*Preferred Habitat*
		Demersal	*Pelagic*	*Freshwater*	*Estuarine*	*Marine*	
Cypriniformes	Carps, minnows	x	x	x	x	x	Predominantly fresh and brackish species found in lakes, backwaters, and marshes. Many consume detritus.
Cyprinodontiformes	Killifish, topminnows	x	x	x	x	x	Abundant forage fish species very common in brackish environments and shallow coastal waters.
Esociformes	Pikes, pickerels, mudminnows	x	x	x			Pikes are large ambush predators. Mudminnows are small and demersal. Found in temperate systems.
Lepisosteiformes	Shortnose gar (Lepisosteus platostomus), alligator gar (Atractosteus spatula)		x	x	x		Found in fresh and brackish waters of the Gulf of Mexico, Mississippi River, and Great Lakes systems.
Jawless Fish							
Myxiniformes	Hagfish	x				x	May occur along the continental shelf, but more common in deep waters.
Petromyzontiformes	Lampreys	x		x	x	x	Some species are catadromous, while others are strictly freshwater. Roughly half are parasitic.

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

3.4.6.1.1.1 Offshore Marine Fish Communities

Pelagic fish live in the upper layers of the open ocean. The pelagic fish communities of the continental shelf typically fall into two categories: (1) large, predatory species (e.g., tunas, mackerels, and coastal sharks); and (2) smaller, omnivorous and herbivorous species that are forage species for larger fish, as well as birds and marine mammals (e.g., herrings, mullets, silversides, etc.) (Collette and Klein-MacPhee 2002; Moyle and Cech Jr 2004; U.S. Bureau of Ocean Energy Management Gulf of Mexico OCS Region 2017). The latter group are more likely to be dependent upon the coastal environment and, thus, likely to be abundant in large numbers within the proposed action areas. The former group would only be encountered regularly in the open ocean (Nelson et al. 2016; U.S. Bureau of Ocean Energy Management Gulf of Mexico OCS Region 2017).

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

The coastal waters of the United States are also home to a large variety of demersal fish, which live close to the bottom. Many of these species, including cod, haddock, and pollock, are commercially important (Froese 2019; Service 2018). These fish are typically opportunistic feeders, feeding on a wide variety of available sources of food on the seafloor (or bottom) and in the water column (Helfman et al. 2009; U.S. Bureau of Ocean Energy Management Gulf of Mexico OCS Region 2017).

Some pelagic species have wider ranges and so are commonly referred to as highly migratory fishes (U.S. Department of the Navy 2007). Examples of these species include billfishes (e.g., marlins and sailfish), Atlantic swordfish (*Xiphias gladius*), members of the mackerel family (e.g., Atlantic albacore tuna [*Thunnus alalunga*] and Atlantic bluefin tuna [*Thunnus thynnus*]), as well as many shark species (e.g., basking shark [*Cetorhinus maximus*], and sand tiger shark [*Carcharias taurus*]). These species transit through both broad geographical ranges and throughout the water column. While theoretically possible within the proposed action areas, these species would not generally be present in high density within the coastal and near coastal waters of the proposed action areas, and thus, would only occasionally be encountered (Froese and Pauly 2019; Nelson et al. 2016).

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

3.4.6.1.1.2 Nearshore Marine Fish Communities

Both rocky and coral reefs provide important habitat and can form the base of unique ecosystems where they occur within the proposed action areas. Reefs can provide important nursery habitat for larval and juvenile fish, which in turn support a large and diverse food web of fish and invertebrates

(Gulf of Mexico Fishery Management Council 1981; Page and Burr 2011; Paxton and Eschmeyer 1998; Williams et al. 2010). Over 300 species of reef-dependent fish have been identified within the Gulf of Mexico (U.S. Department of the Navy 2007) and rocky reefs of the Atlantic and Pacific also support high diversity (Collette and Klein-MacPhee 2002; Nelson et al. 2016; Williams et al. 2010). Common commercially exploited fish groups associated with reefs include snappers, groupers, and grunts, as well as smaller omnivorous or herbivorous groups such as wrasses, gobies, and damselfish (Ajemian et al. 2015; Moyle and Cech Jr 2004; Page and Burr 2011). Pelagic species may also be present on reefs, including jacks, runners, and schools of forage fish (Ajemian et al. 2015; Cross and Allen 1993).

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

Large numbers of fish move through these shallow waters each year. Many of these migrants are marine species that are dependent on shallow estuarine and wetland habitat in their juvenile phases. Examples of these migrants include snappers and grunts in warmer waters, and black seabass (*Centropristis striata*), croaker (*Cynoscion regalis*), and bluefish (*Pomatomus saltatrix*) in temperate waters (Allen et al. 2006; Collette and Klein-MacPhee 2002; U.S. Fish and Wildlife Service 2011). Several species of commercially and ecologically important anadromous fish travel from the ocean through estuaries and their associated habitats to freshwater spawning streams. Examples of these species include Chinook salmon (*Oncorhynchus tshawytscha*), steelhead trout (*Oncorhynchus mykiss*), green sturgeon (*Acipenser medirostris*), American shad (*Alosa sapidissima*), and striped bass (*Morone saxatilis*) (Koslow et al. 2015; Miller and Lea 1972; Roedel 1953). The total number of fish species present in a given coastal area is variable, but often consistently high. For example, Armstrong reports about 385 fish species in the Gulf of Alaska and surrounding fresh waters, while Collette and Klein MacPhee catalog roughly 252 in the Gulf of Maine (Armstrong 1996; Collette and Klein-MacPhee 2002). In large part, this is because numerous fish species utilize spawning, nursery, feeding, and seasonal grounds in nearshore and inshore waters, including bays and estuaries, as well as the associated marshes, kelp forests, seagrass beds, and mangroves (Allen et al. 2006; Horn and Allen 1978; Koslow et al. 2015; Miller and Lea 1972; Roedel 1953).

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

3.4.6.1.1.3 Freshwater Fish Communities

Freshwater ecosystems within the proposed action areas are diverse, ranging from shallow fast moving rivers, to lakes, to backwaters, to highly trafficked waterways such as the Mississippi River. However, due to the nature of the Proposed Action, which is largely restricted to navigable commercial waterways, discussion herein is limited to species that reside in or regularly move through these waterways.

Catfish and fish from the order Cypriniformes, (a diverse group that includes minnows such as the eastern silvery minnow [*Hybognathus regius*], and carp such as the common carp [*Cyprinus carpio*]) are common in most river systems. Catfish are more common in southern waters, but some species, such as the channel catfish (*Ictalurus punctatus*) and the tadpole madtom (*Noturus gyrinus*) range as far north as Maine (Page and Burr 2011). The vast majority of catfish are found exclusively in fresh water. Some of these species prefer shallow running water, or more restricted systems such as caves and springs, but many would be expected in freshwater portions of the proposed action areas (Froese and Pauly 2019; Paxton and Eschmeyer 1998).

Trout and salmon would be expected throughout freshwater portions of the proposed action areas. While many salmon species are fully anadromous (meaning they migrate all the way from the ocean to their natal streams, utilizing all habitats in between), other species make shorter migrations. Brook trout (*Salvelinus fontinalis*) and green sturgeon (*Acipenser medirostris*), for example, are better categorized as amphidromous (living primarily in fresh water, but making periodic feeding migrations to estuarine waters where available) (Collette and Klein-MacPhee 2002; Koslow et al. 2015; U.S. Fish and Wildlife Service 2011). Other anadromous or catadromous (born at sea and migrate to freshwater, then back to sea to spawn) fish species expected in freshwater portions of the proposed action areas include American eel (*Anguilla rostrata*), Pacific eulachon (*Thaleichthys pacificus*), and various species of herring and shad.

Freshwater fish assemblages within the Mississippi River system have been studied more than any other freshwater system in the country, but most accounts are limited to occurrence of species, leaving ecological relationships poorly understood. Perhaps as many as 150 species of freshwater fishes once inhabited the mainstem, but present population estimates are below 100 species, discounting recently introduced species (e.g., grass carp [*Ctenopharyngodon idella*]), strays from small tributaries, and marine species (Abell et al. 2000; Fremling 1989; Macchiusi and Baker 1991). Some of the fish in this river system are common to abundant in nearly all habitats (e.g., channel catfish, common carp, river carpsucker [*Carpioides carpio*], freshwater drum [*Aplodinotus grunniens*], and other common assemblages such as shad, gar, buffalo, and crappie). Other taxa are found almost exclusively in flowing habitats, like blue catfish, blue suckers (*Cycleptus elongatus*), river darter (*Percina shumardi*), and shovelnose sturgeon (*Scaphirhynchus platorynchus*). Many more species assemblages are common only in standing water habitats of pools, abandoned channels, and floodplains, such as pickerel, bullhead (*Ameiurus* spp.), topminnows (family Fundulidae), and sunfish (family Centrarchidae). These species in standing waters may be encountered, but would be much less common within the proposed action areas.

Many freshwater fish species consume invertebrates or fish as adults. Shad consume mostly plankton, but also feed on the bottom, as indicated by the presence of sand and detritus in their guts (Baker and Schmitz 1971). Bottom feeding may be a good way to obtain the abundant organisms on the surface of benthic substrates.

3.4.6.1.2 ESA-Listed Fish

A general description of habitat preference and life history of all ESA-listed species that may occur within the proposed action areas are provided in this section. Table 3-26 summarizes these species and where they may be encountered. In some cases, individual fish from ESA-listed stocks (such as those from a particular run or region) can intermingle with non-listed individuals from the same species. Any proposed action area where the species can reasonably be expected to occur is included in Table 3-26, even if individuals from listed stocks would be substantially outnumbered by individuals from unlisted stocks (e.g., most Pacific salmon species in the SEAK proposed action area). Where the species exists but all individuals present would be expected to belong to unlisted stocks, the proposed action area is not included. There are also several ESA-listed freshwater fish species that exist within the geographic boundaries of a proposed action area (such as the GoMEX and Mississippi River proposed action area), but which would not be impacted by the Proposed Action because their specific habitats do not overlap with the navigable portions of waterways. These species are listed in Appendix H, but are not discussed further in this PEIS. Critical habitat for ESA-listed fish is discussed in Section 3.4.12.1.5.

Table 3-26. ESA-Listed Fish in the Proposed Action Areas

Common Name (Scientific Name)	***ESA Listing Status***	***Distribution***	***Proposed Action Area Occurrence***	***Critical Habitat in the Proposed Action Areas***
Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)	Endangered: New York Bight DPS (77 FR 5879; February 6, 2012)	In rivers and coastal waters from Massachusetts north of Delaware. Eggs hatch in rivers, juveniles head to sea, and return to rivers as adults.	USEC-MidATL	Yes (82 FR 39160; August 17, 2017)
	Endangered: Chesapeake Bay DPS (77 FR 5879; February 6, 2012)	In rivers and coastal waters from north of Delaware to south of Virginia. Eggs hatch in rivers, juveniles head to sea, and return to rivers as adults.	USEC-MidATL	
	Endangered: Carolina DPS (77 FR 5913; February 6, 2012)	In rivers and coastal waters from south of Virginia to mid-South Carolina. Eggs hatch in rivers, juveniles head to sea, and return to rivers as adults.	USEC-South	
	Endangered: South Atlantic DPS (77 FR 5913; February 6, 2012)	In rivers and coastal waters from mid-South Carolina to mid-Florida. Eggs hatch in rivers, juveniles head to sea, and return to rivers as adults.	USEC-South	
Bull trout (*Salvelinus confluentus*)	Threatened (63 FR 31647; June 10, 1998)	Resident bull trout spend their entire lives in the same stream or creek, while migratory bull trout move to larger bodies of water to overwinter and then migrate back to smaller waters to reproduce.	PNW	Yes (69 FR 59996; October 6, 2004)

Common Name (Scientific Name)	***ESA Listing Status***	***Distribution***	***Proposed Action Area Occurrence***	***Critical Habitat in the Proposed Action Areas***
Chinook salmon (*Oncorhynchus tshawytscha*)	Threatened: Lower Columbia River ESU (64 FR 41835; August 2, 1999)	Originates from the Columbia River and its tributaries downstream of a transitional point east of the Hood and White Salmon Rivers, and any such fish originating from the Willamette River and its tributaries below Willamette Falls.	PNW, SEAK	Yes (70 FR 52630; September 2, 2005)
	Threatened: Snake River Fall Run ESU (64 FR 50394, September 16, 1999)	The Idaho portion of the Snake River fall–run Chinook salmon ESU consists of all of the Clearwater River drainage up to Lolo Creek except for the North Fork above Dworshak Dam, the Salmon River drainage upstream to the Little Salmon River and the Snake River drainage upstream to Hells Canyon Dam.	PNW, SEAK	Yes (58 FR 68543; December 28, 1993)
	Threatened: Snake River Spring/Summer Run ESU (64 FR 41835; August 2, 1999)	The Idaho portion of the Snake River spring/summer Chinook salmon ESU consists of all of all the Salmon River drainage and the Snake River drainage upstream to Hells Canyon Dam.	PNW, SEAK	Yes (64 FR 57399; October 25, 1999)
	Endangered: Upper Columbia River Spring Run ESU (64 FR 41835; August 2, 1999)	Wenatchee and Methow River basins.	PNW, SEAK	Yes (70 FR 52630; September 2, 2005)
	Threatened: Upper Willamette River ESU (64 FR 14308, March 24, 1999)	Clackamas, Mollala, North Santiam, South Santiam, Calapooia, McKenzie and Middle Fork Willamette Rivers.	PNW, SEAK	Yes (70 FR 52630; September 2, 2005)
Chum salmon (*Oncorhynchus keta*)	Threatened: Columbia River ESU (64 FR 41835; August 2, 1999)	Columbia River and its tributaries in Washington and Oregon	PNW, SEAK	Yes (70 FR 52630; September 2, 2005)

Common Name (Scientific Name)	*ESA Listing Status*	*Distribution*	*Proposed Action Area Occurrence*	*Critical Habitat in the Proposed Action Areas*
Coho salmon (*Oncorhynchus kisutch*)	Threatened: Lower Columbia River ESU (64 FR 5740, February 5, 1999)	Approximately 2,300 mi (3,701 km) of freshwater and estuarine habitat in Oregon and Washington.	PNW, SEAK	Yes (81 FR 9251; February 24, 2016)
	Threatened Oregon Coast ESU (76 FR 35755; June 20, 2011)	In the Necanicum, Nehalem, Tillamook Bay, Nestucca, Salmon, Siletz, Yaquina, Beaver, Alsea, Siuslaw, Lower Umpqua, Middle Umpqua, North Umpqua, South Umpqua, Siltcoos Lake, Tahkenitch Lake, Tenmile Lake, Coos, Coquille, Flores, Sixes and some smaller ocean front tributaries and sub-basins.		Yes 73 FR 7816; February 11, 2008
	Threatened: Southern Oregon and Northern California Coast	Coastal streams and rivers between Cape Blanco, Oregon, and Punta Gorda, California.		N/A
	Endangered: Central California Coast	Naturally spawned coho salmon originating from rivers south of Punta Gorda, California to and including Aptos Creek, as well as such coho salmon originating from tributaries to San Francisco Bay.		N/A
Eulachon (*Thaleichthys pacificus*)	Threatened: Southern DPS (75 FR 13012; March 18, 2010)	Comprised of fish that spawn in glacial, snow, or rain-fed rivers from the Skeena River in northern British Columbia to, and including, the Mad River in northern California.	PNW, SEAK	Yes (76 FR 65324; October 20, 2011)

Common Name (Scientific Name)	*ESA Listing Status*	*Distribution*	*Proposed Action Area Occurrence*	*Critical Habitat in the Proposed Action Areas*
Giant manta ray (*Manta birostris*)	Threatened (83 FR 2916, January 22, 2018)	They spend "the majority of their time in deep water, paying occasional visits to coastal areas with productive upwellings, 12 oceanic islands, and offshore pinnacles and seamounts. They visit cleaning stations on shallow reefs, are sighted feeding at the surface inshore and offshore, and are also occasionally observed in sandy bottom areas and seagrass beds.	USEC-MidATL, GoMEX and Mississippi River, USEC-South	N/A
Green sturgeon (*Acipenser medirostris*)	Threatened: Southern DPS (71 FR 17757; April 7, 2006)	Marine and estuarine waters from the Bering Sea, Alaska to El Socorro, Baja California, Mexico; Spawning of occurs in the mainstem Sacramento River although a spawning event was documented in 2011 in the lower Feather River at the Thermalito Afterbay Outlet; observed during the spawning season in the lower Yuba River downstream of Daguerre Point Dam.	SEAK	Yes (74 FR 52300; October 9, 2009)
Gulf sturgeon (*Acipenser oxyrinchus desotoi*)	Threatened Southern DPS (56 FR 49653; September 30, 1991)	From the Mississippi River in Louisiana, east to the Suwannee River in Florida where they inhabit both salt and fresh water habitats, annually cycling between the two.	GoMEX and Mississippi River	Yes (68 FR 13370; March 19, 2003)
Largetooth sawfish (*Pristis pristis*)	Endangered (79 FR 42687; July 23, 2014)	Occurring only as far north as the Gulf of Mexico and extreme southeast Florida.	USEC-South, GoMEX	N/A
Nassau grouper (*Epinephelus striatus*)	Threatened (81 FR 42268; July 29, 2016)	In waters off Bermuda and Florida throughout the Bahamas and Caribbean Sea, down to southern Brazil.	USEC-South	N/A

Common Name (Scientific Name)	***ESA Listing Status***	***Distribution***	***Proposed Action Area Occurrence***	***Critical Habitat in the Proposed Action Areas***
Oceanic whitetip shark (*Carcharhinus longimanus*)	Threatened (81 FR 96304; January 30, 2018)	All ocean basins in epipelagic tropical and subtropical waters. The species can be found offshore, along the edges of continental shelves, or around oceanic islands in deep water.	USEC-MidATL, USEC-South, GoMEX and Mississippi River	N/A
Scalloped hammerhead shark (*Sphyrna lewini*)	Threatened: Central & Southwest Atlantic DPS (79 FR 52576; September 4, 2014)	Central and Southwest Atlantic Ocean, including Caribbean Sea; temperate and tropical seas along coastal zones and in deep water adjacent to them.	USEC-MidATL, USEC-South, GoMEX and Mississippi River	N/A
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered (32 FR 4001; March 11, 1967)	Found in 41 bays and rivers along the East Coast, but their distribution across this range is broken up, with a large gap of about 250 miles separating the northern and mid-Atlantic metapopulations from the southern metapopulation.	USEC-MidATL, USEC-South, GoMEX and Mississippi River	N/A
Smalltooth sawfish (*Pristis pectinata*)	Endangered: U.S. DPS (70 FR 69464; November 16, 2005)	Only reliably found in the southeastern United States and Bahamas.	USEC-South	N/A
Sockeye salmon (*Oncorhynchus nerka*)	Endangered: Snake River (64 FR 41835; August 2, 1999)	Only found in lakes in the Stanley basin of the upper Salmon River, primarily Redfish and Alturas lakes. Additionally, they migrate to and from the ocean through the Salmon, Snake and Columbia rivers.	PNW	Yes (58 FR 68543; December 28, 1993)

Common Name (Scientific Name)	***ESA Listing Status***	***Distribution***	***Proposed Action Area Occurrence***	***Critical Habitat in the Proposed Action Areas***
	Threatened: Ozette Lake (63 FR 11750, March 10, 1998)	Large rivers that supplied sufficient room for spawning and rearing historically supported huge runs of sockeye, numbering into the millions. One such run still exists today on the Adams River in British Columbia, a tributary to the Fraser River.	PNW	Yes (70 FR 52630; September 2, 2005)
Steelhead trout (*Oncorhynchus mykiss*)	Threatened: Lower Columbia River (64 FR 5740; February 5, 1999)	Approximately 2,300 mi (3,701 km) of freshwater and estuarine habitat in Oregon and Washington.	PNW	Yes (65 FR 7764; February 16, 2000)
	Threatened: Middle Columbia River (64 FR 5740; February 5, 1999)	Approximately 35,000 square miles in the Columbia plateau of eastern Washington and eastern Oregon. The DPS includes all naturally spawned populations of steelhead in drainages upstream of the Wind River, Washington, and the Hood River, Oregon (exclusive), up to, and including, the Yakima River, Washington, excluding steelhead from the Snake River Basin.	PNW	
	Threatened: Snake River Basin (64 FR 5740; February 5, 1999)	Natural and manmade impassable barriers in streams in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho	PNW	
	Threatened: Upper Columbia River (64 FR 5740; February 5, 1999)	Extends from the Kamchatka Peninsula, east and south along the Pacific coast of North America, to approximately Malibu Creek in southern California. There are infrequent anecdotal reports of steelhead occurring as far south as the Santa Margarita River in San Diego County.	PNW	

Common Name (Scientific Name)	*ESA Listing Status*	*Distribution*	*Proposed Action Area Occurrence*	*Critical Habitat in the Proposed Action Areas*
	Threatened: Upper Willamette River (64 FR 5740; February 5, 1999)	Originating below natural and manmade impassable barriers from the Willamette River and its tributaries upstream of Willamette Falls, to and including the Calapooia River.	PNW	

3.4.6.1.2.1 Atlantic Sturgeon

Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) are grouped into five distinct population segments (DPSs), which occur within the USEC-MidATL and USEC-South proposed action areas and are listed as endangered or threatened (77 FR 5880; February 6, 2012 and 77 FR 5914; February 6, 2012) under the ESA. Atlantic sturgeon are co-managed by the Atlantic States Marine Fisheries Commission (ASMFC) and NMFS. Critical habitat was designated in 2017 (82 FR 39160; August 17, 2017) and overlaps with the USEC-MidATL and USEC-South proposed action areas. Critical habitat for the ESA-listed Atlantic sturgeon is discussed in Section 3.4.12.1.5. ESA-listed Atlantic sturgeon would be expected in the USEC-MidATL and USEC-South proposed action areas.

Atlantic sturgeon are well-studied during their juvenile and spawning life phases in riverine environments, but their subadult and adult estuarine and marine phases are less understood. The Atlantic sturgeon is an anadromous fish that undergoes seasonal migrations between freshwater ecosystems where they spawn and shallow marine waters (33 to 164 ft [10 to 50 m]) where they forage and grow. The age of sexual maturity varies from 5 to 34 years depending on latitude, averaging about 15 years (Atlantic Sturgeon Status Review Team 2007). In the natal river, the highly adhesive eggs are deposited on cobble substrate. Larvae hatch out in four to seven days, and the newly hatched young swim actively, frequently leaving the bottom and swimming throughout the water column. Juveniles begin to move downstream into their natal estuary (Atlantic Sturgeon Status Review Team 2007). In general, juveniles remain for several years in a riverine environment before migrating out to sea, but individuals may move downstream in the fall when temperatures drop. At around three years of age, subadults (typically those exceeding 28 in [70 cm] in total length) move from natal estuaries and begin to migrate to marine waters (Bain et al. 2000). Tagging data indicate that immature Atlantic sturgeon disperse extensively once they move into coastal waters (D.H. Secor et al. 2000). Atlantic sturgeon may occur within the western Atlantic along the U.S. East Coast. Adults may also undertake seasonal coastal migrations. Despite extensive mixing in coastal waters, adults return to their natal rivers to spawn. During non-spawning years, Atlantic sturgeon may remain at sea year-round, or they may seasonally venture into either natal or non-natal estuarine environments (Bain 1997; Hager et al. 2014).

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

3.4.6.1.2.2 Bull Trout

The bull trout (*Salvelinus confluentus*) is listed as threatened throughout its range (63 FR 31647; June 10, 1998). Critical habitat was designated in 2004 (69 FR 59996; October 6, 2004) and overlaps with the PNW proposed action area. Critical habitat for the bull trout is discussed further in Section 3.4.12.2.5. ESA-listed bull trout would be expected in the PNW proposed action area.

Bull trout are members of the Salmonidae family and can be found in Washington, Oregon, Idaho, Nevada, Montana, and western Canada. Bull trout have specific habitat requirements influencing their distribution and abundance. These include cold water (typically temperatures less than 59 to 64° F [15 to 18 ° C), stable stream channels, clean spawning and rearing gravel, complex and diverse cover, and unblocked migratory corridors. Bull trout look similar to brook trout (*Salvelinus fontinalis*) and lake trout (*Salvelinus namaycush*). Bull trout can be either resident or migratory; resident bull trout spend their entire lives in the same stream or creek, while migratory bull trout move to larger bodies of water to overwinter and then migrate back to smaller waters to reproduce. Bull trout were once found in about 60 percent of 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.

Resident and juvenile bull trout prey on invertebrates and small fish. Adult migratory bull trout primarily eat fish.

3.4.6.1.2.3 Chinook Salmon

The Upper Columbia River spring-run and Sacramento River winter-run evolutionarily significant units (ESUs) of Chinook salmon (*Oncorhynchus tshawytscha*) are listed as endangered under the ESA (79 FR 40004; July 11, 2004 and 59 FR 440; January 4, 1994). Seven other ESUs, including Snake River (fall-run, spring/summer-run) and Lower Columbia River are listed as threatened (81 FR 51549; August 4, 2106). Critical habitat for Chinook salmon is designated in areas of Oregon, Washington, and California, including portions of the Columbia River which overlap with the PNW proposed action area. Critical habitat for the ESA-listed Chinook salmon is discussed in Section 3.4.12.1.5. ESA-listed Chinook salmon would be expected in the PNW and SEAK proposed action areas (though no Alaskan ESUs are ESA-listed).

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

Juvenile Chinook prefer coastal areas (less than 34 mi [55 km] from the shore) throughout California, Oregon, and Washington, north to the Strait of Georgia and the Inside Passage, Alaska (Pacific Fishery Management Council 2000). Trudell and colleagues (2009) documented catch of juvenile Chinook salmon from ESA-listed ESUs offshore of central Alaska, but in smaller numbers as compared to other locations. The majority of marine juveniles are found within 17 mi (28 km) of the coast, and they tend to concentrate around areas of pronounced coastal upwelling (Pacific Fishery Management Council 2000). Chinook salmon originating in rivers south of the Rogue River, Oregon rear in marine waters off California and Oregon, whereas salmon originating in rivers north of the Rogue River migrate north and west along the Pacific Coast (National Marine Fisheries Service 2014a). A substantial portion of Chinook salmon from Washington and Oregon were later encountered in the Gulf of Alaska (Gilk-Baumer et al. 2017). These migrations are important from a management perspective since fish from Oregon, Washington, British Columbia, and Alaska have the potential of being harvested in the Gulf of Alaska (U.S. Department of Commerce and National Oceanic and Atmospheric Administration 2005).

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

3.4.6.1.2.4 Chum Salmon

Two ESUs of chum salmon (*Oncorhynchus keta*) are listed as threatened under the ESA—the Columbia River ESU and the Hood Canal summer-run ESU (70 FR 37160; June 28, 2005). Designated critical habitat for chum salmon is located within the states of Washington and Oregon, including portions of the Columbia River, which overlap with the PNW proposed action area (70 FR 52630; September 2, 2005). Critical habitat for the ESA-listed chum salmon is discussed in Section 3.4.12.1.5. ESA-listed chum salmon would be expected in the PNW and SEAK proposed action areas (though no Alaskan ESUs are ESA-listed).

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

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

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

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

3.4.6.1.2.5 Coho Salmon

The Lower Columbia River, Oregon Coast, and Southern Oregon and Northern California Coast ESUs of coho salmon (*Oncorhynchus kisutch*) are listed as threatened under the ESA, and the Central California

Coast ESU is listed as endangered (70 FR 37160; June 28, 2005 and 76 FR 35755; June 20, 2011). Critical habitat for coho salmon is designated within freshwater rivers and tributaries in Washington, Oregon, and California, including portions of the Columbia River which overlap with the PNW proposed action area (Oregon Coast ESU: 73 FR 7816; February 11, 2008; Lower Columbia River ESU: 81 FR 9251; February 24, 2016). Critical habitat for the ESA-listed Coho salmon is discussed in Section 3.4.12.1.5. All four ESUs that are ESA-listed would be expected to overlap with the PNW or SEAK proposed action areas. No Alaska ESUs are ESA-listed.

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

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

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

3.4.6.1.2.6 Eulachon

The Southern Distinct Population Segment (DPS) of Pacific eulachon (*Thaleichthys pacificus*) is listed as threatened under the ESA (75 FR 13012; March 18, 2010). Critical habitat has been designated in a combination of freshwater creeks and rivers and their associated estuaries, including the Columbia River, Umpqua River, Quinault River, Elwha River, Klamath River, Redwood Creek, and Mad River, which overlaps with the PNW proposed action area (76 FR 65324; October 20, 2011). Critical habitat for the ESA-listed eulachon is discussed in Section 3.4.12.1.5. ESA-listed eulachon can be found throughout the PNW and SEAK proposed action areas. Although the vast majority of eulachon found in Alaska would belong to the non-listed Northern DPS, there are isolated records of Southern DPS individuals in the Alaska panhandle, which overlaps with the SEAK proposed action area.

Eulachon are endemic to the eastern Pacific Ocean, ranging from northern California to southwest Alaska and into the southeastern Bering Sea. In the continental United States, most eulachon originate in the Columbia River Basin. Eulachon occur in nearshore ocean waters, except for the brief spawning runs into their natal streams. Spawning grounds are typically in the lower reaches of larger snowmelt-fed rivers with water temperatures ranging from 39 to 50 °F (4 to 10 °C) (National Marine Fisheries Service 2014e). Pacific eulachon typically spend three to five years in saltwater before returning to fresh water to spawn from late winter through mid-spring. Eggs are fertilized in the water column. After fertilization, the eggs sink and adhere to the river bottom, typically in areas of gravel and coarse sand. Most eulachon adults die after spawning. Juvenile eulachon move from shallow, nearshore areas to mid-depth areas. Juveniles may be observed in depths up to 2,000 ft (600 m), but they typically remain between 80 and 500 ft (Allen and Smith 1988).

Pacific eulachon are filter feeders that feed on plankton, but only when they are at sea (Flannery et al. 2013; National Marine Fisheries Service 2014e).

3.4.6.1.2.7 Giant Manta Ray

The giant manta ray (*Manta birostris*) is listed as threatened throughout its entire range under the ESA (83 FR 2916; January 22, 2018). Currently, no critical habitat has been designated for the species. ESA-listed giant manta rays may be present in the USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas.

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

Manta rays primarily feed on planktonic organisms such as euphausiids, copepods, mysids, decapod larvae, and shrimp, but some studies have noted their consumption of small and moderately sized fish as well (Couturier et al. 2012). Within the Gulf of Mexico, giant manta rays commonly feed around rings, eddies, and upwelling zones associated with the predominant Loop Current.

3.4.6.1.2.8 Green Sturgeon

The southern DPS of North American green sturgeon (*Acipenser medirostris*) is listed as threatened under the ESA (71 FR 17757; April 7, 2006). Critical habitat for the southern DPS of green sturgeon is designated in portions of coastal marine waters from California to Washington, including in the lower Columbia River estuary, which is part of the PNW proposed action area (74 FR 52300; October 9, 2009). Critical habitat for the ESA-listed green sturgeon is discussed in Section 3.4.12.1.5. ESA-listed green sturgeon would be expected in the PNW proposed action area, with the potential for encounters in the SEAK proposed action area.

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

Green sturgeon rarely occur more than 12 mi (19 km) from the coast. Green sturgeon forage on benthic invertebrates such as shrimp, mollusks, and amphipods. They also occasionally prey upon small fish (Moyle et al. 1992).

3.4.6.1.2.9 Gulf Sturgeon

The Gulf sturgeon (*Acipenser oxyrinchus desotoi*) is listed as threatened throughout its entire range under the ESA and is co-managed by NMFS and the USFWS (56 FR 49653; September 30, 1991). Designated critical habitat for Gulf sturgeon is located in 14 geographic areas from Florida to Louisiana (National Marine Fisheries Service 2014d). These overlap with coastal portions of the USEC-South and GoMEX and Mississippi River proposed action areas and are discussed in Section 3.4.12.1.5. Critical habitat for the Gulf sturgeon includes habitat which provides abundant prey items across life stages (e.g., detritus, aquatic invertebrates) and suitable spawning substrate, aggregation areas, flow regime, water quality, sediment quality, and safe, unobstructed migratory passage corridors. Gulf sturgeon would be expected in most of the Gulf of Mexico proposed action area, as well as portions of the USEC-South proposed action area.

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

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

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

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

3.4.6.1.2.10 Largetooth Sawfish

The largetooth sawfish (*Pristis pristis*) is listed as endangered throughout its range (79 FR 42687; July 23, 2014). There is currently no critical habitat designated for largetooth sawfish. There is a remote possibility of encountering largetooth sawfish in the USEC-South and GoMEX and Mississippi River proposed action areas, though this species is thought to be extinct or nearly extinct in the waters of the United States.

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

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

Largetooth sawfish prey mostly upon other fish species, but they will also target invertebrates (National Oceanic and Atmospheric Administration 2015b).

3.4.6.1.2.11 Nassau Grouper

Nassau grouper (*Epinephelus striatus*) is listed as threatened throughout its range (81 FR 42268; June 29, 2016). There is currently no critical habitat designated for Nassau grouper. Nassau grouper are commonly reef-associated, and would be expected in fully marine portions of the USEC-South and GoMEX and Mississippi River proposed action areas.

The Nassau grouper is a fairly large grouper species which inhabits waters from Bermuda and Florida throughout the Bahamas and the Caribbean Sea. They are perhaps best known for their massive spawning aggregations, which typically occur on winter full moons. Although occasionally found in deeper waters, they are most abundant in clear waters shallower than 426 ft (130 m) deep with high relief coral reefs or rocky substrate (Sadovy and Aguilar-Perera 2018). Post-settlement fish inhabit macroalgal clumps, seagrass beds, and coral (Cornish and Eklund 2003). They do not typically inhabit deeper or open water, nor freshwater environments, though juvenile grouper are common inhabitants of mangroves and other nearshore structurally-rich environments.

Younger nassau groupers forage on small crustaceans and fish, while older fish are almost exclusively piscivorous ambush predators, which rely on suction to swallow prey whole (Eggleston et al. 1998).

3.4.6.1.2.12 Oceanic Whitetip Shark

The oceanic whitetip shark (*Carcharhinus longimanus*) is listed as threatened throughout its entire range under the ESA (83 FR 4153; January 30, 2018). Currently, no critical habitat is designated for the species. Oceanic whitetips may be encountered in the fully marine portions of the USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas.

Oceanic whitetip sharks are found worldwide in warm tropical and subtropical waters between 30 °N and 35 °S latitude near the surface of the water column (Young et al. 2016). This species has a clear preference for deep, open ocean waters likely occurring near the surface, with abundances decreasing with greater proximity to the continental shelf and offshore islands. Preferring warm waters near or over 68 °F (20 °C), and offshore areas, the oceanic whitetip shark is known to undertake seasonal movements to higher latitudes in the summer and may regularly survey extreme environments (i.e., deep depths, low temperatures) as a foraging strategy (Young et al. 2016). Therefore, its occurrence within the proposed action areas would be rare.

Oceanic whitetip sharks are opportunistic feeders. The oceanic whitetip shark feeds primarily on fish and cephalopods (Bonfil et al. 2008), but are also known to feed on marine birds, marine mammals, other sharks and rays, mollusks, crustaceans, and even garbage (Compagno 1984; Cortés 1999). In addition, blackfin tuna (*Thunnus atlanticus*), barracuda, and white marlin (*Tetrapturus albidus*) have been found in the stomachs of oceanic whitetip sharks (Backus et al. 1956). Oceanic whitetip sharks are usually solitary, but they will follow pods of pilot whales. It is believed that the oceanic whitetip sharks are exploiting the pilot whales' ability to find squid, which is a preferred prey item for both species (Compagno 1984).

3.4.6.1.2.13 Scalloped Hammerhead Shark

The scalloped hammerhead shark (*Sphyma lewini*) is listed under the ESA (79 FR 38213; July 3, 2014). NMFS determined that there are four ESA listed DPSs: the Eastern Pacific and Eastern Atlantic DPSs are listed as endangered, and the Indo and West Pacific and Central and Southwest Atlantic DPSs are listed as threatened. NMFS has not designated critical habitat for this species. The threatened Southwest Atlantic DPS would likely occur in the USEC-South proposed action area. Individuals from non-listed DPSs of scalloped hammerhead would also be expected in the southern portions of the USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas.

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

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

3.4.6.1.2.14 Shortnose Sturgeon

The USFWS has listed the shortnose sturgeon (*Acipenser brevirostrum*) as endangered throughout its range (32 FR 4001; March 11, 1967). The species remained listed following enactment of the ESA in 1973 (Wippelhauser and Squiers Jr 2015), and NMFS assumed jurisdiction for the shortnose sturgeon from the USFWS under a 1974 government reorganization plan. There is no critical habitat for shortnose sturgeon currently designated. Shortnose sturgeon would be expected in freshwater and coastal portions of the USEC-MidATL and USEC-South proposed action areas.

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

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

Sturgeon feed in fresh water during summer and over sand-mud bottoms in the lower estuary during fall, winter, and spring (National Marine Fisheries Service 1998). The shortnose sturgeon feeds by suctioning insects, crustaceans, mollusks, worms, and small benthic fishes (National Marine Fisheries Service 1998; Stein et al. 2004). Freshwater mussels are a main prey item for adult sturgeon.

3.4.6.1.2.15 Smalltooth Sawfish

Both the U.S. and non-U.S. DPSs of smalltooth sawfish (*Pristis pectinata*) are listed as endangered under the ESA (70 FR 69464; April 1, 2003). The U.S. DPS is co-managed by NMFS and the USFWS. Critical habitat for smalltooth sawfish is designed along the southwestern coast of Florida between Charlotte Harbor and Florida Bay (74 FR 45353; October 02, 2009), which overlaps with the GoMEX and Mississippi River proposed action area. Critical habitat for the smalltooth sawfish are discussed in Section 3.4.12.1.5. Smalltooth sawfish may also be encountered in the southernmost portions of the USEC-South proposed action area.

Smalltooth sawfish inhabit shallow coastal waters of tropical seas and estuaries throughout the world. They usually inhabit waters less than 32 ft (10 m) deep that are very close to shore and over muddy or sandy bottoms. They often inhabit sheltered bays, shallow banks, and estuaries or river mouths. Smalltooth sawfish prefer warmer water temperature of 71 to 82 °F (22 to 28 °C). They can ascend inland in river systems and have been shown to have a salinity preference of 18 to 24 parts per thousand (ppt) (National Oceanic and Atmospheric Administration 2014b). In the U.S., smalltooth sawfish are most often found off the southwest coast of Florida from Charlotte Harbor to the Everglades. The smalltooth sawfish occurs in the Gulf of Mexico, particularly at river mouths (e.g., Mississippi River), shallow tropical or subtropical estuarine and marine waters associated with sandy and muddy deep holes, limestone hard bottom, coral reefs, sea fans, artificial reefs, and offshore drilling platforms (National Marine Fisheries Service 2009c; Poulakis and Seitz 2004; Simpfendorfer 2006). Nursery areas of the smalltooth sawfish include estuaries and mangroves, where the roots provide refuge from predators (National Marine Fisheries Service 2009c; Seitz and Poulakis 2006; Simpfendorfer and Wiley 2006). Juveniles exhibit a high site fidelity to nearshore areas and residence up to 55 days, and upstream movement toward preferred lower salinity conditions (Poulakis et al. 2013; Simpfendorfer et al. 2011). Larger individuals may occur to a depth of 394 ft (120 m) (Poulakis and Seitz 2004; Simpfendorfer 2006), although adults are known to spend more time in shallower habitat than in deeper waters (Simpfendorfer and Wiley 2006).

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

3.4.6.1.2.16 Sockeye Salmon

Two ESUs of Sockeye salmon (*Oncorhynchus nerka*) are listed under the ESA; the Ozette Lake is listed as threatened (63 FR 11750; March 10, 1998) and Snake River ESU is listed as endangered (64 FR 41835; August 2, 1999). Designated critical habitat for sockeye salmon is located in interior Washington State (Snake River ESU: 58 FR 68543; December 28, 1993 and Lake Ozette ESU: 70 FR 52630; September 2, 2005). The designated critical habitat for the Snake River ESU consists of river reaches of the Columbia, Snake, and Salmon Rivers, Alturas Lake Creek, Valley Creek, and Stanley, Redfish, Yellow Belly, Pettit, and Alturas Lakes and overlaps with the PNW proposed action area and is discussed in Section 3.4.12.1.5. Both listed sockeye salmon ESUs occur within the PNW and SEAK proposed action areas. A substantial portion of the Ozette Lake ESU is landlocked, and most sockeye salmon encountered in the SEAK proposed action area would belong to non-listed Alaskan populations.

On the Pacific coast, sockeye salmon inhabit marine, riverine, and lake environments from the Klamath River and its tributaries in Oregon and northern California, north and west to western Alaska (National Oceanic and Atmospheric Administration 2014c). Sockeye salmon also are common throughout Alaska, but most individuals found in Alaska, particularly in inshore regions, would be from Alaskan natal stocks, which are not ESA-listed (Beacham et al. 2005; Tucker et al. 2009).

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

The Snake River ESU has the longest migration of any sockeye salmon. Fry emerge in April and May and rear in lakes for one to three years. The migration to the ocean spans 900 mi (1448 km) and passes through the Salmon, Snake, and Columbia Rivers. Salmon then spend one to three years in the ocean, and adult salmon begin the return migration in June and July. Few fish complete the full migration to the ocean and back due to the presence of dams along the Snake and Columbia Rivers (NMFS 2015).

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

3.4.6.1.2.17 Steelhead Trout

Several DPSs of steelhead trout (*Oncorhynchus mykiss*) are listed as threatened or endangered under the ESA. Of the fifteen steelhead trout DPSs, one is listed as endangered, ten are listed as threatened, and one is an ESA species of concern (64 FR 5740; February 5, 1999). Listed DPSs would be expected within the PNW and SEAK proposed action areas. Listed stocks in the PNW proposed action area may occasionally move into Alaskan waters, though steelhead migrate less than the other Pacific salmon species. Although steelhead are abundant in Alaska, most individuals belong to non-listed DPSs. Critical habitat is designated for each DPS (70 FR 52630; September 2, 2005) and overlaps the PNW proposed action area, as discussed in Section 3.4.12.1.5.

The present distribution of steelhead trout extends from the Kamchatka Peninsula in Asia, east to Alaska and south to Southern California (Good et al. 2005). Steelhead trout are found along the entire Pacific Coast of the United States. This species has also been introduced (by stocking) in other locations throughout the world (National Marine Fisheries Service 2014f). The ocean distributions for steelhead trout are not known in detail, but steelhead trout are caught only rarely in ocean salmon fisheries. Studies suggest that steelhead trout do not generally congregate in large schools as do other Pacific salmon species (Burgner 1992; Groot 1991). Steelhead trout exhibit a great diversity of life history patterns and are ecologically complex. Steelhead may exhibit either an anadromous life style or spend their entire life 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 (National Marine Fisheries Service 2014f).

3.4.6.2 Environmental Consequences to Fish

Impacts to fish would potentially result from fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, and pile driving noise, as well as vessel movement, bottom devices, construction, brushing, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines associated with the Proposed Action. As discussed in Table 3-3, it would not be expected that fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, or tool noise would cause PTS or TTS in fish due to the short duration of these sounds. In addition, the frequency of fathometer and Doppler speed log noise and pile driving noise would be outside of the range of hearing of most fish (Appendix E) and therefore is unlikely to cause impacts to most fish species. There would be a discountable risk of entanglement in ATON retrieval devices or tow lines due to the small size and mobility of most fish and the unlikely overlap of these devices with fish. There would be no change in water quality as a result of brushing activities, therefore any impact would be immeasurable. There would also be a discountable risk of ingestion of unrecovered jet cone moorings due to the small size of most fish. Therefore, these stressors would entail a minimal amount of disturbance to fish and are not discussed further in this PEIS. There would be no impacts to fish from construction; therefore, this stressor will not be discussed further in this PEIS.

3.4.6.2.1 Fathometer Noise

As discussed in Appendix E, most fish species can hear sounds between 50 and 1,000 Hz. Fish without hearing specialization (generalists) are not expected to detect signals emitted by the single beam echosounder or the Doppler speed log associated with the Proposed Action, as the operating frequency range of these devices is about 50–200 kHz and 270-284 kHz, respectively, which is well outside the hearing range of these fish. The ESA-listed fish species expected to come in contact with fathometer are generally regarded as hearing non-specialists (Hastings and Popper 2005). As stated previously, however, fish species that are hearing specialists, which include Clupeiformes and Gadiiformes fish like cod and shad, are able to detect sounds from 200 Hz to 180 kHz (Mann and Popper 1997; Popper 2014), while herring are able to detect sounds from 100 Hz to 5 kHz (Mann et al. 2005). In most cases, however, the highest sensitivity of these fish is still at lower frequencies. Characteristics of the fathometer, including the downward-focused sound, narrow beam width, and short pulse lengths, would further diminish potential impacts to those species that may be able to detect these navigational devices. Potential impacts to hearing specialist fish that may detect the signals from fathometer noise include TTS, behavioral responses, and auditory masking.

TTS has been demonstrated in several fish species, but only in those with long term exposure to sounds (170–180 dB re 1μPa_{RMS}) (Smith et al. 2004) or short term, intense sounds (Popper et al. 2005), and in those species with broad frequency hearing ranges (over 2 kHz) and lower hearing thresholds. Coast Guard vessels using acoustic sources would be continually moving through the proposed action areas in order to fulfill mission responsibilities. A long term increase in background noise levels would not be expected as a result of the Proposed Action. As vessels pass near fish using navigational equipment, this may be considered a short term sound, but is much less intense than a high-energy source like an air-gun (McCauley et al. 2003) that may result in TTS. Therefore, no TTS would be expected in fish as a result of the Proposed Action.

Behavioral responses to certain noises could include a startle response, such as a fish swimming away from the source, a fish "freezing" and staying in place, or scattering (Popper 2015). Studies documenting behavioral responses of fish to vessels show that Barents Sea capelin (*Mallotus villosus*) may exhibit avoidance responses to engine noise, sonar, depth finders, and fish finders (Jorgensen et al. 2004).

Avoidance responses are quite variable depending on the type of fish, its life history stage, behavior, time of day, and the sound propagation characteristics of the water (Schwartz 1985). If an individual fish (with enhanced hearing capabilities) were to come into contact with high frequency fathometer noise, it would be expected to exhibit short term behavioral responses. The fathometer noise may result in behavioral responses by pelagic Clupeids in close proximity to the acoustic signals, with fish exhibiting a startle response and/or vacating the area of increased noise. Due to the low intensity of the sound, fish would likely return to the area and assume normal behavior soon after exposure. These behavioral responses would not disrupt migration, breeding, feeding, or sheltering and, therefore, would have no population level effects.

Auditory masking refers to the presence of a noise that interferes with a fish's ability to hear biologically relevant sounds. Fish use sounds to detect predators and prey, as well as for schooling, mating, and navigating (Popper 2003). The masking of sounds associated with these behaviors could impact fish by reducing their ability to perform these biological functions. Any noise (i.e., unwanted or irrelevant sound, often of an anthropogenic nature) detectable by a fish can prevent the fish from hearing biologically important sounds including those produced by prey or predators (Popper 2003). Masking can impede the flight response of fish from predators or may not allow fish to detect potential prey in the area. The frequency of the sound is an important consideration for fish because many fish are limited to detection of the particle motion component of low frequency sounds at relatively high sound intensities (Amoser and Ladich 2005a). Sound, such as that of the echosounder, has a limited potential for propagation, owing to greater attenuation. Therefore, detection of the signal is only expected within a few tens of kilometers from the sound source, as the sound is expected to attenuate to ambient levels within this range (Hildebrand 2009). Thus, only hearing specialist fish located within this detection area of the sound source have the potential to experience a temporary increase in ambient noise levels from the fathometer noise. For a slow-moving vessel and a stationary fish, this equates to a few hours of increased ambient noise as the vessel moves through the area. Additionally, most biological sounds within the ocean environment are in the low frequency band of noise. Thus, masking of biological sounds by the fathometer would not be expected as a result of the Proposed Action.

3.4.6.2.2 Vessel Noise

Fish would be exposed to vessel noise underwater. As discussed in Appendix E, the hearing capabilities of fish are varied, with most fish species detecting sounds up to 1 kHz and clupeids detecting sounds up to 3 to 4 kHz. Most fish would be able to detect the low frequency sound generated by the WCCs. Some fish may also be able to detect the slightly higher frequency sound generated by cutter small boats. Vessel noise has the potential to expose fish to sound and disturbance from particle motion.

Vessel noise from the Proposed Action, as described in Table 2-5, is not expected to cause PTS in fish, as available evidence does not suggest that ship noise can injure or kill a fish (Popper 2014). As stated in Section 3.4.6.2.1, TTS would only be expected from a high intensity sound detected by a fish over a duration of time. As vessels are transient and move throughout very large proposed action areas, TTS would not be expected in fish as a result of the Proposed Action. Therefore, potential impacts to fish from vessel noise include behavioral responses and auditory masking.

Vessel noise could result in short term behavioral or physiological responses (e.g., avoidance, stress, increased respiration rate). Misund (1997) found that fish ahead of a ship showed avoidance responses 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. Avoiding vessels, either vertically or horizontally in the water column, has been reported for cod and herring, and was attributed to vessel noise (Handegard et al. 2003; Vabø et al. 2002). Vessel activity can also alter schooling behavior and swimming speed of fish (UNEP 2012).

Although vessel presence raises the ambient levels of sound in the ocean (Hildebrand 2009), it is expected that vessel noise associated with the Proposed Action would be similar to vessel noise from other ships in the area and would not be expected to alter current levels of ambient sound in any given location, as the new WCC fleet would replace the current, aging WCC fleet. If localized masking were to occur, it would be short term and temporary and the vessel moves through the area.

It is anticipated that temporary behavioral responses or masking would not impact the individual fitness of a fish, as individuals would be expected to regular behavior upon cessation of the sound exposure. Furthermore, while vessel noise may influence the behavior of some fish species (e.g., startle response, masking), other fish species can be equally unresponsive (Becker et al. 2013). Vessel noise associated with the Proposed Action may affect individual fish within the proposed action areas; however, responses to vessel noise would be short term and insignificant behavioral responses, and thus, would not be expected to have any population level impacts.

3.4.6.2.3 Pile Driving Noise

Fish in the proposed action areas may be exposed to pile driving noise associated with ATON maintenance, establishment, and discontinuance during the Proposed Action. The noise from pile driving may be detected by fish underwater. As noted in Appendix E, most fish have been reported to hear best at frequencies less than 1 kHz, though clupeids may detect sounds up to 3 to 4 kHz. Because the majority of energy in the pile driving pulses is at frequencies below 500 Hz, it is within the range of best hearing for fish. The noise created by pile driving and the potential distance at which PTS, TTS, and behavioral responses may occur are detailed in Table 3-42. Section 3.2.1.6.2 provides a general description of TTS and PTS and an evaluation of hearing thresholds for biological resources in the proposed action areas (see also Appendix C and Appendix D). Based on the Coast Guard's analysis, pile driving noise may cause a hearing threshold shift due to the intensity of the sound generated by pile driving (Table 3-42). The potential impacts of pile driving noise to biological resources include injury (Section 3.2.1.6.1), hearing threshold shift (Section 3.2.1.6.2), masking (Section 3.2.1.6.3), and behavioral responses (Section 3.2.1.6.5). While underwater sound levels for a variety of piles are available (Table 3-7), in certain instances, the exact piles that the Coast Guard would be expected to drive were not available, thus, the Coast Guard used sound measurements for "proxy" piles taken at a distance of 10 m (Caltrans 2020), that were more similar to the Proposed Action.

The majority of energy in the impact hammer pulses is at frequencies below 500 Hz, with near source (within 32 ft [10 m]) peak sound pressure levels underwater ranging up to 220 dB and beyond (University of Rhode Island 2019). Table 3-7 provides sound ranges from impact pile driving of different pile materials in a variety of sizes, which coincide with those most typically used in fixed ATON structures. The continuous sounds produced from a vibratory hammer would likely be similar in frequency to the impact hammer, but the sound levels would be expected to be much lower than the impact hammer (University of Rhode Island 2019). Ranges of the sound level produced by vibratory pile driving different pile materials are listed in Table 3-7.

Impacts to fish from pile driving noise are not well understood; however, behavioral responses, injury, or mortality may occur (Hawkins et al. 2014). The potential for injury or mortality of any aquatic species from pile driving depends on the type and intensity of the sounds produced. These are influenced by a variety of factors, including the type of hammer, the type of substrate, and the depth of the water. Pile driving into sediment with an impact or vibratory hammer would increase underwater sound pressure levels and may impact fish (Iafrate et al. 2016). Intense pulses of sound have been shown to potentially cause physical injury to fish when the sound wave is received at high levels. Potential injury due to exposure may increase in shallow waters (Iafrate et al. 2016). In addition, sound waves may cause fish to deviate from their normal behavior, triggering changes in their feeding and breeding, or modifying migration patterns if the sound waves occur for a long duration of time (Iafrate et al. 2016).

To evaluate the potential for underwater noise from pile driving, the Coast Guard considered the sound levels created during impact or vibratory pile driving, the quantitative thresholds to assess the likelihood of injury, TTS, or behavioral disturbance of fish, fish behavior, and the SOPs (Appendix B) that will be implemented by the Coast Guard. The Coast Guard used source levels detailed in (Table 3-7) to analyze impacts to ESA-listed fish from Coast Guard pile driving. The peak sound level injury threshold for fish will not be exceeded during Coast Guard pile driving activities considered in this PEIS, so only the cumulative sound exposure level threshold is considered further for injury and mortality. Table 3-27 details the calculated range to the injury/mortality cumulative sound exposure level threshold for fish and the distance to the TTS and behavioral disturbance thresholds.

Table 3-27. Estimated Range to Effects from Pile Driving for Fish

	Impact Pile Driving					*Vibratory Pile Driving*			
Pile Characteristics (# piles; pile size; material)	***Distance to Injury/Mortality (206 dB peak)***	***Distance to TTS (187 dB cumulative SEL for fish > 2 grams)***	***Distance to TTS (183 dB cumulative SEL for fish < 2 grams)***	***Distance to Behavioral Threshold (150 dB)***	***Pile Characteristics (# piles; pile size; material)***	***Distance to Injury/Mortality (206 dB peak)***	***Distance to TTS (234 dB cumulative SEL for fish > 102 grams)***	***Distance to TTS (190 dB cumulative SEL for fish < 102 grams)***	***Distance to Behavioral Threshold (150 dB)***
1; 12 in (30 cm); wood	0 ft (0 m)	11.2 ft (3.4 m)	20.7 ft (6.3 m)	445.9 ft (135.9 m)	1; 12 in (30 cm); wood	0 ft (0 m)	0 ft (0 m)	2.4 ft (0.7 m)	70.6 ft (21.5 m)
4; 12 in (30 cm); wood	0 ft (0 m)	28.3 ft (8.6 m)	52.2 ft (15.9 m)		4; 12 in (30 cm); wood	0 ft (0 m)	0 ft (0 m)	6.1 ft (1.9 m)	
12; 12 in (30 cm); wood	0 ft (0 m)	58.8 ft (17.9 m)	96.1 ft (29.3 m)		12; 12 in (30 cm); wood	0 ft (0 m)	0 ft (0 m)	12.7 ft (3.9 m)	
1; 18 in (45 cm); steel	44.6 ft (13.6 m)	381.9 ft (116.4 m)	705.7 ft (215.1 m)	9,608.4 ft (2,928.6 m)	1; 18 in (45 cm); steel	7.1 ft (2.2 m)	0 ft (0 m)	14.7 ft (4.5 m)	112.0 ft (34.1 m)
4; 18 in (45 cm); steel	44.6 ft (13.6 m)	962.4 ft (293.3 m)	1,775.5 ft (541.2 m)		4; 18 in (45 cm); steel	7.1 ft (2.2 m)	0 ft (0 m)	37.1 ft (11.3 m)	
1; 10 in (25.4 cm); Steel H	0 ft (0 m)	70.6 ft (21.5 m)	130.4 ft (39.7 m)	1,522.8 ft (464.2 m)	1; 10 in (25.4 cm); Steel H	0 ft (0 m)	0 ft (0 m)	0.8 ft (0.2 m)	20.7 ft (6.3 m)
4; 10 in (25.4 cm); Steel H	0 ft (0 m)	177.8 ft (54.2 m)	328.1 ft (100.0 m)		4; 10 in (25.4 cm); Steel H	0 ft (0 m)	0 ft (0 m)	2.0 ft (0.6 m)	
1; 14 in (35.5 cm); concrete [square]	0 ft (0 m)	6.1 ft (1.8 m)	11.2 ft (3.4 m)	96.1 ft (29.3 m)	1; 14 in (35.5 cm); concrete [square]	-	-	-	-
4; 14 in (35.5 cm); concrete [square]	0 ft (0 m)	15.3 ft (4.7 m)	17.8 ft (5.4 m)		4; 14 in (35.5 cm); concrete [square]	-	-	-	

As described in Table 3-27, the maximum range to the injury/mortality threshold was 44.6 ft (13.6 m) (i.e., for a 1 or 4 pile structure using 18 in [45 cm] steel piles).The maximum range to TTS for fish larger than 2 grams was 962.4 ft (293.3 m) and 1,775.5 ft (541.2 m) for fish smaller than 2 grams.This indicated that for a fish to be killed, injured, or suffer TTS by Coast Guard pile driving activities, a fish would have to remain within 44.6 ft (13.6 m) (for injury or mortality) or 962.4 ft (293.3 m) or 1,775.5 ft (541.2 m) (for TTS), depending on the size of the fish, of the structure being built for the duration of the construction action for the fish to experience that effect.Fish do not normally remain in an area where intense activity is occurring. It would be expected that fish would leave the area during preparation of pile driving activities or as soon as pile driving begins. Avoidance responses by Atlantic and Pacific salmonids and steelhead have been obtained in laboratory and field conditions (Knudsen et al. 1992, 1994; Mueller et al. 1998; Ploskey et al. 2000; Taft et al. 1994). The stimulus for avoidance response was only found in the near field (7 to 10 ft [2 to 3 m]) of sources capable of generating a local flow field with water particle acceleration from infrasound in the range of 5 to 30 Hz where water particle acceleration is greater than 0.01 milliseconds $(ms)^{-2}$. In a study by Hawkins et al. (2014), simulated impact pile driving sounds were generated in the wild and behavior of free-swimming fish was observed. The pile driving sounds caused European sprat (*Sprattus sprattus*) to disperse and Atlantic mackerel (*Scomber scombrus*) to dive deeper. Because of the mobility of fish and the ability to flee the area, fish would not be to be exposed to the most intense pile driving sounds because they would not remain in the immediate area when piles are being driven. Sound pressure levels may result in behavioral disturbance, but would be unlikely to result in injury because each session of pile driving would be relatively short and measures to minimize sound pressures would be implemented, per the SOPs (Appendix B).

Although the impacts of pile driving noise on fish are not widely studied, it would be expected that pile driving noise associated with the Proposed Action would result in temporary behavioral responses and avoidance of the area for a brief time. Fish would likely return to their normal behavior shortly after exposure. Due to the short duration and intermittent nature, pile driving noise would likely result in temporary behavioral responses, but would not result in any population level impact. Injury or mortality caused by pile driving noise would not result in population level impacts.

Any increase in ambient noise as a result of pile driving activities would be temporary and localized to the position of the pile. Fish 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. Because pile driving noise is diffuse and intermittent, the effects of pile driving noise would be expected to be limited to temporary behavioral effects and fish would be expected to return to normal behavior within minutes of a disruption.

3.4.6.2.4 Vessel Movement

Fish in the proposed action areas may be exposed to vessel movement associated with WCCs and cutter small boats during the Proposed Action. Because it is difficult to differentiate between behavioral responses to vessel sound and visual cues associated with the presence of a vessel (Hazel et al. 2007a), it is assumed that both play a role in prompting reactions from animals. The likelihood of strike or disturbance by a WCC is similar to that of any other vessel. Fish possess a specialized tactile sense organ called the lateral line, which is able to detect movement and vibration in the water. The lateral line senses pressure changes that help fish avoid collisions, participate in schooling behavior, orient to water currents, elude predators, and detect prey. Before being struck by an object, fish would sense a pressure wave through the water (Hawkins and Johnstone 1978) and have the ability to swim away from the oncoming object. Vessels do not normally collide with adult fish; it is assumed that most adult fish can detect and avoid a vessel, particularly when noise levels exceed their hearing threshold by 30 dB (Mitson 1995). One study on fish behavioral responses to vessels showed that most adults exhibit avoidance responses, reducing the potential for vessel strikes (Jørgensen et al. 2004). Due to the maneuverability of fish in water, it is extremely unlikely that most species of fish would be struck by a vessel as it moves through the proposed action areas. Regardless of vessel speeds, vessel collisions with fish are possible, particularly in shallow areas. The likelihood of collision with a benthic fish species would be lower than species that swim closer to the water's surface. In the unlikely event that a vessel collided with a fish, this would not result in population level impacts. Given the slow operational speed of WCCs (less than 10 knots) and cutter small boats (less than 15–20 knots) and the high maneuverability of fish species, vessel strike would not be expected to occur. The large size of the proposed action areas would further reduce the potential for fish strikes by a vessel.

Vessel movement could cause short term and localized disturbances to ichthyoplankton (fish eggs and larvae). Fish eggs or larvae that inhabit the upper portions of the water column could potentially be displaced, injured, or killed by vessel movements. However, no measurable effects to fish recruitment or populations would occur because the number of organisms exposed to vessel movements would be low relative to total biomass of the species.

A fish near the vessel may exhibit a detectable behavioral or physiological response (e.g., swimming away, increased heart rate) as the vessel passes. Potential impacts from exposure to vessels would likely be minor and temporary, and any fish exhibiting any response would likely return to normal behavior once a vessel has moved through the area. Vessel movement may result in short term and localized displacement of fish. However, these behavioral responses are not expected to result in substantial changes to an individual's fitness or population recruitment, nor would vessel movement significantly disrupt breeding, feeding, or sheltering. Therefore, population level impacts or effects to fitness and recruitment would not be expected to occur. Vessel presence would be diffuse and spread throughout the proposed action areas. As a result, any response caused by the Proposed Action would be limited to a behavioral disturbance, which would be temporary and localized to the position of the vessel.

3.4.6.2.5 Bottom Devices and ATON Retrieval Devices

Bottom disturbance has the potential to impact fish in the water. For fish within the proposed action areas, bottom disturbance caused by the establishment, maintenance, and discontinuance of floating ATON, as well as spudding, anchoring, and wreckage recovery performed by the WCC may potentially impact species through disturbance and alteration of habitat. ATON operations and wreckage recovery have the potential to cause disturbance and habitat alterations to fish within the proposed action areas. ATON operations and wreckage recovery may cause disturbance as the sinker or jet cone moorings are established and discontinued, while dragging an ATON to relocate it, or during the use of a grapnel hook or wire sweeping method of recovery. Similar to how fish would be expected to avoid slow moving vessels (Section 3.4.6.2.4), they would have the ability to swim away from the moving devices as they could sense a pressure wave through the water (Hawkins and Johnstone 1978) and swim away. Therefore, the likelihood of a collision between any devices and a fish would be low. Habitat may be altered during ATON operations and wreckage recovery, however these operations are isolated and only occur in a small area compared to the size of the proposed action areas. Once operations have completed, fish would be expected to return to the area.

The most likely response to the use of bottom devices and ATON retrieval devices would be a behavioral response, which would be expected to be similar to those if a vessel were operating nearby (Section 3.4.6.2.4). It is assumed that fish would change their direction of travel or temporarily leave the area before WCC operations begin. Anchoring and spudding may impact benthic fish located near the footprint of the devices. Anchor placement and spudding would be brief and only in use during ATON operations. In addition, the impact to fish from increased turbidity during ATON operations, anchoring, spudding, and wreckage recovery is unlikely to cause injury or mortality to individuals, as increases would be temporary and suspended sediments would settle quickly.

Short term behavioral responses to the use of bottom devices and ATON retrieval devices would not be expected to result in long term impacts to individuals (such as chronic stress) or populations in the proposed action areas, given the diffuse ATON spread throughout the proposed action areas. Avoidance of increased activity during the short duration and small footprint of bottom disturbance is unlikely to cause abandonment or significant alteration of behavioral patterns. If an ESA-listed fish were to encounter the devices in use, any behavioral avoidance displayed would not result in significant disruption of breeding, feeding, or sheltering. The use of these devices would be diffuse and spread throughout the proposed action areas. As a result, any response caused by the Proposed Action would be limited to a behavioral disturbance, which would be temporary and localized to the position of the bottom devices and ATON retrieval devices.

3.4.6.2.6 Pile Driving

For fish within the proposed action areas, pile driving may impact species through bottom or habitat disturbance, vibrations, strike, injury, mortality, or behavioral response. While the likelihood of striking an individual is remote, pile driving may cause injury or mortality if struck when installing a pile if an individual is within its footprint. However, no population level impacts would be expected. As discussed in Section 3.4.6.2.3, fish would sense a pressure wave through the water (Hawkins and Johnstone 1978) and have the ability to swim away from the pile as it is being installed.

Pile driving operations may cause an increase in turbidity. However, the impact to fish from increased turbidity is unlikely to cause injury or mortality to individuals, and impacts to populations would be inconsequential due to the short term increases in turbidity, the infrequency of pile driving, and the large size of the proposed action areas. It would be anticipated that suspended sediments caused by pile driving operations would resettle quickly.

There is some evidence to suggest that vibrations (substrate-borne energy) from pile driving may impact fish, particularly those that are benthic. The potential impacts of this stimuli on fish are unknown, though studies indicate that animals are sensitive to and respond to vibrational stimuli (Normandeau Associates 2012). It would be expected that potential responses would be similar to responses to a predator or noxious stimuli nearby, which would be to withdraw or escape from the area.

Habitat may be altered during pile driving. In general, fish (and their eggs and larvae, i.e., ichthyoplankton) encounter a variety of physical, chemical, and biological cues in their environments. Therefore, changes in the physical, chemical, and biological properties of their habitats as a result of pile driving could impact their success. However, because pile driving would not occur frequently, nor continue for a long duration of time, there would be no impact to the physical, chemical, and biological properties of fish and ichthyoplankton habitats. In areas where pile driving would occur, there would be no long term impacts to the success of fish or ichthyoplankton populations. Pile driving operations are isolated and only occur in a small footprint compared to the overall size of the proposed action areas.

In addition, pile driving may cause fish in the vicinity to swim away or alter their behavior during pile driving operations. Once pile driving is complete, fish would be expected to return to the area.

3.4.6.2.7 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, impacts to fish within the proposed action areas would be similar to what is currently present because the new WCC fleet would replace the capabilities of the existing inland tender fleet. In addition, WCC assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include the use of vessels, bottom devices, and pile driving devices. There would be no change to baseline fish populations or habitat conditions as a result of the Proposed Action. Impacts to fish from the Proposed Action would be limited to small areas around ATON and vessels, and the disturbance to fish would be intermittent and brief in duration. Therefore, there would be no significant impact to fish as a result of Alternative 1.

Pursuant to the ESA, there would be no effect to ESA-listed fish as a result of ATON signal testing noise, tool noise, construction, brushing, unrecovered jet cone moorings, and tow lines. Fathometer and Doppler speed log noise, vessel noise, pile driving noise, vessel movement, bottom devices, ATON retrieval devices, and pile driving associated with the Proposed Action may affect, but are not likely to adversely affect ESA-listed fish (Table 3-26). Additionally, Alternative 1 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed fish (Section 3.4.12.2.5).

3.4.6.2.8 Impacts Under Alternatives 2–3

Under Alternatives 2–3, impacts to fish within the proposed action areas would be similar to what is currently present because ship platforms would replace the capabilities of the existing inland tender fleet. In addition, ship platforms and their assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include the use of vessels, bottom devices, and pile driving devices. There would be no change to baseline fish populations or habitat conditions as a result of the Proposed Action. Impacts to fish from the Proposed Action would be limited to small areas around ATON and vessels, and the disturbance to fish would be intermittent and brief in duration. Therefore, there would be no significant impact to fish as a result of Alternatives 2–3.

As discussed in Section 3.4.6.2.7, pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect ESA-listed fish (Table 3-26). Additionally, Alternatives 2–3 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed fish (Section 3.4.12.2.5).

3.4.6.2.9 Impacts Under the No Action Alternative

Under the No Action Alternative, as the existing inland tender fleet is decommissioned and not replaced, the physical and acoustic stressors associated with the Proposed Action would not be introduced into the environment. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impacts to fish with implementation of the No Action Alternative.

3.4.7 Essential Fish Habitat

3.4.7.1 Affected Environment

The fisheries of the United States are managed within a framework of overlapping international, federal, state, interstate, and tribal authorities. States have jurisdiction over fisheries in marine waters within close proximity, typically within 3 nm (6 km) of the state's coast, except for the Gulf of Mexico (Texas, Louisiana, Mississippi, Alabama and the Gulf coast of Florida) where state waters extend to 9 nm (15 km). Federal jurisdiction includes fisheries in marine waters inside the U.S. territorial waters and the U.S. EEZ, which encompasses the area from the outer boundary of state waters out to 200 nm (370 km) offshore of any U.S. coastline, except where intersected closer than this by bordering countries (61 FR 19390; May 1, 1996). The proposed action areas cover coastal ecosystems within the U.S. EEZ, as well as state waters.

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

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

Virtually all marine waters of the U.S. and U.S. EEZ are designated as EFH for at least one managed species of fish. All EFH river systems form a direct connection to the sea, but EFH does not include portions of rivers above naturally occurring barriers to upstream migration or land-locked lakes and ponds. The oceanic component of EFH is typically to a distance of 3 mi (5 km) from the mouth of each river. Therefore, although EFH for some species (e.g. pacific salmonids) does extend into estuarine and fresh waters, there are no species with EFH designated within the Great Lakes proposed action area. Table 3-28 outlines which species have EFH designated in each proposed action area, and which councils are responsible for the management of each species. In some cases, the species (e.g., spiny lobster) is mentioned in the table multiple times. This may be because the species is managed separately by different councils (in this case, the South Atlantic Fisheries Management Council [SAFMC] and the Gulf of Mexico Fisheries Management Council [GMFMC]). In other cases, the species is co-managed (e.g., Atlantic mackerel, squid, and butterfish, which are co-managed by the New England Fisheries Management Council [NEFMC] and the Mid-Atlantic Fisheries Management Council [MAFMC]), and therefore the species is listed only once.

Not all management units under the jurisdiction of each management council may be listed in Table 3-28—if the management unit EFH does not overlap with a proposed action area, it was not included in the table. Many of the management units contain multiple species. However, because FMCs update and amend their plans regularly, the most up-to-date fishery management plan for each management unit can be found on the FMC's website.

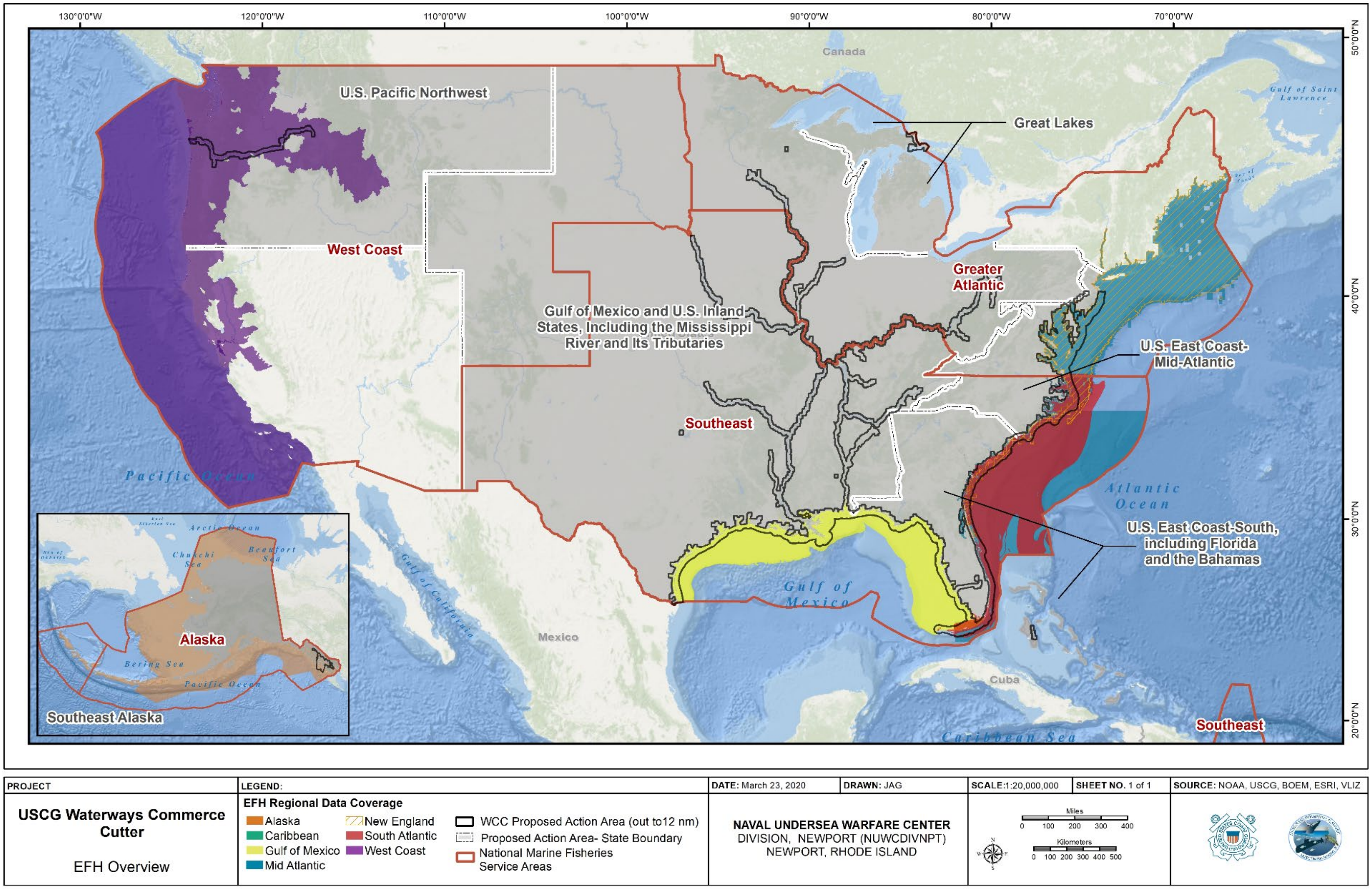


Figure 3-1. EFH Designated Within the Proposed Action Areas

Table 3-28. EFH Designated in Each Proposed Action Area

Fishery Management Plan/Unit	*Proposed Action Areas*						*Managing Agency or FMC*
	USEC-MidATL	*USEC-South*	*Great Lakes*	*GoMEX and the MS River*	*PNW*	*SEAK*	
Atlantic herring (Clupea harengus)	x						New England Fishery Management Council (NEFMC)
Monkfish	x						
Northeast multispecies	x	x					
Northeast skate complex	x	x					
Sea scallop	x						
Atlantic mackerel (*Scomber scombrus*), squid, and butterfish (*Peprilus triacanthus*)	x						Mid Atlantic Fishery Management Council (MAFMC)
Bluefish (Pomatomus saltatrix)	x	x					
Dogfish	x						
Summer flounder (Paralichthys dentatus), scup (Stenotomus chrysops), black sea bass (Centropristis striata)	x	x					
Surfclam (Spisula solidissima) and ocean quahog (Arctica islandica)	x						
Coastal migratory pelagics		x		x			South Atlantic Fishery Management Council (SAFMC)
Corals		x					
Dolphin-Wahoo		x					
Golden crab (Chaceon fenneri)		x					
Sargassum		x					
Shrimp	x	x					
Spiny lobster	x	x					
Snapper-Grouper[1]	x	x					
Red drum (Sciaenops ocellatus)		x		x			

Fishery Management Plan/Unit	***Proposed Action Areas***						***Managing Agency or FMC***
	USEC-MidATL	***USEC-South***	***Great Lakes***	***GoMEX and the MS River***	***PNW***	***SEAK***	
Reef fish		x		x			Gulf of Mexico Fishery Management Council (GMFMC)
Shrimp		x		x			
Spiny lobster		x					
Stone crab (*Menippe* spp.)		x					
Atlantic highly migratory species[2]	x	x		x			NOAA/NMFS
Alaska salmon						x	North Pacific Fishery Management Council (NPFMC)
Gulf of Alaska groundfish						x	

[1] Snapper-Grouper includes grunt, jack, porgie, seabass, grouper, snapper, spadefish, tilefish, triggerfish, wrasse, and wreckfish.
[2] Atlantic highly migratory species includes billfish, sharks, swordfish, and tunas.

A brief review of the general types of habitats which are frequently designated as EFH by the various councils are provided in Table 3-29. For a more thorough review of the EFH designated by each council, a complete list of managed species, and/or more detail on specific habitats can be found in the U.S. Coast Guard ATON Essential Fish Habitat Assessment (United States Coast Guard 2018).

Table 3-29. EFH Habitat Types

EFH Category	*Description*	*Example FMP*	*Section*
Water column	All waters from the surface to the ocean floor (but not including the ocean bottom), including bays, estuaries, and rivers and floating Sargassum	NEFMC Atlantic herring; SAFMC Sargassum	Section 3.4.7.1.1
Benthic: soft-bottom	May include the seafloor substrate on the continental shelf and slope that consists of soft or unconsolidated sediments such as gravel, cobbles, pebbles, sand, clay, mud, silt, and shell fragments	NEFMC northeast multispecies; MAFMC surfclam and ocean quahog; NPFMC Gulf of Alaska groundfish	Section 3.4.7.1.2
Benthic: hard-bottom	Consolidated sediments such as rock; areas of vertical relief such as crevices, overhangs, and vertical walls	GMFMC reef fish; SAFMC corals	Section 3.4.7.1.3
Submerged and shoreline vegetation	Seagrass, kelp, macroalgae, saltmarshes, mangroves	SAFMC Sargassum, MAFMC summer flounder, scup, black seabass; SAFMC/GMFMC Snapper-Grouper	Section 3.4.7.1.4
Biogenic reefs	Scallop beds, mussel beds, oyster reefs, coral reefs	NEFMC sea scallop; SAFMC corals	Section 3.4.7.1.5

3.4.7.1.1 Water Column

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

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

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

3.4.7.1.2 Benthic: Soft-Bottom

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

As detailed in Section 3.3.3.1, soft-bottom sediments range in size from gravel (larger than 2.0 mm) to sand (0.05 to 2.0 mm), silt (0.002 to 0.05 mm), and clay (< 0.002 mm). Sediment deposited on the continental shelf is mostly delivered by rivers, but also by local and regional currents and wind (Wren and Leonard 2005). Sediment quality is influenced by its physical, chemical, and biological components, where it is deposited, and the properties of seawater, contaminants, and other factors. Benthic fauna and infauna often disturb and process sediments in the process of feeding and burrowing. In this way, marine organisms can influence the structure, texture, and composition of sediments as well as the horizontal and vertical distribution of substances in the sediment (Boudreau 1998).

Almost the entire continental shelf along the eastern United States is covered by medium-sized sand (0.35 to 0.50 mm). Nearshore areas of capes and the extensive estuaries of the Atlantic Coast, such as Chesapeake Bay, Long Island Sound, and Narragansett Bay, tend to trap much of the fine sediment delivered by rivers (Murray and Thieler 2004). In the SEAK and PNW proposed action areas, the dominant bottom substrate of the continental shelf and slope is typically covered with silts, clays, and fine sediments (Molnia 2012).

3.4.7.1.3 Benthic: Hard-Bottom

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

Live hard-bottom is also created by oysters, mussels, and other sessile invertebrates (Table 3-29). Hard substrates support communities of living organisms such as sponges, mussels, hydroids, amphipod tubes, red algae, bryozoans, corals, or oysters (Wahl et al. 2009). Features, such as vertical orientation and surface texture, determine which species will attach and persist in a given hard-bottom area. The particular community that develops on a hard surface is shaped by the latitude, water depth, underlying substrate type, light availability, temperature, size, three-dimensional profile, and other characteristics of the surrounding water (Rowe and Kennicutt 2009; Wahl et al. 2009). Hard-bottom habitat is used by many adult members of the Snapper-Grouper Management Unit for feeding, shelter, and spawning (South Atlantic Fishery Management Council 2009).

Most of the rocky subtidal bank habitat of the U.S. Atlantic Coast occurs from Massachusetts northward, which is outside the proposed action area (Roman et al. 2000). In the USEC-MidATL proposed action area, shallow hard-bottom is colonized by Atlantic oysters (*Crassostrea virginica*) as well as kelp and other algae (Section 3.3.3.1.1) in water less than about 33 ft (10 m) deep. Anemones, bryozoans, mussels, tunicates, and even soft corals can also attach tightly to the rocky hard-bottom, creating long-lived complex communities. This hard-bottom community is visited by lobsters, crabs, sea stars, snails, sea urchins, and fishes (Tyrrell 2005).

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

Shallow hard-bottom communities are relatively uncommon and patchy on the Pacific Coast of the United States and have not been mapped extensively (Whitmire and Clarke 2007). The dominant bottom substrate of the continental shelf and slope in Alaska is typically covered with silts, clays, and fine sediments; however, there is occasional hard-bottom substratum (e.g., rocky outcroppings, rubble, talus, vertical wall, and seamounts) that supports a diverse assemblage of deep sea invertebrates and fishes. Bottom substrate type governs the abundance and diversity of deep sea organisms. Abundance and diversity are generally higher on hard, irregular substrates than on smooth, hard surfaces (Lissner et al. 1991).

3.4.7.1.4 Shoreline and Submerged Vegetation

As discussed in Sections 3.4.1 and 3.4.2, nearshore and submerged vegetation such as salt marshes, mangrove communities, and seagrass beds often form a habitat mosaic in areas of low wave energy. These communities provide valuable ecosystem services and resources by stabilizing the coastline and acting as nurseries for many commercially and recreationally-important species, including menhaden, flounder, sea trout, parrotfish, snapper, spot, striped bass, shrimp, and crab (Coles et al. 2014; Green et al. 2003). These species use shallow, complex habitats as breeding grounds or nursery habitats. In some cases (e.g., GMFMC Reef Fish EFH) these habitats are called out and protected directly, and in other cases (e.g. SAFMC’s shrimp EFH), they are protected as part of an individual fishery management plan. Some of these organisms are temporary residents—adults spawn offshore and their offspring migrate to the salt marsh as juveniles for shelter and food. When the juveniles have matured, they migrate offshore or into estuaries as adults. Others are permanent residents, living their entire lives within these shallow coastal systems (Green et al. 2003; Mitsch et al. 2009). While globally distributed, these biomes are only found in shallow waters where sunlight penetrates to the bottom, and thus, would only be encountered in the shallowest portions each proposed action area.

3.4.7.1.4.1 Shoreline Vegetation

Most of the 4 million acres (16,187 km^2) of salt marshes in the United States occur on the Atlantic Coast and along the Gulf of Mexico (Mitsch et al. 2009). The greatest extent of salt marsh habitat is on the coast of South Carolina (Roman et al. 2000). Hundreds of thousands of acres of salt marsh line the northern Gulf of Mexico from Texas to as far south as Tampa Bay in Florida (Stevens et al. 2006; University of Florida 2016). On the U.S. Pacific Coast, coastal salt marshes occur in discontinuous patches on the inland margins of bays, lagoons, and estuaries in both the SEAK and PNW proposed action areas (Mitsch et al. 2009; Ornduff et al. 2003).

Mangrove forests add nutrients to the surrounding ecosystem, making them among the richest nursery grounds for marine life (Feller et al. 2010; Nagelkerken et al. 2008). Mangrove occurrence is limited by freezing weather, so half of the world's mangroves occur between latitudes of 0° and 10° in both hemispheres, commonly near seagrass beds and salt marshes (Mitsch et al. 2009). Mangrove forests are essential habitat for many fishes and animals, including mangrove crabs (Scylla spp.), clams, shrimp, fish, and reptiles. Mangrove forests are the tropical equivalent of salt marshes, lining the shores of coastal embayments and the banks of rivers to the upper tidal limits (Nagelkerken et al. 2008).

Mangrove occurrence in the continental United States is concentrated in Florida, where mangroves cover about 1,954 mi^2 (5,061 km^2) on both coasts of Florida, from Cape Canaveral on the Atlantic to Cedar Key on the Gulf of Mexico, and throughout the Caribbean (Mitsch et al. 2009; Nagelkerken et al. 2008). Mangroves also occur in scattered populations in the northern Gulf of Mexico, the northernmost extent of their range, where they tend to occur interspersed with salt marsh vegetation. Southern Florida supports at least four species of mangroves, though human disturbance has reduced the natural extent of mangrove forests throughout their range (Feller et al. 2010; Martinuzzi et al. 2009; Polidoro et al. 2010).

3.4.7.1.4.2 Submerged Vegetation

Submerged aquatic vegetation, including seagrasses, kelp, and other marine and freshwater macroalgae (Section 3.4.2), are found throughout the proposed action areas. Submerged aquatic vegetation is most prolific in estuarine and nearshore areas, particularly those areas with clear water. The various FMCs refer to submerged aquatic vegetation using different terms, but all focus on seagrasses, kelp, and macroalgae as EFH. Habitat features that support algae and seagrass distribution are the availability of light, salinity level, seafloor type, currents, tidal regime, temperature, and availability of a firm surface for attachment (Green et al. 2003; Mitsch et al. 2009). As discussed in Section 3.4.2, green, brown, and red algae occur throughout each proposed action area. Macroalgal distribution is shaped by the differences in water temperature that are directed by oceanic currents (Hine et al. 2003; Spalding et al. 2001; Spalding et al. 2007).

Seagrasses grow in a range of salinities, from fresh water to salinities of up to 42 ppt, but thrive in intermediate salinities (Green et al. 2003; University of Florida 2016). Seagrasses occur as one element of a complex patchwork of coastal habitats, including estuaries, rocky reefs, coral reefs, mangroves, and bare sediments. Seagrasses are unique among the flowering plants in their ability to grow submerged in shallow marine environments. Seagrass beds provide complex, three-dimensional structures that other organisms use to feed, spawn, and hide (Fonseca 1998; Nelson et al. 2016). Seagrass beds are known as nursery habitat for commercially-important crustaceans, finfish, and shellfish, and they provide food sources for fish, sea turtles, and manatees, amongst others (Russell and Balazs 2009; Spalding et al. 2001).

Seagrasses occur in all coastal U.S. waters, except Georgia and South Carolina (Fonseca 1998). Within the proposed action areas, seagrass coverage is greatest in the Gulf of Mexico (7,470 mi^2 [19,350 km^2]), followed by the Atlantic Coast of Florida (1,080 mi^2 [2,800 km^2]), the north Atlantic Coast of the United States (145 mi^2 [375 km^2]), and the Mid-Atlantic Coast of the United States (110 mi^2 [290 km^2]) (Green et al. 2003; Spalding et al. 2007). The Florida Keys National Marine Sanctuary seagrass bed is the world's largest documented, contiguous seagrass bed (Lewis III et al. 2000; Orth et al. 2006). Eelgrass and surfgrass (Phyllospadix spp.) form extensive underwater meadows or beds in shallow water in the Pacific Northwest, providing important epibenthic food sources for Pacific salmonids (Blackmon et al. 2006).

Kelp forests (Section 3.4.2) occur primarily in coastal habitats in the temperate to arctic latitudes of the northern hemisphere, and are the principal biological structure along rocky shores in cold marine waters (Steneck et al. 2002). Kelp forests influence the distribution and abundance of a wide variety of other marine organisms including bryozoans, snails, fish, and lobsters (Stephens et al. 2006; Williams et al. 2010).

Canopy-forming kelps are common in the California Current and Gulf of Alaska ecosystems and throughout the northeastern Pacific Ocean (Graham et al. 2007; Steneck et al. 2002), where they are designated as a Habitat Area of Particular Concern (HAPC). Kelp beds occur in close association with rocky reefs because, with few exceptions, kelp must attach to rocky structures to maintain their position in the ever-moving ocean (Stephens et al. 2006). Kelp forms dominant structural habitat in coastal portions of the Alaska panhandle (Dean et al. 2000). Kelp does not occur in the Gulf of Mexico, or on the U.S. East Coast south of Long Island Sound (Graham et al. 2007).

3.4.7.1.5 Biogenic Reefs

Biogenic reefs come in a variety of forms that provide EFH for numerous fish species. The principal reef-creating organisms are bivalves (e.g., oysters, scallops, mussels) and stony corals, though there is substantial variation in the form and function of this type of habitat (Table 3-30). Numerous other invertebrates contribute to the complexity of the biogenic reef ecosystem. Both living organisms and the calcareous remains of dead individuals contribute to the habitat value of biogenic reefs (South Atlantic Fishery Management Council 1998).

Table 3-30. Biogenic Habitat Types Occuring in the Proposed Action Areas

Biogenic Reef Habitat Type	*Description*
Scallop beds	Areas of substrate covered with large aggregations of scallops.
Oyster reefs	Distinct aggregations of oyster shells and live oysters in intertidal and subtidal areas; they often occur in nearshore areas with brackish water.
Shell banks	Distinct aggregations of oyster shells and live oysters in intertidal and subtidal areas.

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

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

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

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

Coral reefs are ecosystems of several linked habitats, including unconsolidated sediment, colonized hard-bottom, and submerged vegetation that are organized around a framework of structural components such as the reef crest, lagoon, and fore reef. A functioning coral reef integrates processes and services from all of these components (Rohmann et al. 2005). The framework of coral reefs is composed of sessile, colonial invertebrates in the phylum Cnidaria, in classes Hydrozoa and Anthozoa (Section 3.4.4). The most well-known corals are the stony corals, in the order Scleractinia (Sheppard et al. 2017). Coral reef ecosystems in the western Atlantic Ocean provide habitat for more than 2,000 species of sponges, gastropods, bivalves, crustaceans, echinoderms, and fish (Spalding et al. 2001).

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

3.4.7.1.6 Habitat Areas of Particular Concern

FMCs and NMFS may designate HAPC (a subset of designated EFH comprising the habitats that a species is known to occupy) to conserve fish habitat in geographical locations particularly critical to the survival of a species. This subset could include spawning habitat; nursery habitat for larvae, juveniles, and subadults; and some amount of foraging habitat for mature adults. Designation of HAPC helps focus conservation efforts on locations most important to the continued survival of managed species, but these areas do not garner any special regulatory status beyond the associated EFH. HAPC is present within all of the marine proposed action areas, but constitutes only a very small portion of each proposed action area. In addition, much of the HAPC is designated in shallow coastal areas (e.g., seagrass beds, sandy banks, rocky reefs) which would not regularly be encountered in the course of the Proposed Action. Most of the deep water HAPC is designated around seamounts and underwater canyons which are outside of the proposed action areas. Designated HAPC for each proposed action area, along with the life stages for which it is designated, and the appropriate FMP and FMC is shown in Table 3-31.

Table 3-31. HAPC in the Proposed Action Areas

EFH Species or FMP with Designated HAPC	*HAPC Description*	*Designated Life Stages*	*FMC*
USEC-South			
Atlantic highly migratory species: bluefin tuna	Pelagic waters of the Gulf of Mexico seaward of the 328-ft (100-m) bathymetric line, extending to the seaward extent of the U.S. EEZ and eastward to 82° W longitude	Not specified	NMFS
All Gulf of Mexico species with EFH designations	Tortugas North, Tortugas South (Florida [FL])	All life stages	GMFMC
Coastal migratory pelagics	Charleston Bump (South Carolina [SC]); the Point off Jupiter Inlet (FL); The Point/Amberjack Lump (FL); nearshore hard bottom south of Cape Canaveral (FL); the Hump off Islamorada (FL); Marathon Hump (FL); the Wall off of the Florida Keys (FL); *Phragmatopoma* (worm reef; FL)	All life stages	SAFMC
Coral reefs and hard bottom	Biscayne Bay (FL); Biscayne National Park (FL); Dry Tortugas National Park (FL); Florida Keys National Marine Sanctuary (FL); *Phragmatopoma* (worm reefs;FL); nearshore hard bottom (0-12 ft [0-4 m] from Cape Canaveral to Broward County, FL); offshore hard bottom (15-90 ft [5-30 m]) from Palm Beach County to Fowey Rocks, FL)	All life stages	SAFMC
Dolphin-Wahoo	Marathon Hump (FL); the Point/Amberjack Lump (FL); the Wall off the Florida Keys (FL)	All life stages	SAFMC
Lemon Shark	Along the east central coast of FL from Cape Canaveral to areas just south of Jupiter Inlet (FL), extending out to 12 nm		SAFMC
Panaeid shrimp	coastal inlets; primary nursery areas	All life stages	SAFMC
Snapper-Grouper	coastal inlets; continuous seagrass; discontinuous seagrass; mangroves; Marathon Hump (FL); nearshore hard bottom areas; SAFMC designated artificial reef special management zones; the Point/Amberjack Lump (FL); the Wall off the Florida Keys (FL)	All life stages	SAFMC
Spiny lobster	Biscayne Bay (FL); Card Sound (FL); Florida Bay (FL); Patch Reef (FL); Platform Margin Reef (FL); hard bottom habitat from Jupiter Inlet through the Dry Tortugas (FL)	All life stages	SAFMC
USEC-MidATL			
Coastal migratory pelagics	Sandy shoals of Cape Lookout, Cape Fear, and Cape Hatteras (North Carolina [NC]) from shore to the ends of the respective shoals, but shoreward of the Gulf Stream; Ten Fathom Ledge (NC); Atlantic coast estuaries with high numbers of Spanish mackerel and cobia based on abundance data from the ELMR program including Bogue Sound, New River, and Broad River (NC)	All life stages	SAFMC
Coral reefs and hard bottom	Ten Fathom Ledge (NC)	All life stages	SAFMC
Dolphin-Wahoo	Ten Fathom Ledge (NC); Charleston Bump Complex (South Carolina [SC])	All life stages	SAFMC

EFH Species or FMP with Designated HAPC	*HAPC Description*	*Designated Life Stages*	*FMC*
Panaeid shrimp	Coastal inlets; permanent secondary nursery areas; primary nursery areas	All life stages	SAFMC
Highly migratory species: sandbar shark	Important nursery and pupping grounds in shallow areas and at the mouth of Great Bay (New Jersey), in lower and middle Delaware Bay (Delaware), lower Chesapeake Bay (Maryland), and offshore of the Outer Banks (NC) in water temperatures ranging from 59 to 86 °F (15 to 30 °C), salinities at least from 15 to 35 ppt, water depth ranging from 3 to 75 ft (0.8 to 23 m), and in sand and mud habitats.	All life stages	MAFMC
Highly migratory species: sand tiger shark	Important nursery area in Delaware Bay (Delaware)	All life stages	MAFMC
Snapper-Grouper	Ten Fathom Ledge (NC); coastal inlets; permanent secondary nursery areas; primary nursery areas; special secondary nursery areas	All life stages	SAFMC
GoMEX and Mississippi River			
Highly migratory species: bluefin tuna	Pelagic waters of the Gulf of Mexico seaward of the 328-ft (100-m) bathymetric line, extending to the seaward extent of the U.S. EEZ and eastward to 82° W longitude	Not specified	GMFMC
PNW			
Estuaries	Includes all subtidal estuarine waters between the upriver extent of saltwater (0.5 ppt) intrusion, and an imaginary line closing the mouth of a river, bay, or sound; and to the seaward limit of wetland emergents, shrubs, or trees occurring beyond the lines closing rivers, bays, or sounds. This HAPC also includes those estuary-influenced offshore areas of continuously diluted seawater.	n/a	PFMC

3.4.7.2 Environmental Consequences to Essential Fish Habitat

Impacts to EFH would potentially result from fathometer and Doppler speed log noise, vessel noise, pile driving noise, vessel movement, bottom devices, brushing, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines associated with the Proposed Action. As discussed in Table 3-3, fathometer and Doppler speed log noise is high frequency, and it is unlikely fish in their habitat would detect this noise. Vessel noise is within the hearing range of most fish. However, the potential reduction in the quality of the acoustic habitat would be localized and temporary due to the attenuation of the fathometer and Doppler speed log noise and vessel noise. The quality of the water column environment as EFH would be restored to normal levels immediately following the departure of vessels. Vessel movement and tow lines may disturb different life stages of fish species within the water column or at the surface. However, this disturbance would be temporary as a vessel moves through the proposed action areas. While unrecovered jet cone moorings and constructed structures would occupy a small area of benthic EFH, this area would be very small as compared to the total available amount of EFH in each proposed action area. The impact of brushing to EFH would not be measureable and therefore would be discountable. As impacts to EFH from fathometer and Doppler speed log noise, vessel noise, vessel movement, construction, brushing, unrecovered jet cone moorings, and tow line stressors would be minimal, they will not be discussed further in this PEIS. ATON signal testing noise and tool noise occur in air and must propagate across the air-water interface, making it unlikely that fish in their habitat would detect these sounds, and they would not impact the quality of the EFH as habitat. Therefore, these stressors will not be discussed further in this PEIS. HAPC would not be impacted differently than other EFH, and is therefore included in the discussion of impacts to EFH in the sections below.

3.4.7.2.1 Pile Driving Noise

Pile driving noise could impact the quality of EFH throughout the proposed action areas where pile driving would occur. Pile driving into sediment with an impact or vibratory hammer would increase underwater sound pressure levels and impact habitats for fish (Iafrate et al. 2016). Intense pulses of sound have been shown to potentially cause physical injury to fish when the sound wave is received at high levels. Potential injury due to exposure may increase in shallow waters (Iafrate et al. 2016). In addition, sound waves may cause fish to deviate from their normal behavior, triggering changes in their feeding and breeding, or modifying migration patterns if the sound waves occur for a long duration of time (Iafrate et al. 2016). However, the potential reduction in the quality of the acoustic habitat would be localized to where pile driving is occurring in the proposed action areas, and would occur only for a short duration of time. It would be expected that fish species would utilize other adjacent habitats during pile driving activities, and the elevated sound pressure levels would have no permanent impact on EFH. The quality of the EFH would be restored to normal levels immediately following the conclusion of pile driving noise. Secondary effects to federally managed fish species are considered in Section 3.4.6.2.3.

3.4.7.2.2 Bottom Devices and ATON Retrieval Devices

Bottom devices could impact benthic soft-bottom EFH and submerged aquatic vegetation due to the disturbance of bottom sediment, scouring, and potential reduction of habitat due to the installation of floating ATON using these devices. The use of bottom devices such as anchors and spuds would be very short in duration, to keep the vessel in one general location for a short period of time. Chains and sinkers that hold ATON in place would be used for longer durations of time, as each ATON has been deemed necessary in specific locations until they are discontinued. During the time that sinkers and chains are in use to keep floating ATON in place, a small portion of benthic EFH would not be available for use. It would be expected that fish species would utilize other adjacent habitats during the use of bottom devices in any given proposed action area. In addition, as waters surrounding floating ATON move with the tides and currents, the chain holding the ATON to the sinker circles the sinker, scouring the surrounding substrate. Scouring by bottom devices may uproot or crush vegetation or remove fine-grained sediments. SOPs have been put in place for installation (Appendix B) in order to minimize chain scour in areas containing sensitive habitat (e.g., seagrass, corals) and EFH. These SOPs include using the shortest length chain possible at installation and not establishing floating ATON within sensitive habitats, if at all possible. The quantity of EFH would be restored to normal levels when bottom devices are not in use in the proposed action areas or if an ATON become discontinued. However, chain scour could reduce a portion of EFH within a small area around the sinker.

In some areas, the use of bottom devices could damage EFH, such as using spuds or an anchor in an area of biogenic reef, or a chain and sinker used in an area with hard bottom features. The Coast Guard would follow SOPs (Appendix B) to minimize any impacts to EFH. In addition, Coast Guard would conduct activities consistent with the Biological Opinion issued by NMFS in 2018[22], including measures to avoid impacts from bottom devices, pile driving, and ATON EFH. It would be unlikely that any bottom devices would be placed in an area of biogenic reef, as this is a high relief area where these devices would not function properly. Therefore, the quality of EFH would not be significantly impacted by the use of bottom devices. It would also be unlikely that any bottom devices would be placed in an area of benthic hard bottom, as these devices do not function properly in hard bottom areas.

3.4.7.2.3 Pile Driving

Pile driving could impact water column and benthic EFH, as well as submerged aquatic vegetation due to the disturbance of bottom sediment and potential reduction of habitat due to the installation of fixed ATON with an impact or vibratory hammer. However, this potential reduction in the quality of the water column and benthic habitat would be localized to within and just outside of the footprint of the pile in the area where pile driving operations are being conducted. Due to the small, localized areas of disturbance compared to the overall size of the proposed action areas, as well as the infrequency of pile driving operations, the quality of EFH would not be significantly impacted. In areas where fixed ATON structures have been placed by pile driving, the quantity of EFH is likely slightly less than the full available amount in each proposed action area. Compared to the overall available amount of EFH, this is a small area of habitat. The Coast Guard would follow SOPs (Appendix B) to minimize any impacts to EFH. In addition, Coast Guard would conduct activities consistent with the Biological Opinion issued by NMFS in 2018, including measures to avoid impacts from bottom devices, pile driving, and ATON EFH.

3.4.7.2.4 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, impacts to EFH within the proposed action areas would be similar to what is currently present because the new WCC fleet would replace existing vessels and the operations of those vessels. In addition, WCC assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include the use of bottom devices, as well as construction and brushing and pile driving activities. There would be a small change to baseline quantities of EFH as a result of the Proposed Action. There would be no change to the baseline quality of EFH as a result of the Proposed Action. Impacts to EFH

[22] The Coast Guard completed an ESA Section 7 and Essential Fish Habitat consultation with NMFS on U.S. Coast Guard Federal Aids to Navigation Program, finalized on April 19, 2018. Any information provided in this PEIS includes WCC support of ATONs, only as it pertains to the Proposed Action.

from the Proposed Action would be limited to small areas around fixed ATON, and the pile driving disturbance to EFH would be intermittent and brief in duration. Therefore, there would be no significant impact to EFH as a result of Alternative 1.

3.4.7.2.5 Impacts Under Alternatives 2–3

Under Alternatives 2–3, impacts to EFH within the proposed action areas would be similar to what is currently present because the new WCC fleet would replace the capabilities of the existing inland tender fleet. In addition, WCC assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include the use of bottom devices, as well as construction and brushing and pile driving activities. There would be a small change to baseline quantities of EFH as a result of the Proposed Action. There would be no change to the baseline quality of EFH as a result of the Proposed Action. Impacts to EFH from the Proposed Action would be limited to small areas around fixed ATON, and the pile driving disturbance to EFH would be intermittent and brief in duration. Therefore, there would be no significant impact to EFH as a result of Alternatives 2–3.

3.4.7.2.6 Impacts Under the No Action Alternative

Under the No Action Alternative, as the existing inland tender fleet is decommissioned and not replaced, the physical and acoustic stressors associated with the Proposed Action would not be introduced into the environment. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impacts to EFH with implementation of the No Action Alternative.

3.4.8 Birds

3.4.8.1 Affected Environment

In general, birds are highly migratory—of the more than 650 species of birds that breed in North America, more than half are migratory (Cornell Lab of Ornithology 2007). The annual, large-scale movement of birds between their breeding grounds and their non-breeding grounds usually occurs in spring and fall. Birds that nest in the Northern Hemisphere tend to move north in the spring to take advantage of increasing insect populations, budding plants, and many nesting locations. As winter approaches, food availability decreases, so birds move south to areas where these resources are more plentiful. Therefore, presence in any given area may be seasonal, or year-round, if the species is a permanent resident.

The Proposed Action has the potential to impact bird species that inhabit, nest, and forage in the coastal and riverine habitats in each proposed action area. As such, the following discussions focus on the bird orders and ESA-listed species known to occur in these areas.

Some birds are more terrestrial or aquatic than others. While some bird species may only forage in or nest near to aquatic habitats, others may wade, swim, and dive in marine or fresh water. Bird species that may be present within the proposed action areas largely fall into two groups: those that are distributed mainly on land, but forage in aquatic habitats or those that are distributed in aquatic habitats where they also forage. General bird orders are discussed in Section 3.4.8.1.1 and ESA-listed bird species are discussed in Section 3.4.8.1.2.

3.4.8.1.1 Major Groups of Birds within the Proposed Action Areas

There are 12 orders of birds that may be present throughout the proposed action areas (Table 3-32) and are discussed in further detail below. All orders of birds expected in the proposed action areas inhabit a variety of terrestrial and freshwater environments.

Table 3-32. Major Groups of Birds in the Proposed Action Areas

Taxonomic Order	***Representative Species Present***	***Distribution Within or Near the Proposed Action Areas***	***Foraging Behavior***
Accipitriformes	Osprey (*Pandion haliaetus*), Snail kite (*Rostrhamus sociabilis*)	Common on flooded freshwater marshes, around shallow lakes, on freshwater watercourses, and along the coast.	Aerial divers
Anseriformes	Canada goose (*Branta canadensis*), Red-breasted merganser (*Mergus serrator*)	Widely distributed across the U.S. Common in coastal waters or large lakes and rivers during migration and overwintering.	Ground feeding; dabbling
Caprimulgiformes	Common nighthawk (*Chordeiles minor*)	May nest in coastal sand dunes and beaches and migrate along river valleys, marshes, and coastal dunes.	Feed in flight
Charadriiformes	Piping plover (*Charadrius melodus*), Red knot (*Calidris canutus*), Marbled murrelet (*Brachyramphus marmoratus*), Ring-billed gull (*Larus delawarensis*), Least tern (*Sternula antillarum*)	Broadly distributed birds that occur along beaches, coastlines, inland rivers, freshwater wetlands, and salt marshes.	Ground feeding; plunging; probing; diving
Ciconiiformes	Wood stork (*Mycteria americana*)	Prefer freshwater and marine/estuarine forested habitats, as well as wetlands and marshes.	Probing

Taxonomic Order	***Representative Species Present***	***Distribution Within or Near the Proposed Action Areas***	***Foraging Behavior***
Coraciiformes	Belted kingfisher (*Megaceryle alcyon*)	Favors waterways such as streams, rivers, lakes, and estuaries for breeding. Tend to follow the shoreline of major waterways during migration and stick to waterways in warmer climes during overwintering.	Diving
Cuculiformes	Yellow-billed cuckoo (*Coccyzus americanus*), Black-billed cuckoo (*Coccyzus erythropthalmus*)	Prefer forest edges, woodlands, and thickets, but are frequently associated with freshwater watercourses and river shores.	Gleaning; ground feeding
Falconiformes	Peregrine falcon (*Falco peregrinus*)	Nests terrestrially; may feed in shallow waters.	Aerial pursuit; ground feeding
Passeriformes	Bank swallow (*Riparia riparia*), Seaside sparrow (*Ammospiza maritima*)	Common in lowland areas along coasts, tidal marshes, rivers, streams, floodplains, and lakes across the U.S.	Aerial pursuit; gleaning; ground feeding
Pelecaniformes	American white pelican (*Pelecanus erythrorhynchos*), Great blue heron (*Ardea herodias*)	Occur in salt and freshwater wetlands and water bodies, coastal bays, inlets, estuaries, and rivers.	Dipping
Podicipediformes	Horned grebe (*Podiceps auritus*)	Occur regularly along coasts and on moderately-sized inland bodies of water and rivers during migration. Overwinter on moderate to large bodies of salt and fresh water.	Diving
Suliformes	Anhinga (*Anhinga anhinga*), Double-crested cormorant (*Phalacrocorax auritus*)	Occupy diverse aquatic habitats year-round, including ponds, lakes, rivers, estuaries, and coastal waters.	Diving

3.4.8.1.1.1 Accipitriformes

Order Accipitriformes includes ospreys, kites, eagles, harriers, and hawks. These diurnal (active during the day and resting at night) birds of prey hunt by sight during the day or at twilight. They are carnivorous and may prey on a variety of species such as fish, birds, invertebrates, and reptiles (Winkler

2020a). Birds in the order Accipitriformes have low reproductive rates and typically nest in trees or tree cavities or along cliffs.

3.4.8.1.1.2 Anseriformes

Order Anseriformes includes species of ducks, geese, and other waterfowl. They inhabit a variety of aquatic habitats across the United States, including open ocean areas, bays, lagoons, lakes, ponds, and rivers (Winkler 2020b). These birds are omnivorous and may feed on aquatic or terrestrial plants, insects, aquatic invertebrates, amphibians, fish, and fish eggs. Waterfowl may be ground grazers, dabbling or skimming ducks, or diving birds (Winkler 2020b).

3.4.8.1.1.3 Caprimulgiformes

Order Caprimulgiformes includes species of nightjars, allies, swifts, and hummingbirds; however, only the common nighthawk (*Chordeiles minor*) may occur within all proposed action areas. Widely distributed across the United States, the common nighthawk nests in a variety of habitats, including sand dunes, forest and woodland clearings, plains, grassland, rock outcrops, and urban areas. During migration, however, they prefer farmland, marsh, river valleys, and dunes (Brigham 2020). The common nighthawk forages in flight, feeding on flying insects at dusk and dawn and over water and the tree canopy (Brigham 2020).

3.4.8.1.1.4 Charadriiformes

Order Charadriiformes include stilts, avocets, plovers, lapwings, sandpipers, curlews, turnstones, knots, sanderlings, dunlins, dowitchers, snipes, phalaropes, yellowlegs, willets, gulls, terns, and skimmers. This diverse group ranges from small shorebirds to large pelagic seabirds. Most Charadriiformes live and nest near fresh or salt water and prey on invertebrates or other small animals. Species in this order may probe the shoreline, plunge feed in the shallow waters, dive in deeper waters, or skim the surface of the water for food (Zusi 2015).

3.4.8.1.1.5 Ciconiiformes

Order Ciconiiformes includes species of storks, which are long-legged wading birds. The only species that may overlap the proposed action areas is the wood stork (*Mycteria americana*), which is found in the USEC-South and GoMEX and Mississippi River proposed action areas. More information on the species can be found in Section 3.4.8.1.2.14, as the species is listed as endangered under the ESA.

3.4.8.1.1.6 Coraciiformes

Order Coraciiformes includes species of kingfisher. The only species that overlaps the proposed action areas, potentially occurring within all of them, is the belted kingfisher (*Megaceryle alcyon*). Migratory behavior of the belted kingfisher is poorly known, but they generally follow shorelines of major waterways (Kelly 2020). In the United States, most populations are partial migrants. Nests are typically near water, in earthen banks void of vegetation. The important requirements for breeding are waters that support aquatic animal populations and nearly vertical earth exposures, which are for digging nesting burrows. Clearly visible prey within streams, rivers, ponds, lakes, estuaries, and calm marine waters are favored foraging areas (Kelly 2020). Belted kingfishers feed on a variety of prey including fish, mollusks, crustaceans, insects, amphibians, reptiles, young birds, small mammals, and berries, though fish making up a large portion of their diet. Belted kingfishers prefer fishes that inhabit shallow water or swim near the surface (Kelly 2020).

3.4.8.1.1.7 Cuculiformes

The order Cuculiformes includes species of cuckoos. Representative species that may be found in all but the PNW and SEAK proposed action areas are the yellow-billed cuckoo (*Coccyzus americanus*) and black-billed cuckoo (*Coccyzus erythropthalmus*). These cuckoos are widely distributed and may be aboreal (living in trees) or terrestrial, preferring open woodlands with clearings and scrubby vegetation, trees, thickets, and forest edges often associated with waterways (Hughes 2020a, 2020b). Cuckoos feed primarily in woodlands, open areas, orchards, and along shores for a variety of prey such as insects, small frogs, lizards, mollusks, eggs, and young birds (Hughes 2020a, 2020b). Most species nest in trees or bushes and many species may lay their eggs in the nests of other birds (known as brood parasitism).

3.4.8.1.1.8 Falconiformes

The order Falconiformes includes species of falcons and caracaras. These birds commonly inhabit open areas across a variety of habitats, such as shores, grasslands, and tundra (Winkler 2020c). Diets of the different species within Falconiformes vary greatly, ranging from feeding on insects to small mammals, birds, reptiles, grains, and fruit. Falcons are strictly carnivorous, while caracaras are more generalized feeders (Winkler 2020c). Nesting sites are also variable among species, with some preferring tree cavities and others cliff ledges, nests constructed by other birds, or stick nests (Winkler 2020c).

3.4.8.1.1.9 Passeriformes

Order Passeriformes includes all of the species commonly known as songbirds and is the largest and most diverse order or birds, including 41 different families found in North America. Songbirds live in a wide range of habitats, with nesting sites found in holes in the ground, trees, banks, and in a variety of vegetation (Gill 2018). Passeriformes are primarily insectivores, with some species also feeding on fruit, leaves, nectar, and seeds (Gill 2018).

3.4.8.1.1.10 Pelecaniformes

The order Pelecaniformes contains species of pelicans, cormorants, and egrets. Birds in the order of Pelecaniformes occur in a variety of marine and freshwater habitats across the country, foraging in shallow marshes, rivers, and lake edges for fish, dipping their large bills in the water to catch prey. These birds feed mostly on fish, but have been known to consume amphibians, invertebrates, reptiles, mammals, and birds (Vennesland 2020). Species of birds within Pelecaniformes may be found in all proposed action areas except the SEAK proposed action area. Egrets, ibis, and herons are primarily wading birds and prefer areas of shallow water to hunt, generally living close by (Winkler 2020d). While pelicans inhabit similar environments, they also feed in more marine environments, capturing fish by skimming the surface of the water as they fly above (Winkler 2020d).

3.4.8.1.1.11 Podicipediformes

The order Podicipediformes contains species of grebes; however, only the horned grebe (*Podiceps auritus*) may occur within the proposed action areas during its nonbreeding season. During this time, from October to March, it prefers bodies of fresh and coastal water along both the Atlantic and Pacific Coasts, as well as Alaska. They feed primarily on fish and crustaceans during this season (Stedman 2020). When diving for prey, horned grebes can spend up to 20 seconds underwater (Stedman 2020).

3.4.8.1.1.12 Suliformes

The order Suliformes contains species of boobies and frigatebirds. Species from the order Suliformes inhabit primarily aquatic habitats. They may be found throughout all of the proposed action areas.

Species of frigatebirds are highly pelagic, coming ashore only during the breeding season in winter months. Catching its food in flight, frigatebirds feed primarily on fish or squid close to the surface (Diamond 2020). Boobies and gannets also feed on squid and fish, but dive for their prey rather than pluck from the surface (Grace 2020). Cormorants and shags live along the coast and typically do not stray far from shore, feeding on fish, crustaceans, and mollusks (Dorr 2020).

3.4.8.1.2 ESA-Listed Birds

The USFWS oversees fish and wildlife species (including all bird species) designated as threatened or endangered under the ESA. There are 15 bird species listed as threatened or endangered under the ESA that may occur within the proposed action areas. These species, their ESA status, and regional occurrence are outlined in Table 3-33 and discussed in Sections 3.4.8.1.2. Critical habitat that overlaps the proposed action areas is listed in Table 3-43 and detailed in Section 3.4.12.1.6.

Table 3-33. ESA-Listed Birds in the Proposed Action Areas

Common Name (Scientific Name)	***ESA Listing Status***	***Distribution***	***Proposed Action Area Occurrence***	***Critical Habitat in the Proposed Action Areas***
Audubon's crested caracara (*Ployborus plancus audubonii*)	Threatened (72 FR 25229; July 6, 1987)	Most abundant around Lake Okeechobee, Florida.	USEC-South	N/A
Bachman's warbler (*Vermivora bachmanii*)	Endangered (32 FR 4001; March 11, 1967)	Breeds along the South Carolina coast and uses Florida as a stopping point during migration.	USEC-South	N/A
Eastern black rail (*Laterallus jamaicensis jamaicensis*)	Threatened (83 FR 63764; October 8, 2020)	Wetland dependent bird found primarily along the coast, but may also be found within the interior U.S.	Great Lakes; USEC-MidATL; USEC-South; GoMEX and Mississippi River	N/A
Everglade snail kite (*Rostrhamus sociabilis plumbeus*)	Endangered (32 FR 4001; March 11, 1967)	Distributed across central and southern Florida.	USEC-South	Yes (42 FR 47840; September 22, 1977)
Marbled murrelet (*Brachyramphus marmoratus*)	Threatened (57 FR 45328; October 1, 1992)	Nests in forested areas near the coast; forage close to shore at river mouths, bays and inlets.	PNW	Yes (81 FR 51348; August 4, 2016)

Common Name (Scientific Name)	*ESA Listing Status*	*Distribution*	*Proposed Action Area Occurrence*	*Critical Habitat in the Proposed Action Areas*
Northern aplomado falcon (*Falco femoralis septentrionalis*)	Endangered (51 FR 6686; February 25, 1986)	Closely associated with the coastal prairies and grasslands of southern Texas.	GoMEX and Mississippi River	N/A
Northern spotted owl (*Strix occidentalis caurina*)	Threatened (55 FR 26114; June 26, 1990)	Inhabits old growth forests of the Pacific Northwest, but roosts near streams in the summer.	PNW	Yes (77 FR 71875; December 4, 2012)
Piping plover (*Charadrius melodus*)	Endangered – Great Lakes watershed DPS (50 FR 50726; December 11, 1985)	Shorebird that inhabits beaches, alkali flats, and sandflats along inland rivers and wetlands, as well as the Atlantic Coast.	Great Lakes; USEC-MidATL; USEC-South; GoMEX and Mississippi River	Yes (66 FR 22938 May 7, 2001)
	Threatened – Atlantic Coast and Northern Great Plains populations (50 FR 50726; December 11, 1985)			Yes (66 FR 36137; July 10, 2001)
Red knot (*Calidris canutus rufa*)	Threatened (79 FR 73705; December 11, 2014)	Prefer sandy coastal habitats at or near tidal inlets or the mouths of bays and estuaries during migration and overwintering in the southeast U.S.	Great Lakes; USEC-MidATL; USEC-South; GoMEX and Mississippi River	N/A
Roseate tern (*Sterna dougallii dougallii*)	Endangered (52 FR 42064; November 2, 1987)	Nest on nearshore islands, barrier islands, or barrier beaches. Migrate offshore and overwinter on sandbars or beaches at river mouths, estuaries, or ocean front.	USEC-MidATL; USEC-South	N/A

Common Name (Scientific Name)	*ESA Listing Status*	*Distribution*	*Proposed Action Area Occurrence*	*Critical Habitat in the Proposed Action Areas*
Short-tailed albatross (*Phoebastria albatrus*)	Endangered (65 FR 46643; July 31, 2000)	Pelagic seabirds of the Pacific Northwest and Southeast Alaska.	PNW; SEAK	N/A
Streaked horned lark (*Eremophila alpestris strigata*)	Threatened (78 FR 61451; October 3, 2013)	Open grasslands along the Washington and Oregon coast, Columbia River, and Willamette Valley.	PNW	Yes (78 FR 61505; October 3, 2013)
Whooping crane (*Grus americana*)	Endangered (32 FR 4001; March 11, 1967)	Overwinter along the Texas coast in marshes and tidal flats.	GoMEX and Mississippi River	Yes (43 FR 20938; May 15, 1978)
Wood stork (*Mycteria americana*)	Threatened (79 FR 37077; June 30, 2014)	Colonize and forage in coastal or freshwater wetlands, primarily forested.	USEC-MidATL; USEC-South; GoMEX and Mississippi River	N/A

N/A = no critical habitat has been designated.

3.4.8.1.2.1 Audubon's Crested Caracara

The Audubon's crested caracara (*Polyborus plancus audubonii*) was listed as threatened in 1987 (72 FR 25229; July 6, 1987). There is currently no critical habitat designated for this species. The species may be present within the USEC-South proposed action area.

Audubon's crested caracaras are most abundant in the areas around Lake Okeechobee in Florida year-round. They prefer dry and wet prairies and lightly wooded areas, nesting in cabbage palms (Sabal palmetto) (U.S Fish and Wildlife Service 1999a). Although abundance and population trends are difficult to determine due to the caracara's long life span and observers' limited access to suitable habitat, it is estimated that over 500 individuals inhabit Florida (U.S Fish and Wildlife Service 2009a).

Living up to 30 years in captivity, these birds may have a high reproductive potential. Eggs are laid as early as September with the height of the nesting season occurring in January and February. Clutches consist of two to three eggs, with breeding pairs usually staying together until one mate dies (U.S Fish and Wildlife Service 1999a). Audubon's crested caracaras are highly opportunistic feeders, hunting a variety of live prey and feeding on carrion. Their diet consists of insects, invertebrates, fish, snakes, turtles, birds, and mammals (U.S Fish and Wildlife Service 1999a).

3.4.8.1.2.2 Bachman's Warbler

The Bachman's warbler (*Vermivora bachmanii*) was listed as endangered under the ESA in 1967 (32 FR 4001; March 11, 1967). There is currently no critical habitat for the species. The species may be present within the USEC-South proposed action area.

Bachman's warbler is one of the rarest songbirds in North America. It has not been documented in the United States since 1962 and was last observed in Cuba in 1981 (U.S Fish and Wildlife Service 2015a). Historically inhabiting the southeastern United States, it is believed that the remaining birds breed along the coast of South Carolina and winter in Cuba, using southern Florida as a spotting point before continuing on (U.S Fish and Wildlife Service 1999b). Breeding habitat in South Carolina consists of forested wetlands (U.S Fish and Wildlife Service 2015a). In Florida, a similar habitat of wet, forested areas near water are used during potential nesting and migration (U.S Fish and Wildlife Service 1999b).

Breeding and foraging habits are relatively unknown for the species, but it is assumed that these habits are similar to other species of *Vermivora*. Nesting occurs from March to June with clutch sizes numbering between three and four eggs. It is expected that the Bachman's warbler has a predominantly insect-based diet (U.S Fish and Wildlife Service 1999b).

3.4.8.1.2.3 Eastern Black Rail

The eastern black rail (*Laterallus jamaicensis jamaicensis*) was listed as threatened under the ESA in 2020 (83 FR 63764; October 8, 2020). There is currently no critical habitat for the species. The species may be found within the Great Lakes, USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas.

The eastern black rail is distributed across the United States east of the Rocky Mountains. These wetland-dependent birds are found primarily in coastal wetlands along the Gulf and Atlantic Coasts; however, they have also been found in inland wetlands as well (U.S Fish and Wildlife Service 2019f). Nests require dense vegetative cover and are constructed over moist soil or shallow water in salt, brackish, and freshwater wetlands (U.S Fish and Wildlife Service 2019f).

The high primary productivity in wetland habitats provides an abundance of food for eastern black rails. They tend to forage on aquatic and terrestrial invertebrates, insects, and seeds by gleaning or pecking (U.S Fish and Wildlife Service 2019f). The breeding season for eastern black rails extends from March to September. The average clutch contains seven eggs, which typically hatch in 26 days (U.S Fish and Wildlife Service 2019f).

3.4.8.1.2.4 Everglade Snail Kite

The Everglade snail kite (*Rostrhamus sociabilis plumbeus*) was listed as endangered under the ESA in 1967 (32 FR 4001; March 11, 1967). Critical habitat was designated for the species in 1977 and encompasses a portion of the USEC-South proposed action area near Lake Okeechobee in Florida (42 FR 47840; September 22, 1977). The critical habitat for the Everglade snail kite is discussed further in Section 3.4.12.1.6. The species may be present within the USEC-South proposed action area.

The Everglade snail kite is distributed across central and southern Florida and in this area, are limited to the Upper St. Johns marshes, Kissimmee River Basin, Lake Okeechobee, Loxahatchee Slough, the Everglades, and the Big Cypress Basin (U.S Fish and Wildlife Service 2019b). The kites are also known to inhabit other freshwater wetland areas outside of central and southern Florida in addition to the ones listed. A population estimate conducted in 2014 recorded 1,754 individuals, noting improving conditions in Lake Okeechobee (U.S Fish and Wildlife Service 2019b).

The breeding season for the kites ranges from December to July and is dependent on rainfall and water levels. Clutch sizes range from one to five eggs, which hatch most successfully from February to April. They feed almost exclusively on apple snails (*Pomacea paludosa*) found in freshwater wetlands. Snail kites do not plunge into the water or use their beaks to capture the snails, but rather use their feet to catch prey in shallow waters (U.S Fish and Wildlife Service 1999c).

3.4.8.1.2.5 Marbled Murrelet

The marbled murrelet (*Brachyramphus marmoratus*) was listed as threatened under the ESA in 1992 (57 FR 45328; October 1, 1992). Critical habitat was designated for the species in 2016 (81 FR 51348; August 4, 2016) and encompasses a portion of the PNW proposed action area, which is detailed in Section 3.4.12.1.6. The species may be found within the PNW proposed action area.

Marbled murrelets are distributed along the Pacific Coast from Washington to southern California. Murrelets spend most of their lives in the marine environment where they forage in nearshore areas and consume a diversity of prey species, including small fish and invertebrates. In their terrestrial environment, the presence of platforms (large branches or deformities) used for nesting is the most important characteristic of their nesting habitat. Marbled murrelets generally remain near breeding sites year-round in most areas (U.S. Fish and Wildlife Service 2005b). Foraging habitat is generally found within 3 mi (5 km) from shore and in water less than 195 ft (59 m) deep (BirdLife International 2012; Day and Nigro 2000). Birds occur closer to shore in exposed coastal areas and farther offshore in protected coastal areas (BirdLife International 2012). The highest concentrations are found in protected inshore waters (U.S. Fish and Wildlife Service 2005b). They are more commonly found inland during the summer breeding season but make daily trips to the ocean to gather food and have been detected in forests throughout the year. When not nesting, the birds live at sea, spending their days feeding close to shore and then moving several miles offshore at night.

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

3.4.8.1.2.6 Northern Aplomado Falcon

The northern aplomado falcon (*Falco femoralis septentrionalis*) was listed as endangered under the ESA in 1986, except where it is listed as an experimental population (51 FR 6686; February 25, 1986). There is currently no critical habitat designated for the species. The species may be present within the GoMEX and Mississippi River proposed action area.

Northern aplomado falcons occur along the southern coast of Texas. Closely associated with the coastal prairies and grasslands, these falcons historically ranged across Mexico and the southwestern United States (Mutch 2005). Falcons within the proposed action area are likely members of reintroduced populations near Brownsville and Rockport, Texas. The Brownsville population included about 19 nesting pairs in 2013 and the Rockport population contained an additional 12 pairs (Hunt 2013). Falcons typically use nests constructed by other large birds usually in yucca, mesquite, or artificial structures (U.S Fish and Wildlife Service 2014).

Northern aplomado falcons feed on a variety of prey including birds, insects, rodents, snakes, and lizards. Hunting in riparian woodlands, tidal flats, and marshlands, the falcon captures its prey on the ground, in trees and brush, and in the air. Predators of the species include great-horned owls (*Bubo virginianus*), crows and ravens (*Corvus* spp.), jays, coyotes (*Canis latrans*), and bobcats (*Lynx rufus*) (U.S Fish and Wildlife Service 2014).

3.4.8.1.2.7 Northern Spotted Owl

The northern spotted owl (*Strix occidentalis caurina*) was listed as threatened under the ESA in 1990 (55 FR 26114; June 26, 1990). Critical habitat was designated for the species in 2012 and encompasses a portion of the PNW proposed action area in areas around the Columbia River (77 FR 71875; December 4, 2012), which is detailed in Section 3.4.12.1.6. The species may be present within the PNW proposed action area.

Northern spotted owl habitat is primarily old growth forests in the Pacific Northwest. In the summer, roost sites are selected in areas of dense vegetation that are usually near streams (Gutierrez 2020). Between 2006 and 2011, populations of the northern spotted owl have declined at a rate of 2.7 percent per year due to loss of habitat and competition for resources with the barred owl (Strix varia) (U.S Fish and Wildlife Service 2011).

Foraging within mature coniferous forests, northern spotted owls feed primarily on small mammals and rodents while hunting at night. Predators include other owls such as the great horned owl (*Bubo virginianus*) and northern goshawks (*Accipiter gentilis*) (Gutierrez 2020).

3.4.8.1.2.8 Piping Plover

The piping plover (*Charadrius melodus*) is divided into two subspecies of plovers, the Atlantic Coast population (*C. m. melodus*) and the Northern Great Plains population (*C. m. circumcinctus*). The piping plovers that winter on the Gulf Coast are a combination of the two populations/subspecies listed above, and the piping plovers that breed on the Atlantic Coast of the United States and Canada belong only to the Atlantic subspecies (*C. m. melodus*) (USFWS 2009b). Both subspecies occur within the Great Lakes, USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas. The USFWS listed the Atlantic Coast and Northern Great Plains piping plover populations as threatened under the ESA in 1985 (50 FR 50726; December 11, 1985). In 2000 and 2001, critical habitat was designated for the Great Lakes breeding population (part of the Northern Great Plains population), Northern Great Plains breeding population, and wintering population of piping plovers (both subspecies/populations). Critical habitat for wintering plovers has been designated in coastal areas within the Great Lakes, USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas (66 FR 36137; July 10, 2001) and is discussed further in Section 3.4.12.1.6.

Piping plover migration routes overlap breeding and wintering habitats. Individuals migrate through and winter in coastal areas of the United States from North Carolina to Texas, as well as portions of the Yucatán in Mexico and the Caribbean (USFWS 2009b). Evidence suggests that most of the threatened Northern Plains population winters on the Gulf Coast (Haig and Elliott-Smith 2004). In winter, the species is only found in coastal areas using a wide variety of habitats, including mudflats and dredge spoil areas and, most commonly, sandflats (Gratto-Trevor and Abbott 2011; O'Brien et al. 2006).

Piping plovers forage for food in the intertidal zone typically within 16 ft (5 m) of the water's edge (Haig and Elliott-Smith 2004). Prey items for the piping plover include terrestrial and benthic invertebrates as well as freshwater and marine invertebrates that have washed up on shore.

3.4.8.1.2.9 Red Knot

The red knot (*Calidris canutus*) is divided into three subspecies in North America. Those birds found on the Atlantic Coast of the United States and Canada belong to the subspecies *C. canutus rufa* (U.S. Fish and Wildlife Service and Gulf States Marine Fisheries Commission 1995). This subspecies occurs within the Great Lakes, USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas. This subspecies of red knot was designated as threatened under the ESA in 2014 (79 FR 73705; December 11, 2014). There is currently no critical habitat designated for the red knot. The other two subspecies of red knot are not listed under the ESA.

Red knots breed in the high arctic, utilizing tundra and gravel areas near streams, ponds, or the coast. During migration, red knots use marine habitats, preferring sandy areas along inlets, estuaries, and other intertidal areas. Red knots migrate some of the longest distances known for birds, with many individuals annually flying more than 9,321 mi (15,000 km), sometimes flying over the open ocean. Overwintering habitat consists of sandy beaches in the southern United States, as well as salt marshes and other wetland habitats (Baker et al. 2013).

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

3.4.8.1.2.10 Roseate Tern

The roseate tern (*Sterna dougallii dougallii*) is divided into two populations, both of which may occur within the USEC-MidATL and the USEC-South proposed action areas. The North Atlantic population spans the Atlantic Coast south to North Carolina and the Caribbean population occurs in the United States in southern Florida. These populations were listed as endangered and threatened in 1987, respectively (52 FR 42064; November 2, 1987). There is currently no critical habitat designated for this species.

Roseate terns are colonial breeders. The North Atlantic populations are known to nest on a limited number of small islands off New York and Massachusetts, while the Caribbean population similarly nests in Puerto Rico, the Dry Tortugas, and the Florida Keys (U.S Fish and Wildlife Service 2020c). They nest on islands near or under cover, such as vegetation, rocks, driftwood, and even human-made objects. They have also been documented nesting on sand dunes found at the end of barrier beaches (U.S Fish and Wildlife Service 1998). Approximately 3,200 pairs are estimated in the North Atlantic population, with an additional 250 pairs in Florida (U.S Fish and Wildlife Service 2020c).

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

3.4.8.1.2.11 Short-Tailed Albatross

The short-tailed albatross (*Phoebastria albatrus*) is listed as endangered under the ESA throughout its range (65 FR 46643; July 31, 2000). Currently, no critical habitat has been designated for this species (Piatt et al. 2006; USFWS 2000). The species may occur within the PNW and SEAK proposed action areas.

Short-tailed albatrosses move seasonally around the North Pacific Ocean (International Union for the Conservation of Nature 2016). During the breeding season, short-tailed albatrosses prefer to nest on isolated, windswept, offshore islands protected from human access (USFWS 2000). Almost all of these birds nest on two uninhabited islands outside of the proposed action areas: Torishima Island (78 percent of breeding pairs) and Minami-Kojima (22 percent of breeding pairs) (USFWS 2014).

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

Short-tailed albatrosses are surface feeders and scavengers, foraging frequently in sight of land and more inshore than other North Pacific albatrosses. Short-tailed albatrosses feed at the surface and their diet consists of shrimp, squid, and fish (USFWS 2005). Although flight speed and altitude were not available for short-tailed albatrosses, information concerning other albatross species is available.

3.4.8.1.2.12 Streaked Horned Lark

The streaked horned lark (*Eremophila alpestris strigata*) was listed as threatened under the ESA in 2013 (78 FR 61451; October 3, 2013). Critical habitat was designated for the species in 2012 and encompasses a portion of the PNW proposed action area in areas around the Columbia River (78 FR 61505; October 3, 2013), which is discussed further in Section 3.4.12.1.6. The species may be found within the PNW proposed action area.

The streaked horned lark breeds and winters in Oregon and Washington. Breeding habitat includes areas of sparse vegetation dominated by grasses in the Puget Trough, Washington Coast and lower Columbia River, and the Willamette Valley (Pearson 2005). Winter habitat is very similar to breeding habitat, with larks observed in agricultural lands, dredge spoils, dunes, and airports (Pearson 2005).

Foraging in agricultural fields and short vegetation, streaked horned larks feed primarily on seeds and insects. Predators of the lark include species of falcons, owls, and shrikes, as well as raccoons, squirrels, skunks, and house cats (Beason 2020).

3.4.8.1.2.13 Whooping Crane

The whooping crane (*Grus americana*) was listed as endangered under the ESA in 1967, expect where it is listed as an experimental population (32 FR 4001; March 11, 1967). Critical habitat was designated for the species in 1978 and encompasses a portion of the GoMEX and Mississippi River proposed action area along the Texas Coast (43 FR 20938; May 15, 1978), which is discussed further in Section 3.4.12.1.6. The species may be found within the GoMEX and Mississippi River proposed action area.

Whooping cranes nest in northwestern Canada and areas adjacent to Alberta, which is outside of the proposed action areas. The only naturally occurring, self-sustaining population is the Aransas/Wood Buffalo population (U.S Fish and Wildlife Service 2007b). During nesting, whooping cranes use poorly drained, soft-bottomed, shallow-water wetlands. During migration, whooping cranes will feed in a variety of croplands. They typically use inland shallow freshwater wetlands near their feeding grounds as roosting habitat. Cranes overwinter along the Texas Gulf Coast primarily within estuarine marshes and tidal flats of the Aransas National Wildlife Refuge (U.S Fish and Wildlife Service 2012b). Breeding occurs outside of the proposed action areas in the Wood Buffalo National Park in Canada.

Whooping cranes are omnivorous, feeding on a variety of plants, insects and other animals. In the winter, when the whooping crane may occur within the GoMEX and Mississippi River proposed action area, they primarily feed on crabs, clams, and the wolfberry plant (*Lycium carolinianum*). Whooping cranes primarily forage in bays, marshes, or sand flats (U.S Fish and Wildlife Service 2007b).

3.4.8.1.2.14 Wood Stork

The wood stork (*Mycteria americana*) was listed as endangered under the ESA in 1984 (49 FR 7332; February 28, 1984) and reclassified to threatened in 2014 (79 FR 37077; June 30, 2014). There is currently no critical habitat designated for this species. The species may be found within the USEC-South proposed action area.

Wood storks prefer freshwater and estuarine habitats across the southeastern United States and can be found year-round (Coulter 2020). Nests are typically constructed in medium to tall trees adjacent to these aquatic environments (U.S Fish and Wildlife Service 1996). In 2006, a survey was conducted in the southeastern United States to determine the number of nesting pairs in the region. 11,279 pairs were documented, marking the first time the population was greater than 10,000 pairs since the 1960s (U.S Fish and Wildlife Service 2007c).

Wood storks are seasonally monogamous, forming a new breeding pair every breeding season. The timing of egg laying varies based on geographic distribution. Wood storks in Florida lay eggs between October and June, while storks in Georgia and South Carolina lay from March to May. Two to five eggs are usually laid, with females laying just one clutch per season (U.S Fish and Wildlife Service 1996).

Feeding primarily on fish, wood storks hunt for prey by touch. This tactile feeding allows the wood stork to hunt for prey when murky wetland waters limit hunting solely by sight (Coulter 2020). Raccoons are common predators of fledglings and account for nest loss (U.S Fish and Wildlife Service 1996).

3.4.8.2 Environmental Consequences to Birds

Impacts to birds would potentially result from vessel noise, pile driving noise, vessel movement, construction, brushing, and tow lines associated with the Proposed Action. As discussed in Table 3-3, ATON signal testing noise and tool noise may startle birds and cause them to flush from an area. They would be expected to return after the disturbance has concluded. As discussed in Table 3-3, impacts to birds from brushing, ATON retrieval devices, and tow lines would be minimal, causing disturbance and potentially a behavioral response only while in use. In addition, the risk of a bird becoming entangled in an ATON retrieval devices or tow line would be negligible. There would be no impact to birds from fathometer and Doppler speed log noise, bottom devices, pile driving, or unrecovered jet cone moorings. It is unlikely that bottom devices, such as anchors, spuds, and sinkers, would impact birds because even those species that dive or swim spend only a short duration of time diving underwater. Therefore, these stressors will not be discussed further in this PEIS.

3.4.8.2.1 Vessel Noise

Depending on the species, birds could be exposed to both in-air noise and in-water noise generated by vessels. As noted in Appendix E, most birds have been reported to hear best in air between 1 and 3 kHz

(Crowell et al. 2015a) and underwater from 1–4 kHz, though this is less well studied. As discussed in Section 2.2.4, large vessels, like the WCC, would be expected to emit vessel noise with a frequency range of 20–300 Hz with a source level of 190 dB re 1 µPa at 1 m. Small vessels, like the cutter small boat, would be expected to emit vessel noise with a frequency range of 1–7 kHz with a source level of 175 dB re 1 µPa at 1 m.

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

Bird presence would vary depending on vessel location. In the unlikely event that a seabird overlaps with the Proposed Action, exposure to underwater vessel noise is expected to be temporary because the vessels typically remain in motion and seabirds spend a limited amount of time under water. Vessel noise may also cause startle responses and a temporary displacement of birds from an area. However, any behavioral response to vessel noise would be expected to be temporary and birds would be expected to return to the area once the source of disruption has moved away.

Although vessel presence temporarily raises the ambient levels of sound in any given area (Hildebrand 2009), it would be expected that vessel noise associated with the Proposed Action would be similar to vessel noise from other ships operating in the area. Therefore, the WCC vessels would not be expected to alter current levels of ambient sound because the new WCC fleet would be replace the current, aging WCC fleet. Vessel noise associated with the Proposed Action may affect individual birds within the proposed action areas; however, responses to vessel noise would be short term and insignificant behavioral responses, and thus, would not be expected to have any population level impacts.

Any increase in ambient noise as a result of a WCC would be temporary and localized to the position of the vessel as it moves throughout the proposed action areas. Birds are either not likely to respond to vessel noise or are not likely to respond in ways that would significantly disrupt normal behavior patterns which include, but are not limited to, migration, breeding, feeding, or sheltering. Coast Guard would follow SOPs (Appendix B) to maintain properly trained lookouts and would not purposefully approach large flocks of birds, particularly those that are molting and unable to fly. Because vessel noise is low frequency and located at the edge of the hearing range of most birds, the effects of vessel noise would be expected to be limited to temporary behavioral effects and birds would be expected to return to normal behavior within minutes of a disruption.

3.4.8.2.2 Pile Driving Noise

Birds in the proposed action areas may be exposed to pile driving noise associated with ATON maintenance, establishment, and discontinuance during the Proposed Action. The noise from pile driving may be detected by birds in air most frequently, as that is where most species spend the majority of their time. However, pile driving noise could also be detected by birds underwater.

As noted in Appendix E, most birds have been reported to hear best in air between 1 and 3 kHz (Crowell et al. 2015a) and underwater from 1–4 kHz, though this is less well studied. Because the majority of energy in the pile driving pulses is at frequencies below 500 Hz, it is below the range of best hearing for birds—both in air and underwater. Due to the short duration of pile driving noise and the ability of birds to move away from pile driving activities, it would be assumed that reactions would be limited to short term startle responses, which may cause temporary displacement from the location in which pile driving is occurring.

Any increase in ambient noise as a result of pile driving activities would be temporary and localized to the position of the pile. Birds are either not likely to respond to pile driving 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. Because pile driving noise is low frequency and located at the edge of the hearing range of most birds, the effects of pile driving noise would be expected to be limited to temporary behavioral effects and birds would be expected to return to normal behavior within minutes of a disruption.

3.4.8.2.3 Vessel Movement

Birds in the proposed action areas may be exposed to vessel movement associated with WCCs and cutter small boats during the Proposed Action. While it is difficult to differentiate between behavioral responses to vessel sound and visual cues associated with the presence of a vessel (Hazel et al. 2007a), vessel noise is outside the range of best hearing of most birds. However, it is assumed that both play a role in prompting reactions from animals. Due to the maneuverability of birds in both air and water, it is extremely unlikely that a bird would be struck by a vessel as it moves through the proposed action areas. Regardless of vessel speeds, vessel collisions with birds are possible, particularly during periods of reduced visibility or reduced mobility of the bird. The likelihood of collision with a bird species flying at higher altitudes would be lower than species that fly closer to the water's surface. In the unlikely event that a vessel collided with a bird, an individual impact would not result in population level impacts.

The most likely impact to birds as a result of vessel movement is behavioral response. 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. As operational speeds are slow and thus vessels would be slow moving, vessel movement is not expected to cause more than short term behavioral responses in birds. Birds are either not likely to respond to vessel movement or are not likely to respond in ways that would significantly disrupt normal behavior patterns which include, but are not limited to, migration, breeding, feeding, or sheltering.

Vessel presence would be diffuse and spread throughout the proposed action areas. As a result, any response caused by the Proposed Action would be limited to a behavioral disturbance, which would be temporary and localized to the position of the vessel. Coast Guard would follow SOPs (Appendix B) to maintain properly trained lookouts and would not purposefully approach large flocks of birds, particularly those that are molting and unable to fly.

3.4.8.2.4 Construction

Impacts to birds would be from the construction and maintenance of fixed ATON structures. These activities have the potential to impact birds by causing disturbance, which may result in behavioral responses by birds. Similar to their responses to vessel movement (Section 3.4.8.2.3), it is assumed that the most likely response of a bird to any disturbance is flushing from the area. However, short term behavioral responses to disturbance are not expected to result in long term impacts to individuals (such as chronic stress) or populations in the proposed action areas, given the diffuse fixed ATON structures spread throughout the proposed action areas. Avoidance of increased activity during the short duration of construction within an overall small footprint of disturbance is unlikely to cause abandonment or significant alteration of behavioral patterns.

3.4.8.2.5 Brushing

Birds located at the site of a fixed ATON structure ashore, or close to shore, where brushing would take place could be directly impacted by being disturbed or crushed, or directly or indirectly impacted by chemicals used in brushing, such as herbicides or pesticides. WCC brushing operations are dispersed across the proposed action areas and the footprint in which fixed ATON structures undergo brushing is very small compared to the overall size of the proposed action areas.

ATON brushing operations fall under the Coast Guard CATEX for ATON operations (CATEX L38). The Coast Guard follows best management practices (U.S. Coast Guard 2017a) when conducting brushing operations, such as site surveys prior to arrival and commencing work. In clearing vegetation and sediment away in order to construct or maintain an ATON, a small percentage of habitat may also be lost. No significant loss of habitat would occur, as vegetation would have the potential to regrow and would only impact a small percentage of habitat that is available to birds within each proposed action area. It is also a best management practice, per the brushing manual, to know about any potential ESA-listed birds that may be on site prior to arrival and to avoid damaging these species during brushing activities. Due to the large size of the proposed action area, the small footprint of the fixed ATON structures, and the Coast Guard's best management practices (Appendix B), no long term population level impacts to birds would be expected.

The brushing of fixed ATON structures has the potential to impact birds by causing behavioral responses on land or water. These would be similar to those described in Section 3.4.8.2.3. Because brushing activities would occur infrequently at each site, it would not be expected that behavioral responses would respond in ways that would significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering.

ESA-listed birds may be affected by brushing activities. However, due to the low density of these ESA-listed species and the temporary presence of the team conducting these activities within any proposed action area, overlap between ESA-listed birds and brushing would be minimal. Therefore, brushing may cause short term, temporary behavioral responses, but these responses would not likely disrupt normal behaviors such as breeding, feeding, or sheltering. Brushing would not cause population level impacts to ESA-listed amphibians.

3.4.8.2.6 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, impacts to birds within the proposed action areas would be similar to what is currently present because the new WCC fleet would replace the capabilities of the existing inland tender fleet. In addition, WCC assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include the use of vessels and pile driving devices, as well as construction activities. Impacts to birds from the Proposed Action would be limited to small areas around fixed ATON structures, and the disturbance to birds would be intermittent and brief in duration. Therefore, there would be no significant impact to birds as a result of Alternative 1.

Pursuant to the ESA, there would be no effect to ESA-listed birds as a result of fathometer and Doppler speed log noise, bottom devices, pile driving, or unrecovered jet cone moorings. Vessel noise, pile driving noise, vessel movement, construction, brushing, and tow lines associated with the Proposed Action may affect, but are not likely to adversely affect ESA-listed birds (Table 3-33). Additionally, Alternative 1 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed birds (Section 3.4.12.2.6).

3.4.8.2.7 Impacts Under Alternatives 2–3

Under Alternatives 2–3, impacts to birds within the proposed action areas would be similar to what is currently present because ship platforms would replace the capabilities of the existing inland tender fleet. In addition, ship platforms and their assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include the use of vessels and pile driving devices, as well as construction activities. Impacts to birds from the Proposed Action would be limited to small areas around fixed ATON structures, and the disturbance to birds would be intermittent and brief in duration. Therefore, there would be no significant impact to birds as a result of Alternatives 2–3.

As discussed in Section 3.4.8.2.6, pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect ESA-listed birds (Table 3-33). Additionally, Alternatives 2–3 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed birds (Section 3.4.12.2.6).

3.4.8.2.8 Impacts Under the No Action Alternative

Under the No Action Alternative, as the existing inland tender fleet is decommissioned and not replaced, the physical and acoustic stressors associated with the Proposed Action would not be introduced into the environment. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impacts to birds with implementation of the No Action Alternative.

3.4.9 Reptiles

3.4.9.1 Affected Environment

All reptiles are cold-blooded animals that have adopted different strategies to use external sources of heat to regulate body temperature. They control their body temperature by basking in the sun or moving to areas with warmer or cooler air and water temperatures. There is a wide distribution of reptiles in the proposed action areas, with a small example of species listed in Table 3-34.

In general, a variety of reptiles may be present near sources of water, including rivers of the proposed action areas. Some have a marine habitat and others may have a combination of estuarine and freshwater/terrestrial habitats. Reptiles that belong to the orders Testudines (turtles), Crocodilia (alligators and crocodiles), and Squamata (snakes and lizards) may be present within the proposed action areas (Table 3-34).

3.4.9.1.1 Major Groups of Reptiles within the Proposed Action Areas

All orders of reptiles are present throughout the proposed action areas (Table 3-34) and are discussed in further detail below. Representative species from each order of reptiles would be expected in the proposed action areas and would inhabit a variety of marine, estuarine, freshwater, and terrestrial environments.

Table 3-34. Major Groups of Reptiles in the Proposed Action Areas

Taxonomic Order	*Examples of Species Present*[1]	*Proposed Action Area(s)*	*Distribution*
Testudines	Snapping turtle (*Chelydra serpentina*) Chicken turtle (*Deirochelys reticularia)* Eastern box turtle (*Terrapene carolina)* Eastern mud turtle (*Kinosternon subrubrum)* Pond slider (*Trachemys scripta)* Green sea turtle (*Chelonia mydas*)	Aquatic turtles: USEC-MidATL; USEC-South; Great Lakes; GoMEX and Mississippi River; PNW Sea turtles: USEC-MidATL; USEC-South; GoMEX and Mississippi River; SEAK Tortoises: None	Aquatic turtles: in and near water sources such as rivers and ponds Sea turtles: in the ocean and nesting beaching Tortoises: terrestrial
Crocodilia	American alligator (*Alligator mississippiensis*) American crocodile (*Crocodylus acutus*)	Alligators: USEC-South Crocodiles: USEC-South; GoMEX	Fresh and brackish waters. Nest on land.
Squamata	Rough greensnake (*Opheodrys aestivus*) Six-lined racerunner (*Aspidoscelis sexlineata)* Eastern hog-nosed snake (*Heterodon platirhinos*) Northern alligator lizard (*Elgaria coerulea)* Common five-lined skink (*Plestiodon fasciatus)*	Snakes: All Lizards: USEC-MidATL; USEC-South; GoMEX and Mississippi River; PNW Worm Lizards: None	Snakes: Could be terrestrial or aquatic. Eggs on land. Lizards: terrestrial, but utilize freshwater habitats Worm lizards: Underground

[1] There are examples of species present in freshwater areas of the proposed action areas. Listed examples are representative examples, not necessarily representing all proposed action areas.

3.4.9.1.1.1 Testudines

Order Testudines includes species of turtles, tortoises, and terrapins. ESA-listed sea turtles in the order Testudines may be present in many proposed action areas and both ESA and non-ESA-listed aquatic and terrestrial turtles and tortoises may occur in any of the proposed action areas as well, as reflected in the representative examples in Table 3-34. Further information regarding sea turtles can be found in Section 3.4.9.1.2. The remainder of this section focuses on estuarine, freshwater, and terrestrial Testudines. As the proposed action areas cover a large portion of the United States, turtles and tortoises of the order Testudines are discussed broadly. Various species from this order are expected throughout each of the proposed action areas.

Turtle species richness is highest in Southeast Asia, northern India, and the southeastern United States. Turtle diversity is so rich in the southeast, that if the states of Alabama, Florida, Georgia, Louisiana, Mississippi, and Texas were counted as individual nations they would rank on the global list of species richness (Rhodin and van Dijk 2010). Turtles inhabit a wide variety of habits including lakes, river, ponds, streams, wetlands, and estuaries throughout the United States. Tortoises are common in terrestrial habitats including rainforests, coastal dunes, and deciduous forests (Animals Network Team 2018). These habitats are outside the proposed action areas and overlap would be occasional; therefore, tortoises are not considered for further analysis in this PEIS. Testudines lay eggs in a sand or mud nest and hatchings are fully dependent after hatching. They may feed on fish, frogs, snakes, small mammals, birds, grasses, reeds, algae and roots, though diet depends on species and habitat.

3.4.9.1.1.2 Crocodilia

There are two members of the order Crocodilia found within the USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas: the American alligator and American crocodile. Both are ESA-listed and are therefore discussed in Section 3.4.9.1.2.

3.4.9.1.1.3 Squamata

The order Squamata is comprised of lizards, snakes, and worm lizards. Many species of the order Squamata may be present in the proposed action areas, as reflected in the representative examples in Table 3-34. There is one worm lizard in the United States, present in Florida—the Florida worm lizard (Rhineura floridana). However, because worm lizards live underground, they would not likely be present during the Proposed Action. Therefore, worm lizards are not considered for further analysis in this PEIS.

Snakes can be find in a variety of both terrestrial and aquatic habitats around the world including deserts, rainforests, woodlands, meadows, rivers, lakes, and the ocean (Animal Network Team 2018). While all snakes can swim, some, such as sea snakes, are better adapted for aquatic life. Aquatic snakes may be found predominantly in fresh water or salt water (i.e., sea snakes). Lizards can also live in a variety of terrain including in vegetation, among rocks, and in pine forests (Bradford 2016). While no lizard species is fully aquatic, many regularly utilize freshwater habitats. Some snake species lay eggs, other snake species develop eggs within their bodies (Animal Network Team 2018). All reptiles that lay eggs do so on land. Lizards also are capable of laying eggs or bearing live young, depending on the species (Bradford 2016). Snakes prey on rodents, birds, eggs, frogs, and other animals, depending on the species of snake (Animal Network Team 2018). Lizards' diets vary greatly depending on species. Carnivorous lizards eat ants, spiders, small mammals, and other lizards. Herbivorous lizards eat plants, including algae, fruits, leaves, and vegetables. There are also omnivorous lizards that eat both (Bradford 2016).

3.4.9.1.2 ESA-Listed Reptiles

There are 14 ESA-listed reptiles that may be present within the proposed action areas (Table 3-35). Sections 3.4.9.1.2.1 through 3.4.9.1.2.14 describe the presence of estuarine, freshwater, and marine ESA-reptiles that overlap with the waterways of the proposed action areas.

Table 3-35. ESA-Listed Reptiles in the Proposed Action Areas

Common Name (Scientific Name)	*ESA Listing Status*	*Distribution*			*Proposed Action Area Occurrence*	*Critical Habitat in the Proposed Action Areas*
		Marine	*Estuarine*	*Fresh Water or Terrestrial*		
Estuarine and Freshwater						
Alabama red-bellied turtle (*Pseudemys alabamensis*)	Endangered (52 FR 22939; June 16, 1987)		x		GoMEX and Mississippi River	N/A
American alligator (*Alligator mississippiensis*)	Endangered (52 FR 21059; June 4, 1987)		x	x	USEC-South	N/A
American crocodile (*Crocodylus acutus*)	Threatened (in FL; 40 FR 44149; September 25, 1975)		x		USEC-South	Yes (42 FR 47840; September 22, 1977)
Atlantic salt marsh snake (*Nerodia clarkii taeniata*)	Threatened (42 FR 28165; June 2, 1977)		x		USEC-South	N/A
Bog turtle (*Clemmys muhlenbergii*)	Threatened (62 FR 59605; November 4, 1997)			x	USEC-MidATL and USEC-South	N/A
Eastern massasauga rattlesnake (*Sistrurus catenatus*)	Threatened (81 FR 67193; September 30, 2016)			x	Great Lakes and GoMEX and Mississippi River	No
Ringed map turtle (*Graptemys oculifera*)	Threatened (51 FR 45907; December 23, 1986)			x	GoMEX and Mississippi River proposed action area.	N/A

Common Name (Scientific Name)	***ESA Listing Status***	***Distribution***			***Proposed Action Area Occurrence***	***Critical Habitat in the Proposed Action Areas***
		Marine	***Estuarine***	***Fresh Water or Terrestrial***		
Yellow-blotched map turtle (*Graptemys flavimaculata*)	Threatened (56 FR 1459; January 14, 1991)			x	GoMEX and Mississippi River	N/A
Marine						
Green sea turtle (*Chelonia mydas*)	East Pacific DPS: Threatened (81 FR 20057; April 6, 2016)	x			SEAK	No
	North Atlantic DPS: Threatened (81 FR 20057; April 6, 2016)				USEC-MidATL; USEC-South SEAK	No
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered (35 FR 8491; June 2, 1970)	x			USEC-MidATL; USEC-South; GoMEX and Mississippi River	No
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered (35 FR 18319; December 2, 1970)	x			USEC-MidATL; USEC-South; GoMEX and Mississippi River	N/A

Common Name (Scientific Name)	***ESA Listing Status***	***Distribution***			***Proposed Action Area Occurrence***	***Critical Habitat in the Proposed Action Areas***
		Marine	***Estuarine***	***Fresh Water or Terrestrial***		
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered (35 FR 8491; June 2, 1970) No DPSs; however a Northwest Atlantic DPS is under review	x			USEC-MidATL; USEC-South; GoMEX and Mississippi River; SEAK	No
Loggerhead sea turtle (*Caretta caretta*)	North Pacific Ocean DPS: Endangered (76 FR 58868; September 22, 2011)	x			SE AK	No
	Northwest Atlantic Ocean DPS: Threatened (76 FR 58868; September 22, 2011)				USEC-MidATL; USEC-South; GoMEX and Mississippi River	Yes (79 FR 39855; July 10, 2014)
Olive ridley sea turtle (*Lepidochelys olivacea*)	All other populations (43 FR 32800; July 28, 1978)	x			USEC-South	N/A

Common Name (Scientific Name)	*ESA Listing Status*	*Distribution*			*Proposed Action Area Occurrence*	*Critical Habitat in the Proposed Action Areas*
		Marine	*Estuarine*	*Fresh Water or Terrestrial*		
	Not Mexico's breeding population: Threatened (43 FR 32800; July 28, 1978)					

3.4.9.1.2.1 Alabama Red-Bellied Turtle

The Alabama red-bellied turtle (*Pseudemys alabamensis*) was listed as endangered under the ESA in 1987 (52 FR 22939; June 16, 1987). There is no critical habitat designated for this species. The Alabama red-bellied turtle may be present within the GoMEX and Mississippi River proposed action area.

Little is known about the lifestyle of Alabama red-bellied turtles. They inhabit fresh to brackish waters, river channels, and salt marsh areas (Animalia 2018; Tortoise & Freshwater Turtle Specialist Group 1996) and lay their eggs on dry land (Animalia 2018). They are diurnal and spend most of the time foraging in vegetation or basking on logs. When disturbed, especially while basking, these turtles will quickly submerge underwater. They are found in Mobile Bay, Alabama (Animalia 2018; Tortoise & Freshwater Turtle Specialist Group 1996), which overlaps with the GoMEX and Mississippi River proposed action area. The basis of their diet is aquatic plants (McDowell 2017).

3.4.9.1.2.2 American Alligator

The American alligator (*Alligator mississippiensis*) was listed as endangered in 1967 (52 FR 21059; June 4, 1987). In 1987, the USFWS pronounced the American alligator population as fully recovered, and the species was removed from the endangered species list. While the American alligator population is now secure, it is still protected under the ESA as threatened due to similarity of appearance to the threatened American crocodile in areas where there two species overlap, specifically in the Florida portion of the USEC-South proposed action area. Therefore, the ESA-listed American alligator may be present in the USEC-South proposed action area. There is currently no critical habitat designated for the American alligator.

American alligators are found throughout the Atlantic and Gulf Coasts of the United States, with their range extending from Texas through Florida to North Carolina (U.S. Fish and Wildlife Service 2008). Alligators live in swampy areas, slow-moving rivers, marshes, streams, lakes, and ponds. Important habitat characteristics for the American alligator include vegetative cover along the shoreline and water clarity (Smith et al. 2016). Alligators are primarily freshwater animals, but also venture into brackish water (Conant and Collins 1991; Reid 1967; Savannah River Ecology Laboratory University of Georgia 2012). While alligators move quickly in the water, they are slow-moving on land (U.S. Fish and Wildlife Service 2008). The American alligator is active year-round, but is most active in the warmer months (Savannah River Ecology Laboratory University of Georgia 2012). Breeding occurs at night in shallow ponds, streams, and wetland waters (Reid 1967). Courtship and mating take place during the spring warming period (typically April and May), and nesting and egg-laying is initiated during the early part of the warm, wet summers (Briggs-Gonzalez et al. 2017; Vliet 2001). Females build nests in sheltered areas in or near the water using vegetation, sticks, leaf debris, and mud (Conant and Collins 1991). Adult alligators consume fish, turtles, birds, snakes, frogs, small mammals, and snails. Young alligators feed on insects and crustaceans in addition to small fish and snails. Young alligators feed on insects and crustaceans in addition to small fish and snails (Conant and Collins 1991).

3.4.9.1.2.3 American Crocodile

The American crocodile (*Crocodylus acutus*) was listed as threatened in Florida under the ESA in 1975 (40 FR 44149; September 25, 1975) and listed as endangered in 2007 everywhere else they may occur (72 FR 13027; March 20, 2007). Critical habitat was designated in 1977 (42 FR 47840; September 22, 1977) in southern Florida and was revised in 2000 (50 CFR 1-199; October 1, 2000). Critical habitat for the American crocodile is within the USEC-South proposed action area and is discussed in Section 3.4.12.1.7. The American crocodile may be present in the USEC-South and GoMEX and Mississippi River proposed action areas.

Crocodilians are also long-lived reptiles whose life spans can exceed 40 years in the wild. American crocodile inhabits freshwater wetland habitats including rivers, lakes, and reservoirs, and can also be found in brackish environments such as estuaries and swamps (Fishman et al. 2009) due to the presence of salt glands that remove excess salt from their bodies (Nifong and Silliman 2017). Crocodiles depend on brackish and freshwater estuarine wetland types, where there is sufficient water to use as concealment for hunting and stalking of prey.

Crocodiles are territorial, but will gather in groups as juveniles (as a defense against predators), and as adults when feeding or exhibiting courtship behavior (Hidalgo-Ruz et al. 2012; National Park Service 2012). Nesting habitats are on dry land, with eggs deposited in holes dug in soft mud and sediments (Britton 2009).

3.4.9.1.2.4 Atlantic Salt Marsh Snake

The Atlantic salt marsh snake (*Nerodia clarkii taeniata*) is listed as threatened under the ESA (42 FR 28165; June 2, 1977). There is no critical habitat designated for this species. The Atlantic salt marsh snake may be present in the USEC-South proposed action area.

Atlantic salt marsh snakes inhabit coastal salt marshes and mangroves, particularly in shallow tidal creeks and pools in Florida (North Florida Ecological Services Office 2018). They most often have been found in association with saltwort flats and salt grass-bordered tidal creeks (U.S. Fish & Wildlife Service n.d.). These snakes were historically present in coastal areas of Volusia, Brevard, and Indian River Counties in Florida, but currently are restricted to a limited coastal strip in Volusia County (North Florida Ecological Services Office 2018; U.S. Fish & Wildlife Service n.d.). They feed on small fishes that become trapped in the shallow water at low tide (Moler 1992).

3.4.9.1.2.5 Bog Turtle

The bog turtle (*Clemmys muhlenbergii*) was listed as threatened throughout its range under the ESA in 1997 (62 FR 59605; November 4, 1997). The northern population of bog turtles ranges from New York to Maryland. The southern population, which occurs in the Appalachian Mountains from Virginia to Georgia, is listed as threatened due to similarity of appearance to the northern population. There is no critical habitat designated for this species. The bog turtle may be present in the USEC-MidATL and USEC-South proposed action areas.

Bog turtles inhabit open emergent scrub/shrub wetlands, including sphagnum bogs and swamps. They prefer soft, muddy bottoms with low grasses, sedges, and slow-moving water (U.S. Fish & Wildlife Service 2010). Bog turtles are not typically found in rivers, but rather in areas with a low volume of standing or slow-moving water, which forms a network of shallow pools and rivulets. Bog turtles typically retreat into densely vegetated areas to hibernate from mid-September through mid-April (U.S Fish and Wildlife Service 2020a). Eggs are often laid in elevated areas. Their diet consists of insects, snails, worms, seeds, and carrion (U.S. Fish & Wildlife Service 2010).

3.4.9.1.2.6 Eastern Massasauga Rattlesnake

The Eastern massasauga rattlesnake (*Sistrurus catenatus*) is listed as threatened under the ESA (81 FR 67193; September 30, 2016). There is no critical habitat designated for this species. The eastern massasauga rattlesnake may be present in the Great Lakes and GoMEX and Mississippi River proposed action areas.

The range of the eastern massasauga rattlesnake includes parts of Illinois, Indiana, Iowa, Michigan, New York, Ohio, Pennsylvania, and Wisconsin. They inhabit a variety of wetland habitats including bogs, fens, scrub swamps, wet meadows, marshes, moist grasslands, wet prairies, and floodplain forests. Habitat use also depends upon the season, generally using wetlands in the spring, fall, and winter, and migrating upland to drier sites in the summer. Furthermore, the eastern massasauga rattlesnake typically hibernates in wetlands in crayfish or small mammal burrows, depending on water there that does not freeze (U.S. Fish & Wildlife Service 2020b).

They primarily feed on small mammals includes moles, mice, and shrews. They also eat other snake species, birds, and frogs (U.S. Fish & Wildlife Service 2020b).

3.4.9.1.2.7 Ringed Map Turtle

The ringed map turtle (*Graptemys oculifera*) is listed as threatened throughout its range under the ESA (51 FR 45907; December 23, 1986). There is no critical habitat designated for this species. The ringed map turtle may be present in the GoMEX and Mississippi River proposed action area.

Ringed map turtles are endemic to the Pearl River system in Mississippi River system in Mississippi and Louisiana and found in the lowest reaches of the Bougue Chitto River (Bonasia 2020). Ringed map turtles prefer wide rivers with clay or sandy bottoms with moderate to strong currents. They bask on fallen trees and debris. They spend several hours basking, both in groups and individually. Eggs are laid in terrestrial areas on sandbars adjacent to river channels (Bonasia 2020; Ernst et al. 1994).

Ringed map turtles are omnivores, feeding on vegetation on the undersides of logs, such as algae and flowers. They also eat a variety of insects (Bonasia 2020; Ernst et al. 1994).

3.4.9.1.2.8 Yellow-Blotched Map Turtle

The yellow-blotched map turtle (*Graptemys flavimaculata*) is listed as threatened under the ESA (56 FR 1459; January 14, 1991). There is no critical habitat designated for this species. The yellow-blotched map turtle may be present in the GoMEX and Mississippi River proposed action area.

Yellow-blotched map turtles are only found in the Pascagoula River system in Mississippi (Turtle Source LLC. 2010). Their habitat is sandy or mud-bottom rivers with dead trees and branches protruding into the water where they can bask (Tennessee Aquarium 2020). Aside from basking, they spend most of their time in the water (Carvajal 2020). Their diet consists of aquatic insects and small crustaceans (Tennessee Aquarium 2020).

3.4.9.1.2.9 Green Sea Turtle

The green sea turtle (*Chelonia mydas*) was first listed under the ESA in 1978 (43 FR 32800; July 28, 1978). In 2016, the species was reclassified into 11 DPSs (81 FR 20057; April 6, 2016). The DPSs of green sea turtles are: North Atlantic, Mediterranean, South Atlantic, Southwest Indian, North Indian, East Indian-West Pacific, Central West Pacific, Southwest Pacific, Central South Pacific, Central North Pacific, and East Pacific. Two DPSs of green sea turtles, both of which are listed as threatened under the ESA, may occur within the proposed action areas and are listed in Table 3-35. Critical habitat has been designated in the waters surrounding Puerto Rico (63 FR 46693; September 2, 1998) and is outside of the proposed action areas. The green sea turtle may be present in the USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas. The green sea turtle may be present rarely in the SEAK proposed action area.

The green sea turtle is distributed worldwide across tropical and subtropical coastal waters generally between 45 degrees North (°N) and 40 degrees South (°S). After emerging from the beach nest, green sea turtle hatchlings swim to offshore areas where they float passively in major current systems; however, laboratory and modeling studies suggest that dispersal trajectories might also be shaped by active swimming (Christiansen et al. 2016; Putman and Mansfield 2015). At the juvenile stage (estimated at five to six years), they leave the floating Sargassum habitats of the open ocean and retreat to protected lagoons and open coastal areas that are rich in seagrass or marine algae (Bresette et al. 2006) where they will spend most of their lives (Bjorndal and Bolten 1988). The optimal developmental habitats for late juveniles and foraging habitats for adults are warm shallow waters (10–16 ft [3–5 m]), with abundant submerged aquatic vegetation and close to nearshore reefs or rocky areas (Holloway-Adkins 2006; Seminoff et al. 2015; Seminoff et al. 2002).

In the Atlantic Ocean, the highest concentration of nesting is in along the Yucatán Peninsula, outside of the proposed action area; however, there is nesting the USEC-South proposed action area. Green sea turtles are known to live in the open ocean waters of the Gulf Stream and North Atlantic Gyre during the first five to six years of life, but little is known about preferred habitat or general distribution during this life phase. Green sea turtle post-hatchling and juvenile foraging grounds in the North Atlantic range from coral or nearshore reefs and seagrass beds, to inshore bays and estuaries (Bresette et al. 1998; Plotkin and Amos 1988). In the western North Atlantic, juvenile green sea turtles typically forage as far north as Cape Cod Bay, Massachusetts since their distribution is limited by water temperature.

In the Pacific Ocean, while the most common occurrence of green sea turtles is south of San Diego, CA, there is a rare occurrence in the SE AK proposed action area, with just 15 green sea turtle sightings since 1960 (Alaska Department of Fish and Game 2020b). Furthermore, while they may be found coastally in the PNW, the PNW proposed action area is limited to the Columbia River. If green sea turtles are very rare in this area, if they are spotted, it is because they have stranded (KVAL News Staff 2017).

The green sea turtle is the only species of sea turtle that, as an adult, primarily consumes plants and other types of vegetation (Mortimer 1995; Nagaoka et al. 2012), mainly foraging on seagrasses and algae. While primarily herbivorous, a green sea turtle's diet changes substantially throughout its life. Very young green sea turtles are omnivorous (Bjorndal 1997). Research indicates that green sea turtles in the open ocean and in coastal waters also consume jellyfish, sponges, and sea pens (Hatase et al. 2006; Seminoff et al. 2015).

The loss of eggs to land-based predators such as mammals, snakes, crabs, and ants occurs on some nesting beaches. As with other sea turtles, hatchlings may be preyed upon by birds and fish. Sharks are the primary nonhuman predators of juvenile and adult green sea turtles at sea (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991; Seminoff et al. 2015).

3.4.9.1.2.10 Hawksbill Sea Turtle

The hawksbill sea turtle (*Eretmochelys imbricata*) is listed as a single population and is classified as endangered under the ESA (35 FR 8491; June 2, 1970). Hawksbill sea turtles are the most tropical of all sea turtles, inhabiting tropical and subtropical seas of the Atlantic and Pacific Oceans, rarely occurring above 35 °N or below 30 °S (Seminoff et al. 2003). Critical habitat has been designated (63 FR 46693; September 2, 1998) in the waters surrounding Puerto Rico in the Caribbean Sea, which is outside of the proposed action areas. This species may occur in GoMEX and Mississippi River, USEC-MidATL, and USEC-South proposed action areas.

As southern California is their northernmost extent in the Pacific, hawksbill sea turtles would not be expected in the PNW or SEAK proposed action areas. The species is widely distributed in the western Atlantic Ocean. While hawksbill sea turtles are known to occasionally migrate long distances in the open ocean, they are primarily found in coastal habitats and use nearshore areas more exclusively than other sea turtles. Hawksbills have a mixed migratory strategy—some will migrate long distances (up to 1,200 mi [1,931 km]) between nesting beaches and foraging areas, while other hawksbill populations will stay within 50–200 mi (80–322 km) of their rookery. Hatchlings are believed to occupy the oceanic zone where water depths are greater than 656 ft (200 m), associating themselves with surface algal mats of Sargassum spp. Juveniles leave the open ocean habitat after three to four years and settle in coastal foraging areas (Mortimer and Donnelly 2008).

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

The largest nesting population of hawksbill turtles is believed to be in Australia and Solomon Islands (U.S. Fish and Wildlife Service 2018), which is outside of the proposed action areas. No nesting occurs on the West Coast of the United States. Roughly 20–30 percent of the world’s population nests in the Caribbean, outside of the proposed action areas (U.S. Fish and Wildlife Service 2018). Hawksbill sea turtles also nest in low densities on the coast of Florida, which is in the USEC-South proposed action area. In the Gulf of Mexico, rare hawksbill sea turtle sightings occur in waters off the Florida Panhandle, Alabama, Mississippi, Louisiana, and Texas (Rester and Condrey 1996; Seminoff et al. 2003); these individuals are more likely to be early juveniles born on nesting beaches in Mexico that have drifted north with the dominant currents (National Marine Fisheries Service and United States Fish and Wildlife Service 1993).

3.4.9.1.2.11 Kemp's Ridley Sea Turtle

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

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

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

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

3.4.9.1.2.12 Leatherback Sea Turtle

The leatherback sea turtle (*Dermochelys coriacea*) is listed as endangered under the ESA (35 FR 8491; June 2, 1970). Critical habitat for leatherback sea turtles has been designated in the Atlantic Ocean off of the U.S. Virgin Islands (44 FR 17710; March 23, 1979), outside of the proposed action areas. The leatherback sea turtle may be present in the USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas. Leatherback sea turtles may be present in the SEAK proposed action area, but are considered rare visitors.

The leatherback sea turtle is distributed worldwide in tropical and temperate waters of the Atlantic, Pacific, and Indian Oceans. Important nesting areas in the western Atlantic Ocean occur in Florida, which is in the USEC-South proposed action area, and in St. Croix, Puerto Rico, Costa Rica, Panama, Colombia, Trinidad and Tobago, Guyana, Suriname, French Guiana, and southern Brazil (Bräutigam et al. 2006; Márquez-Millán 1990; Spotila et al. 1996), outside of the proposed action areas. Leatherback nesting season begins in March in the more northern nesting habitats (e.g., Florida) and continues through July or August in the more southern nesting habitats (e.g., Puerto Rico). Migrations of leatherbacks between nesting seasons were typically to the north towards more temperate latitudes, which support high densities of jellyfish prey in the summer (James et al. 2005b). Females usually nest every other year, during March and April, and may not migrate as far north as males during breeding years (Payne and Selzer 1986).

After two to seven years, leatherback sea turtles move into more coastal, nearshore habitats. It is during this coastal juvenile stage that leatherback sea turtles may be present in the Gulf of Mexico. Adult leatherback sea turtles migrate farther and venture into colder water more so than any other sea turtle (Goff and Lien 1988). The evidence currently available from tag returns and strandings in the western Atlantic suggests that adults engage in routine migrations between boreal, temperate, and tropical waters, presumably to optimize both foraging and nesting (Schoelkopf 1982). Adult leatherbacks are able to tolerate a wide range of water temperatures (from 32 °F [0 °C] and warmer) and have been observed along the entire East Coast of the United States (Goff and Lien 1988), including the Gulf of Mexico (James et al. 2005a; James et al. 2005b; James et al. 2006). Late juvenile and adult leatherback sea turtles are known to range from mid-ocean to the continental shelf and nearshore waters (Barco and Lockhard 2015; Grant and Ferrell 1993; Schroeder and Thompson 1987; Shoop and Kenney 1992). In general, leatherback sea turtles spend most of their time out at sea (Defenders of Wildlife n.d.).

Distribution of leatherback sea turtles in the Pacific is from the Aleutian Islands south. However, given the mainly pelagic distribution of leatherback sea turtles, they are both rare along the coast and within Alaskan waters. Leatherback sea turtles have been recorded off the coast of Alaska, though they are not plentiful enough to be considered common—nineteen leatherbacks have been reported in Alaska between 1960 and 2007. Prior to 1993, they were the most common sea turtle species in Alaskan waters (Alaska Department of Fish and Game 2020c). Pacific leatherbacks are divided into western and eastern Pacific subpopulations based on their distribution and biological and genetic characteristics. Eastern Pacific leatherbacks nest along the Pacific coast of the Americas, primarily in Mexico and Costa Rica, and forage throughout coastal and pelagic habitats of the eastern tropical Pacific. Western Pacific leatherbacks nest in the Indo-Pacific, primarily in Indonesia, Papua New Guinea, and the Solomon Islands. A proportion of this population migrates north across the Pacific (past Hawaii) to feeding areas off the West Coast of North America. Another segment of the Western Pacific subpopulation migrates into the southern hemisphere, into waters of the western South Pacific Ocean (National Marine Fisheries Service 2016a). Leatherback sea turtles are regularly seen off the U.S. West Coast, with the greatest densities found in waters of central California, outside of the proposed action areas. Western Pacific leatherbacks often forage in the coastal and shelf waters adjacent to the mouth of the Columbia River (Benson et al. 2011), but leatherback sea turtles would not be found up the river, in the PNW proposed action area.

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

3.4.9.1.2.13 Loggerhead Sea Turtle

The loggerhead sea turtle (*Caretta caretta*) was listed under the ESA in 1978. Currently, there are five DPSs of loggerhead sea turtles that are listed as endangered and four listed as threatened under the ESA (76 FR 58868; September 22, 2011). The Northwest Atlantic Ocean DPS (listed as threatened) and the North Pacific Ocean DPS (listed as endangered) are the only two DPSs that occur within the proposed action areas. Critical habitat has been designated along the mid-Atlantic Coast, the southeast Atlantic states, and in the Gulf of Mexico (79 FR 39855; July 10, 2014) and is within the USEC-MidATL, USEC-

South, and GoMEX and Mississippi River proposed action areas. Critical habitat for the loggerhead sea turtle is further discussed in Section 3.4.12.1.7. The loggerhead sea turtle may be present in the USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas. Loggerhead sea turtles would be considered very rare in the SEAK proposed action area.

Loggerheads typically nest on beaches close to reef formations and in close proximity to warm currents (Dodd Jr 1988), preferring beaches facing the ocean or along narrow bays (National Marine Fisheries Service 2014b; Reece et al. 2013). Nesting occurs in areas in Florida, Virginia, and along the Gulf Coast from April through September, with a peak in June and July (Dodd Jr 1988; Weishampel et al. 2006; Williams-Walls et al. 1983). At emergence, hatchlings swim to offshore currents and remain in the open ocean, often associating with floating mats of Sargassum (Carr 1986; Witherington and Hirama 2006). Within the United States, the highest concentration of loggerhead nesting occurs in Florida. There are at least five demographically independent loggerhead sea turtle nesting groups or subpopulations of the Northwest Atlantic Ocean: (1) the Northern Recovery Unit, from the Florida-Georgia border to southern Virginia; (2) the Peninsular Florida Recovery Unit, along Florida's Atlantic Coast to Key West; (3) the Dry Tortugas Recovery Unit, encompassing all islands west of Key West; (4) the Northern Gulf of Mexico Recovery Unit, from the Florida panhandle through Texas; and (5) the Greater Caribbean Recovery Unit, from Mexico through French Guiana, the Bahamas, and the Lesser and Greater Antilles (National Marine Fisheries Service and U.S. Fish and Wildlife Service 2008).

In the Pacific, the range of loggerhead sea turtles is from the equator north to 60 °N (Alaska); however, as this species is vulnerable to cold-stunning, presence in Alaska is considered very rare. In the Atlantic, the range is the same, encompassing the waters from Brazil to Canada. Loggerhead sea turtles occur in U.S. waters in habitats ranging from coastal estuaries to waters far beyond the continental shelf (Chapman and Seminoff 2016; Dodd Jr 1988). Juvenile loggerhead sea turtles inhabit offshore waters in the North Atlantic Ocean. These offshore habitats provide juveniles with an abundance of prey and sheltered locations where they can rest (Rosman et al. 1987). Loggerheads are generally observed in the northern extent of their range during the summer, in shallow water habitats with large expanses of open ocean access (Arendt et al. 2012; Bolten 1992; National Marine Fisheries Service 2010a; Witherington and Hirama 2006). Juveniles also use the strong current of the North Atlantic Gyre to move from developmental nursery habitats to later developmental habitats, and to and from adult foraging, nesting, and breeding habitats (Bolten et al. 1998; Musick and Limpus 1997). Seasonal movements of juvenile loggerheads along the Atlantic Coast, from more northerly resident areas during warmer months to more southerly or offshore resident areas during colder months, are well documented (National Marine Fisheries Service and U.S. Fish and Wildlife Service 2008). Subadult and adult loggerhead sea turtles tend to inhabit deeper offshore feeding areas along the western Atlantic Coast, from mid-Florida to New Jersey (Hopkins-Murphy et al. 2003; Roberts et al. 2005). As water temperatures drop from October to December, most loggerheads emigrate from their summer developmental habitats and eventually return to warmer waters south of Cape Hatteras, where they spend the winter (Morreale and Standora 1998).

Loggerhead sea turtles are primarily carnivorous in both open ocean and nearshore habitats, although they also consume some algae (Bjorndal 1997). Diet varies by age class (Godley et al. 1998) and by specializing in specific prey groups dependent on location. When they reach 40 to 50 cm (16 to 20 in) carapace length in the Atlantic, loggerheads begin to move into shallower coastal habitats, where they forage over a variety of benthic hard- and soft-bottom habitats, although they also capture prey throughout the water column (Bjorndal 2003). Adult loggerheads feed on a variety of bottom-dwelling animals, such as crabs, shrimp, sea urchins, sponges, and fish. They have powerful jaws that enable them to feed on hard-shelled prey, such as whelks and conch. During migration through the open sea, they eat jellyfish, mollusks, flying fish, and squid (Briscoe et al. 2016; Fukuoka et al. 2016; Pajuelo et al. 2016).

3.4.9.1.2.14 Olive Ridley Sea Turtle

The olive ridley sea turtle (*Lepidochelys olivacea*) is listed under the ESA; there are two DPSs—the Mexico's Pacific Coast breeding population (endangered) and all other populations (threatened) (43 FR 32800; July 28, 1978). Only the other populations would be present in the proposed action areas. There is no critical habitat designated for this species. The olive ridley sea turtle may be present in the USEC-South proposed action area.

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.). Studies from different populations of olive ridley sea turtles show a strong preference for neretic (shallow part of the sea near a coast and overlying the continental shelf) areas (Plot et al. 2015; Polovina et al. 2004; Rees et al. 2016). They migrate each year between their pelagic foraging areas and coastal breeding and nesting grounds (Alaska Department of Fish and Game n.d.). Despite the fact that the olive ridley is the most abundant sea turtle in the world, the number of olive ridley sea turtles occurring in U.S. territorial waters is believed to be small (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1998, 2014).

In the eastern Pacific, olive ridleys typically occur in tropical and subtropical waters, as far south as Peru and as far north as California, but occasionally have been documented as far north as Alaska. However, in Alaska this species would be considered very rare, having been reported only three times between 1960 and 2007 (Alaska Department of Fish and Game n.d.).

The range of olive ridley sea turtles in the Atlantic is the tropical, southern latitudes of the Caribbean and the Atlantic Coast of South America (Abreu-Grobois and Plotkin 2008). In the western Atlantic, olive ridley sea turtles do not nest in the United States, but rather in French Guiana and Brazil (NOAA Fisheries n.d.), outside of the proposed action areas. Within a region, olive ridleys may move between the oceanic and neritic zones or may just occupy neritic waters (Abreu-Grobois and Plotkin 2008).

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

3.4.9.2 Environmental Consequences to Reptiles

Impacts to reptiles would potentially result from vessel noise, ATON signal testing noise, tool noise, pile driving noise, vessel movement, bottom devices and ATON retrieval devices, and construction associated with the Proposed Action. As discussed in Table 3-3, vessel noise, ATON signal testing noise, and tool noise would be brief and intermittent and would not cause PTS or TTS in reptiles. The risk of a reptile becoming entangled in ATON retrieval devices or tow lines would be negligible and will not be discussed further in this PEIS. There would be no impact to reptiles from fathometer and Doppler speed log noise, as it is outside their range of best hearing, or unrecoverd jet cone moorings. Therefore, these stressors will not be discussed further in this PEIS.

3.4.9.2.1 Vessel Noise

Vessel noise also has the potential to impact reptiles in the proposed action area by masking or causing behavioral response. Because some species are more aquatic and others more terrestrial, reptiles could be exposed to both in-air noise and in-water noise generated by vessels. As discussed in Appendix E, most reptiles are known to be most sensitive to low frequencies, ranging from 30 Hz to 4 kHz, depending on the species. As discussed in Section 3.2.1.2, large vessels, like the WCC, would be expected to emit vessel noise with a frequency range of 20–300 Hz with a source level of 190 dB re 1 µPa at 1 m. Small vessels, like the cutter small boat, would be expected to emit vessel noise with a frequency range of 1–7 kHz with a source level of 175 dB re 1 µPa at 1 m.

Reptile presence would vary depending on vessel location. In the unlikely event that an aquatic reptile overlaps with the Proposed Action, exposure to underwater vessel noise is expected to be temporary because the vessels typically remain in motion and reptiles spend a limited amount of time under water. Similarly, reptiles on land would not be exposed to vessel noise in the air for long durations of time, as the vessel would be moving throughout the proposed action areas on the waterways. Vessel noise may cause startle responses and a temporary displacement of reptiles from an area. However, any behavioral response to vessel noise would be expected to be temporary and reptiles would be expected to return to the area once the source of disruption has moved away.

Little is known about how sea turtles and other reptiles use sound in their environment, and whether masking would be a potential impact to reptiles. There is evidence that reptiles may rely primarily on senses other than hearing for interacting with their environment, such as vision (Narazaki et al. 2013) and magnetic orientation (Avens and Lohmann 2003; Putman et al. 2015). Based on knowledge of their sensory biology, reptiles, particularly sea turtles, may be able to detect objects within the water column (e.g., vessels, prey, predators) via some combination of auditory and visual cues (Bartol and Ketten 2006; Bartol and Musick 2003; Levenson et al. 2004); therefore, it is difficult to distinguish which would trigger a response from the animal. For sea turtles, research examining their ability o to avoid collisions with vessels shows they may rely more on visual, as opposed to auditory cues (Hazel et al. 2007a). Similarly, while sea turtles may rely on acoustic cues to identify nesting beaches, they appear to rely on other non-acoustic cues for navigation, such as magnetic fields (Lohmann and Lohmann 1996a; Lohmann and Lohmann 1996b) and light (Avens and Lohmann 2003). Additionally, they are not known to produce sounds underwater for communication. Any potential masking from WCCs and cutter small boat would be temporary as both the sea turtle and vessel would be transiting through the proposed action action area (likely at different speeds and in different directions) or the sea turtle would avoid the immediate area where proposed ATON activities are expected to occur. For these reasons, any short term instances of masking are not expected to have any fitness consequences for any individual sea turtles. In addition to masking, vessel noise may result in temporary changes in sea turtle behavior (Popper et al. 2014). However, any behavioral responses are expected to be temporary (e.g., a startle response, brief avoidance behavior) lasting only as long as the vessel is in close proximity (or as long as the ATON maintenance event lasts) and these reactions are not expected to have any measurable effects on any individual's fitness. Any sea turtle that exhibits a temporary behavioral response would be expected to return to baseline behavior immediately following exposure. Therefore, these short term behavioral reactions are not expected to increase the likelihood of injury by disturbing a sea turtle to such an extent as to significantly disrupt normal behavioral patterns and therefore such reactions would not rise to the level of take as defined under the ESA. Therefore, the effect of vessel noise is insignificant and is not likely to adversely affect the ESA-listed sea turtle species considered in this PEIS.

There is evidence that snakes may rely on vibrations to sense water movement (Crowe-Riddell et al. 2016; Young 2003a). Crocodilians use hearing for prey detection and social communication, but they also rely on vision, scent, and touch for interacting with their environment (Grigg and Gans 1993; Wever 1971). Similar to sea turtles, any effect of masking would be brief and temporary as a vessel passes through the area. As detailed above, in reptiles, any temporary masking effects may be mediated by reliance on other environmental inputs.

Although vessel presence raises the ambient levels of sound (Hildebrand 2009), it is expected that vessel noise associated with the Proposed Action would be similar to vessel noise from other ships in the proposed action areas and would not be expected to alter current levels of ambient sound, as the new WCC fleet would replace the existing inland tender fleet. Vessel noise associated with the Proposed Action may affect individual reptiles within the proposed action areas; however, responses to vessel noise would be short term and insignificant behavioral responses, and thus, would not be expected to have any population level impacts.

Any increase in ambient noise as a result of a WCC would be temporary and localized to the position of the vessel as it moves throughout the proposed action areas. Reptiles 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. Coast Guard would follow SOPs (Appendix B) to maintain properly trained lookouts and would avoid ESA-listed sea turtles, if able. Because vessel noise is transient as vessels move through very large proposed action areas, the effects of vessel noise would be expected to be limited to temporary behavioral effects and reptiles would be expected to return to normal behavior within minutes of a disruption.

3.4.9.2.2 ATON Signal Testing Noise

ATON signal testing noise also has the potential to impact reptiles in the proposed action area by masking or causing behavioral response. Because some species are more aquatic and others more terrestrial, reptiles could be exposed to both in-air noise and in-water noise generated by ATON signal testing noise. As discussed in Appendix E, most reptiles are known to be most sensitive to low frequencies, ranging from 30 Hz to 4 kHz, depending on the species. The frequency of ATON signals range from 300–850 Hz and the intensity can be from 118–140 dBA. While the signal is intense, the ATON signal testing noise is intermittent, either only occurring in certain types of weather conditions or only when triggered to sound, such as by a radio. The testing of these signals would only occur briefly to ensure they are in working order.

Sea turtles are able to detect low-frequency sound (Popper et al. 2014), they would likely be able to detect the acoustic signal, if exposed. However, because the air-sea interface constitutes a substantial sound barrier (i.e., sound waves in the water are reduced in intensity by a factor of more than a thousand when they cross the air-sea boundary; Appendix C) (Hildebrand 2005) and the sound signals produced by ATON are of relatively low intensity, injury or physiological effects are not expected. There are no sea turtle nesting sites within the proposed action areas adjacent to ATON, so there are no impacts expected from ATON signal testing noise to nesting sea turtles or their hatchlings. If sea turtles were exposed to a sound signal (i.e., most likely while at the surface) and if they were to respond at all, the most likely response would be a temporary behavioral reaction or avoidance of the immediate area of the ATON. The effect of such a reaction is not expected to not be meaningful for the animal given the short term nature of a startle reaction (i.e., lasting a few seconds with the animal returning to normal behaviors shortly thereafter) and the small area of habitat that may be avoided around the ATON site. For these reasons, the effect of sound signals emitted by ATON on ESA-listed sea turtles is considered insignficiant and sound signals may affect, but are not likely to adversely affect ESA-listed sea turtles.

It is expected that ATON signal testing noise associated with the Proposed Action would be similar to current levels of noise in each proposed action area, as the WCCs would continue to service the ATON that currently exist, as well as any new ATON that are established. ATON signal testing noise associated with the Proposed Action may affect individual reptiles within the proposed action areas; however, responses to ATON signal testing noise would be short term behavioral responses, such as flushing from the area adjacent to the ATON or entering the water. These behavioral responses would be insignificant and thus, would not be expected to have any population level impacts.

Any temporary increase in ambient noise as a result of an ATON signal testing noise would be temporary and localized to the position of the ATON and the surrounding area. Reptiles are either not likely to respond to ATON signal testing 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. Because ATON signal testing noise is brief and intermittent, as well as scattered through very large proposed action areas, the effects of ATON signal testing noise would be expected to be limited to temporary behavioral effects and reptiles would be expected to return to normal behavior within minutes of a disruption.

3.4.9.2.3 Tool Noise

Tool noise has the potential to impact reptiles in the proposed action area by masking or causing behavioral response. Because some species are more aquatic and others more terrestrial, reptiles could be exposed to both in-air noise and in-water noise generated by tools. As discussed in Appendix E, most reptiles are known to be most sensitive to low frequencies, ranging from 30 Hz to 4 kHz, depending on the species. The frequency of tools and equipment used in construction and brushing are considered broadband noise, in which sound energy is distributed over a wide section of the audible range. The intensity can be from 74–116 dBA. While tool noise can be moderately intense, the tool noise would be intermittent and only occur when ATON require construction, repairs, or brushing to maintain working order and visibility.

It is expected that tool noise associated with the Proposed Action would be would be similar to current levels of noise in each proposed action area, as the WCCs would continue to service the ATON that currently exist, as well as any new ATON that are established. Tool noise associated with the Proposed Action may affect individual reptiles within the proposed action areas; however, responses to tool noise would be short term and behavioral responses, such as flushing from the area adjacent to the activity by the ATON or entering the water. These behavioral responses would be insignificant and thus, would not be expected to have any population level impacts.

Any temporary increase in ambient noise as a result of tool use would be temporary and localized to the position of the ATON and the surrounding area. Reptiles are either not likely to respond to tool 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. Because tool noise is intermittent and infrequent, as well as scattered through very large proposed action areas, the effects of tool noise would be expected to be limited to temporary behavioral effects and reptiles would be expected to return to normal behavior within minutes of a disruption.

3.4.9.2.4 Pile Driving Noise

Pile driving noise has the potential to impact reptiles in the proposed action area and because some species are more aquatic and others more terrestrial, reptiles could be exposed to both in-air noise and in-water noise generated by plie driving. As discussed in Appendix E, most reptiles are known to be most sensitive to low frequencies, ranging from 30 Hz to 4 kHz, depending on the species. The majority of energy in the impact hammer pulses is at frequencies below 500 Hz, with near source (within 32 ft [10 m]) peak sound pressure levels underwater ranging up to 220 dB and beyond (University of Rhode Island

2019). While underwater sound levels for a variety of piles are available (Table 3-7), in certain instances, the exact piles that the Coast Guard would be expected to drive were not available, thus, the Coast Guard used sound measurements for "proxy" piles taken at a distance of 10 m (Caltrans 2020), that were more similar to the Proposed Action.

There is evidence that reptiles may rely primarily on senses other than hearing for interacting with their environment, such as vision (Narazaki et al. 2013) and magnetic orientation (Avens and Lohmann 2003; Putman et al. 2015).However, impacts to reptiles are not well understood and behavioral responses, physiological impacts, or injury and mortality may occur.

Little is known about how sea turtles and other reptiles use sound in their environment. The response of a sea turtle to an anthropogenic sound will 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. Distance from the sound source and whether it is perceived as approaching or moving away could also affect the way a sea turtle responds. Little is known about the how sea turtles may respond to acoustic disturbance (e.g., from pile driving). Potential behavioral responses to anthropogenic sound could include startle reactions, disruption of feeding, disruption of migration, changes in respiration, alteration of swim speed, alteration of swim direction, and area avoidance. In addition to the potential for behavioral response, higher sound exposure levels could lead to physiological effects (e.g., temporary threshold shift).

In their sound exposure guidelines for pile driving, Popper et al. (2014) recommended using the sound levels for fish that do not hear well for injury and mortality thresholds for sea turtles (i.e., 210 dB SEL_{cum} and > 206 dB_{peak}). The Coast Guard used this threshold to evaluate pile driving activities that may injure or kill sea turtles, though the authors noted that because of their rigid anatomy, it is possible that sea turtles are highly protected from impulsive sound effects (Popper et al. 2014). Popper et al. (2014) did not provide a quantitative threshold for the onset of TTS in sea turtles, but qualitatively assessed the relative risk of a sea turtle experiencing such an effect. Lacking specific data on the sound levels that could cause TTS in sea turtles, we will use the sound levels for fish for a TTS threshold for sea turtles (i.e., 187 dB SEL_{cum}). Although information regarding the behavioral response of sea turtles to acoustic stressors is generally lacking, McCauley et al. (2000) provides an indication that 175 dB re 1 µPa RMS is a reasonable threshold criterion in the absence of more rigorous experimental or observational data.

To evaluate the potential for underwater noise from pile driving the Coast Guard considered the sound levels created during impact or vibratory pile driving, the quantitative thresholds described above to assess the likelihood of injury, TTS, or behavioral disturbance of sea turtles, sea turtle behavior, and the SOPs (Appendix B) that will be implemented by the Coast Guard. The Coast Guard used source levels detailed in (Table 3-7) to analyze impacts to ESA-listed sea turtles from Coast Guard pile driving. The peak sound level injury threshold for sea turtles will not be exceeded during Coast Guard pile driving activities considered in this PEIS, so only the cumulative sound exposure level threshold is considered further for injury and mortality. Table 3-36 details the calculated range to the injury/mortality cumulative sound exposure level threshold for sea turtles and the distance to the TTS and behavioral disturbance thresholds.

Table 3-36. Estimated Range to Effects for Sea Turtles from Pile Driving Activities

Pile Characteristics (# piles; pile size; material)	*Impact Pile Driving*			*Vibratory Pile Driving*		
	Distance to Injury/Mortality	*Distance to TTS*	*Distance to Behavioral Threshold*	*Distance to Injury/Mortality*	*Distance to TTS*	*Distance to Behavioral Threshold*
1; 12 in (30 cm); wood	0 ft (0 m)	11.2 ft (3.4 m)	96.1 ft (29.9 m)	0 ft (0 m)	0 ft (0 m)	15.2 ft (4.6 m)
4; 12 in (30 cm); wood	0 ft (0 m)	28.3 ft (8.6 m)		0 ft (0 m)	0 ft (0 m)	
12; 12 in (30 cm); wood	0 ft (0 m)	58.8 ft (17.9 m)		0 ft (0 m)	0 ft (0 m)	
1; 18 in (45 cm); steel	44.6 ft (13.6 m)	381.9 ft (116.4 m)	2070.1 ft (630.9 m)	7.1 ft (2.1 m)	0 ft (0 m)	24.1 ft (7.3 m)
4; 18 in (45 cm); steel	44.6 ft (13.6 m)	962.4 ft (293.3 m)		7.1 ft (2.1 m)	0 ft (0 m)	
1; 10 in (25.4 cm); Steel H	0 ft (0 m)	70.6 ft (21.5 m)	328.1 ft (100 m)	0 ft (0 m)	0 ft (0 m)	4.4 ft (1.3 m)
4; 10 in (25.4 cm); Steel H	0 ft (0 m)	177.8 ft (54.2 m)		0 ft (0 m)	0 ft (0 m)	
1; 14 in (35.5 cm); concrete [square]	0 ft (0 m)	6.1 ft (1.8 m)	20.7 ft (6.3 m)	-	-	-
4; 14 in (35.5 cm); concrete [square]	0 ft (0 m)	15.3 ft (4.6 m)		-	-	

As detailed in Table 3-36, the maximum range to the injury/mortality threshold was 44.6 ft (13.6 m) (i.e., for a 1 or 4 pile structure using 18 in [45 cm] steel piles). The maximum range to TTS was 962.4 ft (293.3 m). This indicates that for a sea turtle to be killed, injured, or suffer TTS by Coast Guard pile driving activities, a turtle would have to remain within 44.6 ft (13.6 m) (for injury or mortality) or 962.4 ft (293.3 m) (for TTS) of the structure being built for the duration of the construction action for the turtle to experience that effect. However, it is unlikely that a sea turtle would be exposed to this effect as they are mobile organisms and are known to avoid and move away from anthropogenic sounds (McCauley et al. 2000). In addition, to help mitigate any potential impact, the Coast Guard will employ a 1,000-meter safety zone around each pile while pile driving is occurring (Appendix B). These impact distances for mortality, injury, and TTS are well within these safety zones. If any sea turtles are observed within these safety zones, pile driving may not commence or must be shut down until the properly trained lookout is confident that the animal has moved out of the area on its own volition.

Even if a sea turtle were to enter this safety zone undetected, sea turtles are mobile organisms and would be expected to avoid the pile driving area once they detect pile driving and other project related construction noise (McCauley et al. 2000). Similarly, a sea turtle could avoid the immediate project area as a result of exposure to the vessel noise prior to pile driving or other general construction noise during ATON activities. Avoidance of the small habitat area for a short duration (i.e., at most, a few hours) would not have a meaningful impact on the animal because they could simply select alternative habitat a short distance away. Any individual that exhibits a temporary behavioral response is expected to return to baseline behavior immediately following exposure to underwater pile driving noise. These short term behavioral reactions or brief avoidance behaviors would not be expected to increase the likelihood of injury by disturbing a sea turtle to such an extent as to significantly disrupt normal behavioral patterns and therefore such reactions would not rise to the level of take as defined under the ESA. Therefore, pile driving noise would not result in any population level impacts. Injury or mortality caused by pile driving noise would not result in population level impacts. Pile driving noise would be short term and temporary, diffuse throughout the proposed action areas, and mitigated by SOPs (Appendix B).

3.4.9.2.5 Vessel Movement

Aquatic reptiles in the proposed action areas may be exposed to vessel movement associated with WCCs and cutter small boat during the Proposed Action. While it is difficult to differentiate between behavioral responses to vessel sound and visual cues associated with the presence of a vessel, it is assumed that both play a role in prompting reactions from animals. Although reptiles would likely hear and see approaching vessels, a risk of a vessel collision with an aquatic reptile exists due to the co-occurrence of aquatic reptiles and vessels.

Due to the maneuverability of small reptiles in water, it is unlikely that a small reptile would be struck by a vessel as it moves through the proposed action areas. As aquatic reptiles (with the exception of sea turtles) are most often found in fresh water, swampy areas, and coastal marshes, there is potential overlap with vessels within the proposed action areas. Many reptiles would be located outside of the water in the proposed action areas, which would limit the possibility of strike to only those individuals within the waterways. Given the slow speed of WCCs while operating (11.4 knots maximum), it is expected that freshwater reptiles would have a behavioral response to a vessel. While cutter small boats could operate at higher speeds than the WCC (15–20 knots), cutter small boats would typically operate at less than 15–20 knots, particularly in support of ATON activities. Vessel strike of a freshwater reptile would be unlikely.

Reptiles can detect approaching vessels, likely by sight rather than sound (Bartol and Ketten 2006; Hazel et al. 2007a). Reptiles have been observed to exhibit short term responses in their reaction to vessels, such as changing their direction of travel or submerging/diving. For example, water snakes that are basking in trees are known to drop into the water and then either dive to the bottom or to a submerged object when disturbed, sometimes accidently landing on nearby boats (Irvine and Prange 1976; Mills 2002; Mills et al. 1995). The most likely impact to reptiles as a result of vessel movement is behavioral response. Behavioral responses of reptiles to vessels may include changes in general activity (e.g., from resting or feeding to active avoidance), and changes in speed and direction of movement. The most likely response of a reptile to any disturbance is moving from the area; however, reptiles would be expected to return to normal behavior soon after the disturbance has occurred. As transiting vessels would be slow moving, vessel movement is not expected to cause more than short term behavioral responses in reptiles. Reptiles are either not likely to respond to vessel movement or are not likely to respond in ways that would significantly disrupt normal behavior patterns which include, but are not limited to, migration, breeding, feeding, or sheltering.

Vessel strike of sea turtles is poorly studied (Work et al. 2010). Sea turtles must surface to breathe and several species are known to bask at the surface for long periods. Sea turtles may not be able to move out of the way of vessels moving at more than 2.5 mi/hr (4 km/hr) (Hazel et al. 2007b; Work et al. 2010). However, the Coast Guard would conduct activities consistent with the Biological Opinion issued by

NMFS in 2018[23], including measures to minimize impacts to sea turtles from vessel movement. Generally, vessel speed at the ATON site or between adjacent ATON sites is relatively slow due to the precision with which vessels must operate during these activities. There has never been a documented instance where a vessel associated with ATON activities (i.e., vessel operations in the immediate vicinity of the ATON and transit between adjacent ATON) has struck an ESA-listed sea turtle. Further, the Coast Guard will implement SOPs (Appendix B) to minimize the likelihood that a vessel will strike a sea turtle. For these reasons, while it is possible for a vessel associated with ATON activities to strike a sea turtle, we do not believe that a vessel strike is likely to occur. The Coast Guard has been conducting ATON activities in the proposed action areas for years and no such incident has been documented. Additionally, the Coast Guard employs minimization measures to reduce the likelihood for a strike to a sea turtle. Therefore, the likelihood of a vessel strike of a sea turtle during WCC proposed action activities is low. For this reason, vessel strike may affect, but is not likely to adversely affect sea turtles and will not be considered further in this PEIS.

3.4.9.2.6 Bottom Devices and ATON Retrieval Devices

Bottom disturbance has the potential to impact aquatic reptiles. For aquatic reptiles within the proposed action areas, bottom disturbance caused by the establishment, maintenance, and discontinuance of floating ATON, as well as spudding, anchoring, and wreckage recovery performed by the WCC may potentially impact species through disturbance and alteration of habitat. ATON operations and wreckage recovery have the potential to cause disturbance and habitat alterations to aquatic reptiles within the proposed action areas. ATON operations and wreckage recovery may cause disturbance as the sinker or jet cone moorings are established and discontinued, while dragging an ATON to relocate it, or the use of a grapnel hook or wire sweeping method of recovery. Similar to how reptiles would be expected to avoid slow moving vessels, reptiles would have the ability to swim away from the moving devices. Habitat may be altered during ATON operations and wreckage recovery; however, these operations are isolated and only occur in a small area compared to the size of the proposed action areas. Once operations have completed, reptiles would be expected to return to the area.

Potential effects to sea turtles within the proposed action areas also include being temporarily unable to use a site for forage and refuge habitat due to potential avoidance of construction activities (Section 3.4.9.2.7) and related noise. These effects would be insignificant due to the small size of ATON activity action areas and the limited time it would take to complete each action (i.e., typically a few hours).

The most likely response to the use of bottom devices and ATON retrieval devices would be a behavioral response, which would be expected to be similar to those if a vessel were operating nearby (Section 3.4.9.2.5). It is assumed that due to their ability to detect approaching vessels by sight (Bartol and Ketten 2006; Hazel et al. 2007a), aquatic reptiles would change their direction of travel or temporarily leave the area before WCC operations begin. Anchoring and spudding may impact aquatic reptiles feeding benthically near the footprint of the devices. Anchor placement and spudding would be brief and only in use during ATON operations. In addition, the impact to aquatic reptiles from increased turbidity during ATON operations, anchoring, spudding, and wreckage recovery is unlikely to cause

[23] The Coast Guard completed an ESA Section 7 and Essential Fish Habitat consultation with NMFS on U.S. Coast Guard Federal Aids to Navigation Program, finalized on April 19, 2018. Any information provided in this PEIS includes WCC support of ATONs, only as it pertains to the Proposed Action.

injury or mortality to individuals, as increases would be temporary and suspended sediments would settle quickly.

Short term behavioral responses from bottom devices and ATON retrieval devices would not be expected to result in long term impacts to individuals (such as chronic stress) or populations in the proposed action areas, given the diffuse activities requiring the use of bottom devices or ATON retrieval devices spread throughout the proposed action areas. Avoidance of increased activity during the short duration and small footprint of bottom disturbance is unlikely to cause abandonment or significant alteration of behavioral patterns. Any habitat exclusion during ATON maintenance (e.g., that required the use of bottom devices or ATON retrieval devices) would be insignificant to ESA-listed reptiles. If a sea turtle or other reptile were to encounter the devices in use, any behavioral avoidance displayed would not result in significant disruption of breeding, feeding, or sheltering. Further, Coast Guard would follow SOPs (Appendix B) to maintain properly trained lookouts and would not purposefully approach ESA-listed reptiles, particularly those that are visible at the surface. Therefore, the likelihood of a collision between any devices and a sea turtle would be low. The use of bottom devices and ATON retrieval devices may affect, but is not likely to adversely affect ESA-listed reptiles.

3.4.9.2.7 Construction

Construction activities have the potential to impact reptiles by causing disturbance, which may result in behavioral responses. Similar to their responses to vessel movement and vessel noise, it would be assumed that the most likely response of a reptile to any disturbance is changing their direction of travel or fleeing the area as they detect an approaching vessel or person. However, short term behavioral responses to disturbance are not expected to result in long term impacts to individuals (such as chronic stress) or populations in the proposed action areas, given the diffuse fixed ATON structures spread throughout the proposed action areas. Any avoidance during the short duration of construction activities in the small disturbance footprint is unlikely to cause abandonment or significant alteration of behavioral patterns.

As discussed in Section 3.4.9.2.6, when conducting construction activities, a small percentage of habitat may be lost. However, no significant loss of habitat would occur, as vegetation would have the potential to regrow and the Proposed Action would only impact a small percentage of habitat that is available to reptiles within each proposed action area. Because the effects of temporary habitat exclusion during ATON maintenance (e.g. construction) would be insignificant to ESA-listed reptiles, temporary habitat exclusion may affect, but is not likely to adversely effect ESA-listed reptiles.

Short term behavioral responses to construction are not expected to result in long term impacts to individuals (such as chronic stress) or populations in the proposed action area, given the diffuse ATON spread out throughout the proposed action areas. Avoidance of construction activity is unlikely to cause abandonment or significant alteration of behavioral patterns. If an ESA-listed reptile were to encounter construction activity, any behavioral avoidance displayed would not result in significant disruption of breeding, feeding, or sheltering. Further, Coast Guard would follow SOPs (Appendix B) to be aware of ESA-listed reptiles near ATON they maintain and not to disturb them.

3.4.9.2.8 Pile Driving

For reptiles within the proposed action areas, pile driving may impact species through bottom or habitat disturbance, vibrations, strike, injury, mortality, or behavioral response. While the likelihood of striking an individual is remote, pile driving may cause injury or mortality if struck when installing a pile if an individual is within its footprint. However, no population level impacts would be expected. Pile driving operations may cause an increase in turbidity. However, the impact to reptiles from increased turbidity is unlikely to cause injury or mortality to individuals, and impacts to populations would be inconsequential due to the short term increases in turbidity, the infrequency of pile driving, and the large size of the proposed action areas. It would be anticipated that suspended sediments caused by pile driving operations would resettle quickly.

Snakes are able to detect both airborne and groundborne vibrations using their body surface as well as their inner ears (Young 2003b). Turtles are less sensitive to whole-body vibration than pythons (Christensen et al. 2012) and auditory sensitivity in turtles is probably not based on sound-induced vibrations in the skull (Christensen-Dalsgaard et al. 2012a). Turtles able to sense vibrations with their inner ear bones (Lenhardt et al. 1985). Crocodilians have integumentary sensory organs densely distributed on their bodies and jaws that can detect prey-generated water ripples and are more sensitive than primate fingertips (Leitch and Catania 2012). The detection of vibrations and their use has not been widely studied. The ability to sense vibrations in these species likely aid in navigation, prey detection, and predator avoidance. Vibrations from pile driving would likely cause reptiles to move from the area. However, pile driving would not occur regularly in any proposed action area—only when it is required to establish, maintain, or discontinue a fixed ATON, which are dispersed widely throughout the proposed action areas. When pile driving needed to occur for these reasons, it would not be a long enough duration to impact communication among reptiles, if vibrations are used for this purpose.

As discussed in Section 3.4.9.2.4, sea turtles are mobile organisms and would be expected to avoid the pile driving area once they detect pile driving and other project related construction noise (McCauley et al. 2000). Similarly, a sea turtle could avoid the immediate project area as a result of exposure to the vessel noise prior to pile driving or other general construction noise during ATON activities, reducing the risk of a potential strike during pile driving operations. Avoidance of the small habitat area for a short duration (i.e., at most, a few hours) would not have a meaningful impact on the animal because they could simply select alternative habitat a short distance away. Any individual that exhibits a temporary behavioral response is expected to return to baseline behavior once the pile driving activity has concluded. These short term behavioral reactions or brief avoidance behaviors would not be expected to increase the likelihood of injury by disturbing a sea turtle to such an extent as to significantly disrupt normal behavioral patterns and therefore such reactions would not rise to the level of take as defined under the ESA.

Short term behavioral responses to pile driving are not expected to result in long term impacts to individuals (such as chronic stress) or populations in the proposed action area, given the diffuse ATON spread out throughout the proposed action areas. Avoidance of pile driving activity is unlikely to cause abandonment or significant alteration of behavioral patterns. In the unlikely event that an ESA-listed reptile were to encounter pile driving, any behavioral avoidance displayed would not result in significant disruption of breeding, feeding, or sheltering. Further, Coast Guard would follow SOPs (Appendix B) to maintain properly trained lookouts. Therefore, the likelihood of disturbance to an aquatic reptile, particularly a sea turtle would be low.

3.4.9.2.9 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, impacts to reptiles within the proposed action areas would be similar to what is currently present because the new WCC fleet would replace the capabilities of the existing inland tender fleet. In addition, WCC assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include the use of vessels, tools, bottom devices, and pile driving devices, as well as construction activities. Impacts to reptiles from the Proposed Action would be limited to small areas around ATON and vessels, and the disturbance to reptiles would be intermittent and brief in duration. Therefore, there would be no significant impact to reptiles as a result of Alternative 1.

Pursuant to the ESA, there would be no effect to ESA-listed reptiles as a result of fathometer and Doppler speed log noise and unrecovered jet cone moorings. Vessel noise, ATON signal testing noise, tool noise, pile driving noise, vessel movement, and construction associated with the Proposed Action may affect, but are not likely to adversely affect ESA-listed reptiles (Table 3-35). Additionally, Alternative 1 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed reptiles (Section 3.4.12.2.7).

3.4.9.2.10 Impacts Under Alternatives 2–3

Under Alternatives 2–3, impacts to reptiles within the proposed action areas would be similar to what is currently present because ship platforms would replace the capabilities of the existing inland tender fleet. In addition, ship platforms and their assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include the use of vessels, tools, bottom devices, and pile driving devices, as well as construction activities. Impacts to reptiles from the Proposed Action would be limited to small areas around ATON and vessels, and the disturbance to reptiles would be intermittent and brief in duration. Therefore, there would be no significant impact to reptiles as a result of Alternatives 2–3.

As discussed in Section 3.4.9.2.9), the Proposed Action may affect, but is not likely to adversely affect ESA-listed reptiles (Table 3-35). Additionally, Alternatives 2–3 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed reptiles (Section 3.4.12.2.7).

3.4.9.2.11 Impacts Under the No Action Alternative

Under the No Action Alternative, as the existing inland tender fleet is decommissioned and not replaced, the physical and acoustic stressors associated with the Proposed Action would not be introduced into the environment. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impacts to reptiles with implementation of the No Action Alternative.

3.4.10 Terrestrial Mammals

3.4.10.1 Affected Environment

Terrestrial mammals are those that do not live in water, though they may rely on aquatic environments for their survival. Species range from canines to rodents to deer to bats. Mammal species on land occupy diverse habitats and use waterways, or areas adjacent to waterways, in all proposed action areas. Marine mammals are discussed separately, in Section 3.4.11.

3.4.10.1.1 Major Groups of Terrestrial Mammals within the Proposed Action Areas

Of the hundreds of terrestrial mammals present in the United States, eight major taxonomic groups may overlap with the proposed action areas. These taxonomic groups are defined in Table 3-37.

Table 3-37. Major Groups of Terrestrial Mammals in the Proposed Action Areas

Taxonomic Order	*Representative Species Present*	*Proposed Action Areas*	*Distribution Within or Near the Proposed Action Area*
Artiodactyla	White-tailed deer (Odocoileus virginianus), elk (Cervus canadensis)	USEC-MidATL, USEC-South, Great Lakes, GoMEX and Mississippi River, PNW	Distributed throughout the United States in nearly all habitat types, including some aquatic systems. Most prefer relatively open habitats.
Carnivora	Jaguarundi (*Herpailurus yagouaroundi*), gray wolf (*Canis lupus*), American black bear (*Ursus americanus*), northern river otter (*Lontra canadensis*)	USEC-MidATL, USEC-South, Great Lakes, GoMEX and Mississippi River, PNW, SEAK	Distributed throughout the United States in a variety of terrestrial and aquatic habitats ranging from forests and mountains to freshwater rivers and lakes.
Chiroptera	Southeastern myotis (*Myotis austroriparius*), big brown bat (*Eptesicus fuscus*), Townsend's big-eared bat (*Corynorhinus townsendii*)	USEC-MidATL, USEC-South, Great Lakes, GoMEX and Mississippi River, PNW, SEAK	Distributed throughout the United States in a variety of habitats, including woodlands, caves, and populated areas.
Cingulata	Nine-banded armadillo (*Dasypus novemcinctus*)	USEC-MidATL, USEC-South, GoMEX and Mississippi River	Widely distributed in the southeastern United States. Prefer riparian habitats or those with sufficient amounts of water.
Didelphimorphia	Virginia opossum (Didelphis virginiana)	USEC-MidATL, USEC-South, Great Lakes, GoMEX and Mississippi River, PNW	Widely distributed east of the Rocky Mountains and the U.S. West Coast. Prefer areas near a water source.
Eulipotyphlans	American pygmy shrew (*Sorex hoyi*), Townsend's mole (*Scapanus townsendii*)	USEC-MidATL, USEC-South, Great Lakes, GoMEX and Mississippi River, PNW, SEAK	Distributed throughout the United States in predominantly dark and damp areas where they can burrow.
Lagomorpha	Marsh rabbit (*Sylvilagus palustris*), Appalachian cottontail (*Sylvilagus obscurus*)	USEC-MidATL, USEC-South, Great Lakes, GoMEX and Mississippi River, PNW, SEAK	Variety of habitats, including desert, tundra, forest, mountain, and swampland.

Taxonomic Order	*Representative Species Present*	*Proposed Action Areas*	*Distribution Within or Near the Proposed Action Area*
Rodentia	American beaver (*Castor canadensis*), eastern gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*)	USEC-MidATL, USEC-South, Great Lakes, GoMEX and Mississippi River, PNW, SEAK	Widely distributed in the United States in a variety of habitats, including semi-aquatic species.

3.4.10.1.1.1 Artiodactyla

Order Artiodactyla is made up of ungulates, or hoofed mammals. Although the majority of these species live in relatively open habitats, they can be found in all habitat types, including some aquatic systems. Examples that are expected in the proposed action areas include elk, moose, mule deer, and white-tailed deer. Order Artiodactyla may be present in all proposed action areas, except for the SEAK proposed action area. These animals feed on a variety of vegetation, depending on what is available in their habitat. Most eat buds and twigs from various trees and shrubs, and consume grasses as well. Conifers are often utilized in winter when other foods are scarce (Dewey 2003).

3.4.10.1.1.2 Carnivora

The Order Carnivora includes those mammals that are primarily meat eaters. Families of terrestrial mammals in the Order Carnivora include bears, raccoons, weasels, skunks, otters, badgers, wolves and foxes, and large felines. They are distributed throughout all of the proposed action areas, and occupy just about every type of terrestrial habitat (Stains 1984; Vaughan et al. 2000). Carnivores live in forests, deserts, mountains, grasslands, scrublands, and tundra; aquatic and semi-aquatic species live in freshwater rivers, lakes, and marshes. Foods consumed by carnivores include mammals, birds and eggs, reptiles, amphibians, fish, carrion, insects, and other arthropods. Many carnivores also eat berries, nuts, and fruits, but usually their main diet is flesh. As many are the top predators in their ecosystems, most carnivores do not face the threat of predation as adults.

3.4.10.1.1.3 Chiroptera

Order Chiroptera consists of multiple species of bats—the only true flying mammals. Chiroptera are present in all proposed action areas. Bats can be found in almost every type of habitat; they live in deserts, woodlands, suburban communities, caves, and cities. Bats can roost in a variety of structures, including trees, caves, bridges, and buildings (National Wildlife Federation 2020). All North American bats are nocturnal. The majority of bats are insectivorous, though some are carnivorous (feeding on rodents, other bats, reptiles, birds, amphibians, and even fish), and many consume fruit (Wund and Myers 2005).

3.4.10.1.1.4 Cingulata

In the proposed action areas, Order Cingulata includes only one species: the nine-banded armadillo (*Dasypus novemcinctus*). This species ranges through South, Central, and North America. In the United States, nine-banded armadillos are found in the southeast, and may be present in the USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas. They prefer warm, wet climates and live in forested or grassland habitats; riparian habitats or those with sufficient amounts of water are preferred (McDonald and Larson 2011). Nine-banded armadillos are generalist, opportunistic feeders.

Almost 500 separate food items make up their diet, and over ninety percent of their diet by weight consists of animal matter (McDonald and Larson 2011).

3.4.10.1.1.5 Didelphimorphia

In the proposed action areas, Order Didelphimorphia includes only one species: the Virginia opossum (*Didelphis virginiana*). This species ranges from Costa Rica through southern Ontario, Canada. In the United States, Virginia opossums may be present throughout the USEC-MidATL, USEC-South, Great Lakes, GoMEX and Mississippi River, and PNW proposed action areas. This nocturnal species may be found in a wide range of habitats, but typically prefer areas near a water source (e.g., stream, swamp). They are the only marsupials found in North America. They may live in woodlands and thickets, but are very often found within human altered areas. This species are opportunistic omnivores; diets include vertebrates, invertebrates, plant material, fruits, grains, and carrion.

3.4.10.1.1.6 Eulipotyphlans

In the proposed action areas, Order Eulipotyphlans includes moles and shrews. Moles are subterranean mammals, found in the eastern states and southern Great Plains of the United States. Preferred habitat contains well-drained, loose, sandy or loamy soil. Moles avoid very dry or very wet soils. They may be present in the USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas. Their diet primarily consists of earthworms and other small invertebrates found in the soil.

Shrews are more widely distributed through North America; they may be present in all proposed action areas. Their preferred habitats range by individual species. While short-tailed shrews prefer dark, damp, or wet locations in flooded areas, Pacific shrews can be found in damp areas along creeks in forests and sometimes near collapsed trees (Missouri Department of Conservation 2020b). Shrews generally forage for seeds, insects, nuts, worms, and a variety of other foods in leaf litter and dense vegetation.

3.4.10.1.1.7 Lagomorpha

In the proposed action areas, Order Lagomorpha is comprised of rabbits and hares. They have adapted to a variety of habitats, from desert to tundra, forests, mountains, and swamps and may be present in all proposed action areas. While rabbits generally dig permanent burrows for shelter, hares rarely dig shelters. Both rabbits and hares are almost exclusively herbivorous, feeding primarily on grasses and herbs, though they also eat leaves, fruit, and various seeds.

3.4.10.1.1.8 Rodentia

Order Rodentia is the largest order of mammals by number of taxa, and includes squirrels, gophers, rats, mice, lemmings, and voles. Rodentia are found throughout the proposed action areas in a variety of environments. Some rodents live in trees (e.g., squirrels), while others live in burrows (e.g., gophers, voles). Beavers are considered semiaquatic, building dams and lodges. Due to the variety of habitats preferred by different families of rodents and their wide distribution throughout North America, it is assumed that rodents would be present in all proposed action areas. The primary defining feature of rodents is their continuously growing, razor-sharp, open-rooted incisors (Myers 2000). Most rodents are herbivores, though some will opportunistically consume insects, fish, or meat.

3.4.10.1.2 ESA-Listed Terrestrial Mammals

There are 19 ESA-listed terrestrial mammals that may be present in the proposed action areas. ESA-listed species may be present in all of the proposed action areas, and are listed in Table 3-38. Critical habitat for ESA-listed terrestrial mammals is discussed in Section 3.4.12.1.8.

Table 3-38. ESA-Listed Terrestrial Mammal Species in the Proposed Action Areas

Common Name (Scientific Name)	***ESA Listing Status***	***Distribution***	***Proposed Action Area Occurrence***	***Critical Habitat in the Proposed Action Areas***
Alabama beach mouse (*Peromyscus polionotus ammobates*)	Endangered (50 FR 23872; June 6, 1985)	Restricted to the coastal sand dunes of Escambia, Alabama.	GoMEX and Mississippi River	Yes (72 FR 4330; January 30, 2007)
Anastasia Island beach mouse (*Peromyscus polionotus phasma*)	Endangered (54 FR 91; May 12, 1989)	Occurs in coastal sand dunes on the north and south ends of Anastasia Island, Florida.	USEC-South	N/A
Canada lynx (*Lynx canadensis*)	Threatened (65 FR 58; March 24, 2000)	Known or believed to occur in Alaska, Colorado, Idaho, Maine, Michigan, Minnesota, Montana, New Hampshire, New Mexico, Oregon, Utah, Vermont, Washington, Wisconsin, and Wyoming. They are closely associated with the North American boreal forest.	Great Lakes, PNW, GoMEX and Mississippi River, SEAK	No
Choctawhatchee beach mouse (*Peromyscus polionotus allophrys*)	Endangered (50 FR 23872; June 6, 1985)	Range is limited to Walton and Bay Counties, Florida.	USEC-South	Yes (71 FR 60237; October 12, 2006)
Columbian white-tailed deer (*Odocoileus virginianus leucarus*)	Columbia River DPS: Threatened (81 FR 71386; October 17, 2016)	In limited areas of Clatsop, Multnomah, and Columbia Counties in Oregon and Cowlitz, Wahkiakum, Pacific, Skamania, and Clark Counties in Washington.	PNW	N/A
Florida bonneted bat (*Eumops floridanus*)	Endangered (78 FR 61003; October 2, 2013)	Extreme southern and southeastern Florida coast to southwestern Florida.	USEC-South	No
Florida panther (*Puma concolor coryi*)	Endangered (32 FR 4001; March 11, 1967)	Mostly south of the Caloosahatchee River in southern Florida with some movement north as far as Georgia. They inhabit forested habitats, marsh shrub swamps, prairie grasslands, and agricultural lands.	USEC-South, GoMEX and Mississippi River	N/A
Florida salt marsh vole (*Microtus pennsylvanicus dukecampbelli*)	Endangered (56 FR 1457; January 14, 1991)	Inhibits a single salt marsh at Waccasassa Bay on the Gulf Coast of Florida in Levy County.	USEC-South	N/A

Common Name (Scientific Name)	*ESA Listing Status*	*Distribution*	*Proposed Action Area Occurrence*	*Critical Habitat in the Proposed Action Areas*
Gray bat (*Myotis girsescens*)	Endangered (41 FR 17736; April 28, 1976)	Tennessee to eastern Oklahoma and south to Alabama, with a growing population in Indiana	USEC-South, GoMEX and Mississippi River	N/A
Indiana bat (*Myotis sodalist*)	Endangered (32 FR 4001; March 11, 1967)	Eastern-central United States, from Oklahoma, Kansas, Iowa and Wisconsin east to Vermont, and south to northwestern Florida	GoMEX and Mississippi River	Yes (41 FR 41914; September 24, 1976)
Key deer (*Odocoileus virginianus clavium*)	Endangered (32 FR 4001; March 11, 1967)	Every habitat, including pine forests, mangroves, and freshwater wetlands throughout the Florida Keys.	USEC-South	N/A
Lower Keys marsh rabbit (*Sylvilagus palustris hefneri*)	Endangered (55 FR 25588; June 21, 1990)	Grassy areas of freshwater wetlands and salt marshes in the Lower Florida Keys.	USEC-South	N/A
Northern long-eared bat (*Myotis septenrionalis*)	Threatened (80 FR 2371; January 16, 2015)	Eastern and north central United States and all Canadian provinces	USEC-MidATL, USEC-South, Great Lakes, GoMEX and Mississippi River	N/A
Ozark big-eared bat (*Corynorhinus townsendii ingens*)	Endangered (44 FR 69206; November 30, 1976)	Eastern Oklahoma, northwestern and north-central Arkansas	GoMEX and Mississippi River	N/A
Perdido Key beach mouse (*Peromyscus polionotus trissyllepsis*)	Endangered (50 FR 23872; June 6, 1985)	Restricted to the beaches and dunes of Perdido Key in Baldwin County, Alabama and Escambia County, Florida.	GoMEX and Mississippi River; USEC-South	Yes (71 FR 60237; October 12, 2006)
Puma (*Puma concolor*)	Threatened (56 FR 40265; August 14, 1991)	Protected within the Florida portion of their range (where they potentially overlap with the Florida panther).	USEC-South, GoMEX and Mississippi River	N/A
Red wolf (*Canis rufus*)	Endangered (32 FR 4001; March 11, 1967) Experimental Population, Non-Essential (51 FR 41790; January 19, 1986)	Only a non-essential experimental population in northeastern North Carolina exists, along with some wolves in captivity.	USEC-MidATL	N/A
Silver rice rat (*Oryzomys palustris natator*)	Endangered (56 FR 19809; April 30, 1991)	Occurs in freshwater and salt marshes in the Lower Keys, Florida.	USEC-South	Yes (58 FR 46030; August 31, 1993)

Common Name (Scientific Name)	***ESA Listing Status***	***Distribution***	***Proposed Action Area Occurrence***	***Critical Habitat in the Proposed Action Areas***
Southeastern beach mouse (*Peromyscus polionotus niveiventris*)	Threatened (54 FR 20599; May 12, 1989)	Occurs in isolated sand dunes, on public lands, from Volusia County to Indian River County, Florida.	USEC-South	N/A
St. Andrew beach mouse (*Peromyscus polionotus peninsularis*)	Endangered (63 FR 70053; December 18, 1998)	This subspecies is restricted to coastal sand dunes in a portion of the St. Joseph Peninsula in Gulf County and Bay County, Florida.	USEC-South	Yes (71 FR 60237; October 12, 2006)
Virginia big-eared bat (*Corynorhinus townsendii virginianus*)	Endangered (44 FR 69206; November 30, 1979)	Western North Carolina, eastern Tennessee, southwestern Virginia, eastern Kentucky, and southern West Virginia	GoMEX and Mississippi River	No

N/A = no critical habitat has been designated.

3.4.10.1.2.1 Alabama Beach Mouse

The Alabama beach mouse (*Peromyscus polionotus ammobates*) is listed as endangered under the ESA throughout its range (50 FR 23872; June 6, 1985). Critical habitat has been designated for this species (72 FR 4330; January 30, 2007) within the proposed action areas. Alabama beach mice may be present in the GoMEX and Mississippi River proposed action area.

Gulf Coast species of beach mice, like the Alabama beach mouse, are all found in geographically distinct populations on barrier islands, keys, or coastal peninsulas between the eastern edge of Alabama and Cape San Blas (St. Joseph Peninsula), Florida. These species were endemic to the Gulf Coast of southern Alabama and northwestern Florida and are now restricted to sand dune habitat only. Existing populations of Alabama beach mouse occur in the primary and secondary coastal sand dunes, as well as interior dune ridges and scrub habitat along the Alabama Gulf Coast (U.S. Fish & Wildlife Service 2020a), specifically at Fort Morgan, within the Perdue Unit of the Bon Secour National Refuge, and the Gulf State Park, Alabama (Swilling Jr and Wooten 2002). Beach mice prefer to construct their burrows in mature, sparsely vegetated dunes adjacent to the high tide line (primary dunes) and the more densely vegetated dunes farther inland (secondary dunes).

Beach mice are nocturnal herbivores and live in the dunes that are located just above the high-tide line. Beach mice feed primarily on the seeds and fruits of sea oats (*Uniola paniculata*) and beach grass (*Panicum amarums*) (Blair 1951). However, based on seasonal availability, beach mice also feed on bluestem, ground cherry (*Physallis angustafolia*), evening primrose (*Oenothera humifusa*), beach pea (*Galactia* spp.), dune spurge (*Chamaesyce ammannioides*), jointweed (*Polygonella gracilis*), seashore elder (*Iva imbricata*), and seaside pennywort (*Hydrocotyle bonariensis*) (Bird et al. 2019). When these seeds are scarce, especially in the late winter or early spring, beach mice may consume invertebrates (e.g., beetles, leaf hoppers, true bugs, and ants) or fruiting bodies of sea rocket (*Cakile* spp.) (Ehrhart L.M. 1978).

3.4.10.1.2.2 Anastasia Island Beach Mouse

The Anastasia Island beach mouse (*Peromyscus polionotus phasma*) is listed as endangered under the ESA throughout its range (54 FR 91; May 12, 1989). No critical habitat has been designated for this species.

Atlantic Coast beach mice, like the Anastasia Island beach mouse, range along Florida's Atlantic coast between Ponte Vedra Beach and Hollywood Beach. The Anastasia Island beach mouse currently only inhabits sand dunes on Anastasia Island, Florida (Florida Fish and Wildlife Conservation Commission 2020a), which is within the USEC-South proposed action area. Beach mice prefer to construct their burrows in mature, sparsely vegetated dunes adjacent to the high tide line (primary dunes) and the more densely vegetated dunes farther inland (secondary dunes).

Beach mice are nocturnal herbivores and live in the dunes that are located just above the high-tide line. The diet of the Anastasia Island beach mouse consists of insects and the seeds and fruit of dune vegetation, as described in Section 3.4.10.1.2.1.

3.4.10.1.2.3 Canada Lynx

Canada lynx (*Lynx canadensis*) are listed as threatened under the ESA throughout their range (65 FR 58; March 24, 2000). Critical habitat has been designated within five various units in the states of Idaho, Maine, Minnesota, Montana, Washington, and Wyoming (79 FR 177; September 12, 2014), but is outside of the proposed action areas. Canada lynx may be present in the Great Lakes, PNW, GoMEX and Mississippi River, and SEAK proposed action areas.

They have a population that is known or believed to occur in Alaska, Colorado, Idaho, Maine, Michigan, Minnesota, Montana, New Hampshire, New Mexico, Oregon, Utah, Vermont, Washington, Wisconsin, and Wyoming (Devineau et al. 2010; U.S. Fish & Wildlife Service 2013). They are closely associated with the North American boreal forest and, in Canada and Alaska, they inhabit the boreal forest ecosystem known as the taiga (Squires et al. 2013).

Lynx are most likely to be present in areas that receive deep snow and have high populations of snowshoe hares (*Lepus americanus*), the principal prey of lynx. Snowshoe hares make up to 60-97% of their diet, averaging a rate of consumption of one hare every 1-2 days (Sunquist and Sunquist 2017).

3.4.10.1.2.4 Choctawhatchee Beach Mouse

The Choctawhatchee beach mouse (*Peromyscus polionotus allophrys*) is listed as endangered under the ESA throughout its range (50 FR 23872; June 6, 1985). Critical habitat has been designated for this species (71 FR 60237; October 12, 2006) within the USEC-South proposed action area. Choctawhatchee beach mice may be present in the USEC-South proposed action area.

Gulf Coast species of beach mice, like the Choctawhatchee beach mouse, are all found in geographically distinct populations on barrier islands, keys, or coastal peninsulas between the eastern edge of Alabama and Cape San Blas (St. Joseph Peninsula), Florida. These species were endemic to the Gulf Coast of southern Alabama and northwestern Florida and are now restricted to sand dune habitat only. Found in the sand dunes, the Choctawhatchee beach mouse is endemic to the Walton area of the Florida Panhandle from Okaloosa County west to St. Andrew Bay in Bay County, Florida (Hipes et al. 2001). Beach mice prefer to construct their burrows in mature, sparsely vegetated dunes adjacent to the high tide line (primary dunes) and the more densely vegetated dunes farther inland (secondary dunes).

Beach mice are nocturnal herbivores and live in the dunes that are located just above the high-tide line. Beach mice feed primarily on the seeds and fruits of sea oats (*Uniola paniculata*) and beach grass (*Panicum amarums*) (Blair 1951). However, based on seasonal availability, beach mice also feed on bluestem, ground cherry (*Physallis angustafolia*), evening primrose (*Oenothera humifusa*), beach pea (*Galactia* spp.), dune spurge (*Chamaesyce ammannioides*), jointweed (*Polygonella gracilis*), seashore elder (*Iva imbricata*), and seaside pennywort (*Hydrocotyle bonariensis*) (Bird et al. 2019). When these seeds are scarce, especially in the late winter or early spring, beach mice may consume invertebrates (e.g., beetles, leaf hoppers, true bugs, and ants) or fruiting bodies of sea rocket (*Cakile* spp.) (Ehrhart L.M. 1978).

3.4.10.1.2.5 Columbian White-Tailed Deer

Columbian white-tailed deer (*Odocoileus virginianus leucarus*) are listed as threatened under the ESA throughout their range along the lower Columbia River (81 FR 71386; October 17, 2016). No critical habitat is designated for this species. This species is likely to overlap with the PNW proposed action area only.

Their historic range is from the western slopes of the Cascade Mountains to the ocean and from Puget Sound in Washington southward to the Umpqua River Basin in southern Oregon. The Lower Columbia River population is found in Clark, Cowlitz, Pacific, Skamania and Wahkiakum Counties, Washington, and Clatsop, Columbia and Multnomah Counties, Oregon. Columbian white-tailed deer are closely associated with riparian habitats. They found on islands in the Columbia River and use tidal spruce habitats characterized by densely forested swamps covered with tall shrubs and scattered spruce, alder, cottonwood and willow trees (U.S Fish and Wildlife Service 2019a).

Columbian white-tailed deer feed on young willow, cottonwood, alder, and other deciduous trees in riparian areas (U.S Fish and Wildlife Service 2016a). They have several natural predators, including coyotes, though habitat change, agricultural practices, and commercial developed are most destructive to their riparian habitats (U.S Fish and Wildlife Service 2016a).

3.4.10.1.2.6 Florida Bonneted Bat

Florida bonneted bats (*Eumops floridanus*) are listed as endangered under the ESA throughout their range. Currently, no critical habitat has been designated for the Florida bonneted bat. They are likely to be present within the USEC-South proposed action area only.

Florida bonneted bats are endemic to southern Florida and have one of the most restricted distributions of any species of bat in the North America. A limited number of individuals range from the extreme southern and southeastern Florida coast to southwestern Florida (Timm and Genoways 2004). However, Bailey et al (2017) estimates that this species may be more common and more widely distributed, particularly in the northern limit of its range, than previously thought (Bailey et al. 2017).

Little is known about the ecology and long-term habitat requirements of the Florida bonneted bat. They use forests and other areas with tall, mature trees, as well as manmade structures, such as buildings, bridges, and bat houses, as habitats for roosting and rearing offspring (U.S. Department of Interior). At present, there are no known active, natural roosting sites for Florida bonneted bats, and only a limited amount of information is available about historical roosting sites (U.S Fish and Wildlife Service 2015b). Based on the Florida bonneted bat's ability of prolong flight, it is believed to be capable of dispersing large distances. This species is presumed to have a large home range and foraging areas located long distances from roost sites (U.S. Department of Interior 2013).

Florida bonneted bats forage in relatively open areas to find prey and freshwater. Bats forage over ponds, streams, and wetlands and drink when flying over open water. During dry seasons, this species becomes more dependent on standing wetlands. They primarily utilize dry prairie, freshwater marsh, wet prairie and pine flatwoods habitats for foraging and roosting (Marks and Marks 2008a; U.S Fish and Wildlife Service 2015b).

These bats primarily feed on flying insects, mostly from the orders Coleoptera, Diptera, and Lepidoptera. They forage in open spaces and use echolocation to detect prey at ranges approximately 10 to 16 ft (3 to 5 m) away (Belwood 1981, 1992; U.S. Department of Interior 2013).

3.4.10.1.2.7 Florida Panther

The Florida panther (*Puma concolor coryi*) is listed as endangered under the ESA throughout its range (32 FR 4001; March 11, 1967). No critical habitat has been designated for this species. Florida panthers may be present in the USEC-South and GoMEX and Mississippi River proposed action areas.

Current range includes one breeding population in southern Florida south of the Caloosahatchee River while there have been documented cases north of that, even into Georgia (Florida Fish and Wildlife Conservation Commission 2020b; U.S. Fish & Wildlife Service 2008). The Florida panther inhabits forested habitats, marsh shrub swamps, prairie grasslands, and agricultural lands. Dense understory vegetation provides some of the most important feeding, resting, and denning cover for panthers (U.S Fish and Wildlife Service 2018a).

Distribution through southern Florida is not continuous, and population fluctuations of the panther and their prey in certain areas are due to periodic floods and droughts (Maehr et al. 2002). They are opportunistic predators that primarily eat white-tailed deer and wild hogs, as well as smaller mammals such as raccoons, armadillos, and rabbits as well as unsecured livestock and pets (U.S Fish and Wildlife Service 2018a).

3.4.10.1.2.8 Florida Salt Marsh Vole

Florida salt marsh voles (*Microtus pennsylvanicus dukecampbelli*) are listed as endangered under the ESA throughout their range (56 FR 1457; January 14, 1991). No critical habitat has been designated for this species. The Florida salt marsh vole is known to occur at only one site at Waccasassa Bay, on the northern west coast in Levy County, Florida, which is within the USEC-South proposed action area.

Florida salt marsh voles are generally restricted to the transitional high salt marsh zone, and is further restricted to areas near the edge of patches of black rush (*Juncus roemerianus*) and patches of seashore saltgrass (*Distichlis spicata*) (U.S. Fish & Wildlife Service 1997). The diet of the Florida salt marsh vole consists of plants, but primarily grasses (U.S. Fish and Wildlife Service 2001).

3.4.10.1.2.9 Gray Bat

The gray bat (*Myotis girsescens*) is listed as endangered under the ESA throughout its range (32 FR 4001; March 11, 1967). Currently, no critical habitat has been designated for the gray bat. This species is likely to overlap with the USEC-South and GoMEX and Mississippi River proposed action areas.

The gray bat occupies a limited range in the United States, from Tennessee to eastern Oklahoma and south to Alabama, with a growing population in Indiana. This species inhabits limestone karst (a topography formed from the dissolution of soluble rocks such as limestone) caves year-round. (Barbour and Davis 1969b). In winter, gray bats hibernate in deep vertical caves, with the lower levels of the cave acting as a cold air trap (U.S Fish and Wildlife Service 1982). They typically form large clusters, with some aggregations numbering in hundreds of thousands of individuals (Tuttle and Kennedy 2005). In the summer, they roost in caves along rivers. Tuttle (1979) noted that an estimated 95 percent of this species population was confined to only nine caves (Tuttle 1979). Gray bats forage over the open water of rivers, streams, lakes, and reservoirs. Although, some gray bats have been recorded traveling up to 22 mi (35 km) from cave roosts to prime foraging habitat, most gray bats forage between 0.5–2.5 mi (1–4 km) from their roosts (LaVal et al. 1977; Tuttle 1976b; Tuttle and Kennedy 2005).

Foraging of gray bats in the summer is strongly correlated with open water of rivers, streams, lakes or reservoirs. Gray bats are opportunistic foragers; however, they are highly dependent on aquatic insects, especially mayflies, caddisflies, and stone flies, but will also consume beetles and moths (Tuttle and Kennedy 2005). Gray bats may fall prey to hawks, owls, skunks, foxes, mice, snakes, and housecats (Harriman 2003).

3.4.10.1.2.10 Indiana Bat

The Indiana bat (*Myotis sodalist*) is listed as endangered under the ESA throughout its range (32 FR 4001; March 11, 1967). Critical habitat was designated as 13 winter habitat locations (hibernacula), including 11 caves and two mines in six states (U.S Fish and Wildlife Service 2009b), some of which overlap with the GoMEX and Mississippi River proposed action area, as discussed in Section 3.4.12.1.8. This species is likely to overlap with the GoMEX and Mississippi River proposed action area only.

The range of the Indiana bat includes much of the eastern-central United States, from Oklahoma, Kansas, Iowa and Wisconsin east to Vermont, and south to northwestern Florida (Thomson 1982). During winter, this species hibernates in limestone karst caves, as well as abandoned mines. These types of hibernacula usually include large rooms and vertical or extended passages. This complexity allows for the temperature and humidity to remain constant during the winter. This species usually hibernates in large dense clusters (300 bats per square foot) and share hibernaculum with other species such as gray bats, Virginia big-eared bats, northern long-eared bats and little brown bats (*Myotis lucifugus*). Female Indiana bats are thought to return annually to the same hibernacula (U.S Fish and Wildlife Service 2007a).

Indiana bat's summer habitat includes small to medium river and stream corridors with well-developed riparian woods (U.S Fish and Wildlife Service 2007a) . Most reproductive females occupy roost sites under exfoliating bark of dead trees. Roost tree heights range from 52 to 85 ft (16 to 26 m). Generally, living trees are used as alternate roost sites when dead ones are not available (U.S Fish and Wildlife Service 2007a). Roost trees are typically within canopy gaps in a forest, along manmade fences, or along a wooded edge. (U.S Fish and Wildlife Service 2009b). During mating season in the fall, male bats roost in trees near the hibernacula during the day and fly to the cave at night (Murray and Kurta 2002; U.S Fish and Wildlife Service 2007a).

Indiana bats are nocturnal insectivores. They forage between dusk and dawn and feed exclusively on flying insects, primarily moths, beetles, and aquatic insects. Terrestrial-based prey (i.e., moth and beetles) were more common in southern studies, whereas aquatic-based insects (i.e., flies and caddisflies) dominated in the north. This indicates that southern bats forage more in upland habitats, and northern bats hunt more in wetlands or above streams and ponds. They capture and consume prey while flying (Murray and Kurta 2002; Sparks et al. 2005b). Foraging typically occurs in semi-open to closed forested habitats, forest edges, and riparian areas (U.S Fish and Wildlife Service 2007a). Indiana bats hunt primarily around, not within, the canopy of trees, but they occasionally descend to sub canopy and shrub layers. In riparian areas, they primarily forage near riparian and floorplan trees, as well as solitary trees and forest edges within the floodplain (Clark et al. 1987). Predators of Indiana bats include snakes, owls, and feral cats (Butchkoski 2010).

3.4.10.1.2.11 Key Deer

The Key deer (*Odocoileus virginianus clavium*) is listed as endangered under the ESA throughout its range (32 FR 4001; March 11, 1967). No critical habitat is designated for this species. This species is likely to overlap with the USEC-South proposed action area only.

Key deer are found throughout the Florida Keys in every habitat including pine forests, mangroves, and freshwater wetlands. They swim between islands of the Florida Keys and move around their habitat in search of freshwater (The National Wildlife Federation n.d.). They graze on several native plant species including mangrove trees and thatch palm berries. They do not have any natural predators, but rather, this species is threatened by habitat loss and poaching (U.S Fish and Wildlife Service 2018b).

3.4.10.1.2.12 Lower Keys Marsh Rabbit

The lower keys marsh rabbit (*Sylvilagus palustris hefneri*), a subspecies of the marsh rabbit (*S. palustris*), is listed as endangered under the ESA throughout its range (55 FR 25588; June 21, 1990). There is no critical habitat designated for this species. They may be present in the USEC-South proposed action area only.

Marsh rabbits are widespread in the southeastern U.S., and the lower keys marsh rabbit is endemic to the Lower Florida Keys (U.S Fish and Wildlife Service 2020b). This species lives in grassy areas of both freshwater wetlands and saltmarshes. They use tall grasses for food, shelter, and nesting sites (U.S Fish and Wildlife Service 2015c). They prefer areas with high amounts of grass clumps, ground cover, and areas close to large bodies of water. They will occasionally use low shrub marshes and mangrove communities (U.S Fish and Wildlife Service 2020b). Breeding may occur year-round in southern Florida (Thompson 2020).

Marsh rabbits are avid swimmers, often diving into the water as an escape response (Thompson 2020). Additionally, they are nocturnal; to help them avoid predators, they hide in dense vegetation during the day. Marsh rabbits eat a variety of vegetation, with the most important food species being sea ox-eye (*Borrichia frutescens*) (U.S Fish and Wildlife Service 2020b).

3.4.10.1.2.13 Northern Long-Eared Bat

The northern long-eared bat (*Myotis septentrionalis*) is listed as threated under the ESA throughout its range (80 FR 2371; January 16, 2015). Currently, no critical habitat has been designated for the northern long-eared bat. This species is likely to overlap with portions of the USEC-MidATL, USEC-South, Great Lakes, and GoMEX and Mississippi River proposed action areas.

Northern long-eared bats are common and widely distributed forest dwellers. They are found in the eastern and north-central United States and all Canadian provinces (Henderson and Broders 2008). They are commonly encountered, especially during swarming and hibernation, in eastern Canada and New England states, but range as far south as Florida and west into Alberta, British Columbia, Montana, and Wyoming (Caceres and Baraclay 2000).

The northern long-eared bat’s diet varies with geographic location or seasonally among individuals (Caceres and Baraclay 2000). They forage most commonly on moths, beetles, and spiders (Brack and Whitaker 2001; Feldhamer et al. 2009). Their foraging techniques include hawking, catching insects in flight, and gleaning (i.e., catching insects from vegetation and from the water’s surface) (Ratcliffe and

Dawson 2003). Gleaning bats use passive listening as well as echolocation to locate insects resting on leaves, tree trunks, or against buildings (Caceres and Baraclay 2000). They show a preference for foraging in forested hillsides and ridges, as opposed to riparian areas (Brack and Whitaker 2001; LaVal et al. 1977).

3.4.10.1.2.14 Ozark Big-Eared Bat

The Ozark big-eared bat (*Corynorhinus townsendii ingens*) is listed as endangered under the ESA throughout its range (44 FR 69206; November 30, 1976). Currently, no critical habitat has been designated for the Ozark big-eared bat. Ozark big-eared bats are likely to be present within the GoMEX and Mississippi River proposed action area only.

Ozark big-eared bats are obligate cave dwellers during winter and summer (Swanson 1991). Their current range is eastern Oklahoma, northwestern and north-central Arkansas. Historically, they were also found in southwestern Missouri. There are ten known caves in Oklahoma and four in Arkansas considered essential to bats' continued existence in this range. (U.S Fish and Wildlife Service 1995). Harvey (1992) found that banded bats are seldom found more than 20 mi (32 km) from the banding site. Like many other bats, these bats generally return year after year to the same maternity site and hibernaculum (Harvey 1992). This bat is associated with caves, cliffs, and rock ledges in well-drained, oak-hickory Ozark forests. Maternity caves and hibernacula occur in a variety of areas, including large blocks of forests to small forest tracts interspersed with open areas. (U.S Fish and Wildlife Service 1995).

Solitary males usually occur in caves, talus cracks, and cliff overhangs during the summer. Both sexes hibernate at cold locations in cold caves during winter months (U.S Fish and Wildlife Service 1995). Tight-clustered hibernation colonies can include over 100 individuals of both sexes (Clark 1991).

Ozark big-eared bats emerge from their cave to forage later in the day than most bats, usually after dark (Harvey 1992). These bats feed mainly on moths and primarily near trees. Edge habitat, between forested and open area are the preferred foraging areas. Open areas are preferable as bats are not obstructed (e.g., clutter) while pursuing prey and are able to discriminate insects at a greater distance (Clark 1991). As the sun sets, bats move closer to the entrance and fly in and out several times before foraging (Clark et al. 2002). Edge habitats of intermittent streams were used more than other relatively available habitats (Clark et al. 1993).

3.4.10.1.2.15 Perdido Key Beach Mouse

The Perdido Key beach mouse (*Peromyscus polionotus trissyllepsis*) is listed as endangered under the ESA throughout its range (50 FR 23872; June 6, 1985). Critical habitat has been designated for this species (71 FR 60237; October 12, 2006) and overlaps with the USEC-South and GoMEX and Mississippi River proposed action areas, as discussed in Section 3.4.12.1.8. The Perdido Key beach mouse may be present in the GoMEX and Mississippi River proposed action area.

Gulf Coast species of beach mice, like the Perdido Key beach mouse, are all found in geographically distinct populations on barrier islands, keys, or coastal peninsulas between the eastern edge of Alabama and Cape San Blas (St. Joseph Peninsula), Florida. These species were endemic to the Gulf Coast of southern Alabama and northwestern Florida and are now restricted to sand dune habitat only. Perdido Key beach mice are restricted to the Perdido Key State Recreation Area and Johnson Beach National Seashore, which make up the Perdido Key barrier island (Alabama Department of Conservation and Natural Resources 2020b). The Perdido Key beach mouse is found in all areas from the frontal dunes to within several feet of the northern Perdido Bay. Beach mice prefer to construct their burrows in mature, sparsely vegetated dunes adjacent to the high tide line (primary dunes) and the more densely vegetated dunes farther inland (secondary dunes).

Beach mice are nocturnal herbivores and live in the dunes that are located just above the high-tide line. Beach mice feed primarily on the seeds and fruits of sea oats (*Uniola paniculata*) and beach grass (*Panicum amarums*) (Blair 1951). However, based on seasonal availability, beach mice also feed on bluestem, ground cherry (*Physallis angustafolia*), evening primrose (*Oenothera humifusa*), beach pea (*Galactia* spp.), dune spurge (*Chamaesyce ammannioides*), jointweed (*Polygonella gracilis*), seashore elder (*Iva imbricata*), and seaside pennywort (*Hydrocotyle bonariensis*) (Bird et al. 2019). When these seeds are scarce, especially in the late winter or early spring, beach mice may consume invertebrates (e.g., beetles, leaf hoppers, true bugs, and ants) or fruiting bodies of sea rocket (*Cakile* spp.) (Ehrhart L.M. 1978).

3.4.10.1.2.16 Puma

The puma (*Puma concolor*), also commonly called mountain lion, cougar, or panther, is listed as threatened under the ESA wherever they occur in Florida, due to a similarity of appearance to the Florida panther (56 FR 40265; August 14, 1991). This protection was enacted to prevent the endangered Florida panther from illegal “take” under the ESA, as they are very difficult to distinguish.

3.4.10.1.2.17 Red Wolf

The red wolf (*Canis rufus*) is listed as endangered (32 FR 4001; March 11, 1967) under the ESA if found outside of those which are known and part of the experimental population (51 FR 41790; January 19, 1986). No critical habitat has been designated for this species.

Red wolves are the world’s most endangered wolf and were declared extinct in the wild in 1980. A small remaining population was found in southeast Texas and southwest Louisiana and captured to create a captive breeding program and prevent extinction (U.S. Fish & Wildlife Service 2020c). In 1987, wild recovery efforts commenced with the establishment of a non-essential experimental population in northeastern North Carolina. There was a peak in population from 2000–2010 of around 130 animals, which has since declined dramatically from human caused mortality and hybridization with coyotes, to an estimated 20 (U.S. Fish & Wildlife Service 2020c).

Red wolves are opportunistic feeders and predate on vulnerable prey, which offer the best chance of capture (U.S Fish and Wildlife Service 2018c). In Texas and Louisiana, the remnant red wolf population primarily ate small mammals (i.e., rabbits and rodents) and other small animals like nutria (Paradiso and Nowak 1972). In eastern North Carolina the primary food sources consist of white-tailed deer, raccoons, marsh rabbits, and small rodents (McVey et al. 2013; Phillips et al. 2003) while small mammals, insects, reptiles, amphibians, vegetation, fish, birds, and crustaceans have also been consumed (Phillips et al. 1995).

3.4.10.1.2.18 Silver Rice Rat

The silver rice rat (*Oryzomys palustris natator*) is listed as endangered under the ESA throughout its range (56 FR 19809; April 30, 1991). Critical habitat has been designated for this species (58 FR 46030; August 31, 1993) in the USEC-South proposed action area and is discussed further in Section 3.4.12.1.8. Silver rice rats may be present in the USEC-South proposed action area.

Silver rice rats inhabit salt marsh flats, mangrove swamps, and buttonwood transition vegetation on 12 islands in the lower Florida Keys (U.S. Fish & Wildlife Service 1999a). They feed on insects, crabs, and snails, but may occasionally feed on clams, fishes, baby turtles, carcasses of muskrats, deer mice (*Peromyscus maniculatus*), sparrows, eggs and young of marsh wrens, and seeds from wetland plants (Sharp Jr 1967). Silver rice rats are preyed upon by cats, black rats (*Rattus rattus*), and raccoons. Silver rice rats depend on both freshwater wetlands and saline wetland habitat, especially large areas of adjacent or contiguous habitat. Silver rice rats' range does not extend beyond the southernmost edges of freshwater marshes (Goodyear 1987).

3.4.10.1.2.19 Southeastern Beach Mouse

The southeastern beach mouse (*Peromyscus polionotus niveiventris*) is listed as threatened under the ESA throughout its range (54 FR 20599; May 12, 1989). No critical habitat has been designated for this species. Southeastern beach mice may be present in the USEC-South proposed action area.

Atlantic Coast beach mice, like the southeastern beach mouse, range along Florida's Atlantic coast between Ponte Vedra Beach and Hollywood Beach. It occurs in sand dunes in Volusia County (Smyrna Dunes Park), federal lands in Brevard County (Canaveral National Seashore, Merritt Island National Wildlife Refuge, and Cape Canaveral Air Force Station), and in Indian River County (Sebastian Inlet State Recreation Area), Florida (U.S. Fish and Wildlife Service 2005a), which is within the USEC-South proposed action area. A study conducted on Merritt Island in Brevard County, Florida indicated that the southeastern beach mice may prefer open sand habitat with clumps of palmetto and sea grapes, or dense scrub habitat dominated by palmetto, sea grape, and wax myrtle (Extine and Stout 1987). Beach mice prefer to construct their burrows in mature, sparsely vegetated dunes adjacent to the high tide line (primary dunes) and the more densely vegetated dunes farther inland (secondary dunes).

Beach mice are nocturnal herbivores and live in the dunes that are located just above the high-tide line. Beach mice feed primarily on the seeds and fruits of sea oats (*Uniola paniculata*) and beach grass (*Panicum amarums*) (Blair 1951). However, based on seasonal availability, beach mice also feed on bluestem, ground cherry (*Physallis angustafolia*), evening primrose (*Oenothera humifusa*), beach pea (*Galactia* spp.), dune spurge (*Chamaesyce ammannioides*), jointweed (*Polygonella gracilis*), seashore elder (*Iva imbricata*), and seaside pennywort (*Hydrocotyle bonariensis*) (Bird et al. 2019). When these seeds are scarce, especially in the late winter or early spring, beach mice may consume invertebrates (e.g., beetles, leaf hoppers, true bugs, and ants) or fruiting bodies of sea rocket (*Cakile* spp.) (Ehrhart L.M. 1978).

3.4.10.1.2.20 St. Andrew Beach Mouse

The St. Andrew beach mouse (*Peromyscus polionotus peninsularis*) is listed as endangered under the ESA throughout its range (63 FR 70053; December 18, 1998). Critical habitat has been designated for this species (71 FR 60237; October 12, 2006) and overlaps with the USEC-South proposed action area, as discussed in Section 3.4.12.1.8. St. Andrew beach mice may be present in the USEC-South proposed action area.

Gulf Coast species of beach mice, like the St. Andrew beach mouse, are all found in geographically distinct populations on barrier islands, keys, or coastal peninsulas between the eastern edge of Alabama and Cape San Blas (St. Joseph Peninsula), Florida. These species were endemic to the Gulf Coast of southern Alabama and northwestern Florida and are now restricted to sand dune habitat only. St. Andrew beach mice are restricted to coastal sand dunes in a portion of the St. Joseph Peninsula in Gulf County, Florida. Beach mice prefer to construct their burrows in mature, sparsely vegetated dunes adjacent to the high tide line (primary dunes) and the more densely vegetated dunes farther inland (secondary dunes).

Beach mice are nocturnal herbivores and live in the dunes that are located just above the high-tide line. Beach mice feed primarily on the seeds and fruits of sea oats (*Uniola paniculata*) and beach grass (*Panicum amarums*) (Blair 1951). However, based on seasonal availability, beach mice also feed on bluestem, ground cherry (*Physallis angustafolia*), evening primrose (*Oenothera humifusa*), beach pea (*Galactia* spp.), dune spurge (*Chamaesyce ammannioides*), jointweed (*Polygonella gracilis*), seashore elder (*Iva imbricata*), and seaside pennywort (*Hydrocotyle bonariensis*) (Bird et al. 2019). When these seeds are scarce, especially in the late winter or early spring, beach mice may consume invertebrates (e.g., beetles, leaf hoppers, true bugs, and ants) or fruiting bodies of sea rocket (*Cakile* spp.) (Ehrhart L.M. 1978).

3.4.10.1.2.21 Virginia Big-Eared Bat

Virginia big-eared bats (*Corynorhinus townsendii virginianus*) are listed as endangered under the ESA throughout their range (44 FR 69206; November 30, 1979). Five caves in West Virginia are designated as critical habitat for the Virginia big-eared bat (44 FR 69206; November 30, 1979); however, these caves do not overlap with any of the proposed action areas. The Virginia big-eared bat is likely to be present within the GoMEX and Mississippi River proposed action area only.

Virginia big-eared bats are considered non-migratory, and are found in isolated colonies in parts of western North Carolina, eastern Tennessee, southwestern Virginia, eastern Kentucky, and southern West Virginia. This species inhabits caves year-round in karst limestone regions dominated by oak-hickory forests (Barbour and Davis 1969a; Humphrey and Kunz 1976; Johnson and Strickland 2003).

Big-eared bats occupy a special feeding niche due to their enlarged and elongated ears and use of low-intensity echolocation calls. These adaptations, along with passive listening to locate moving prey, allow this genus to effectively use both gleaning and aerial hawing foraging strategies to capture flying insects. Gleaning bats are not dependent on having insect prey actively flying during foraging bouts, thus gleaning bats can feed later in the night and at cooler temperatures than bats that rely solely on aerial hawking to capture prey. Foraging habitats for Virginia big-eared bat include woodlands, oil fields, agricultural fields, along the edges of forest clearings, and along forested and riparian corridors (Lacki and Dodd 2011; U.S Fish and Wildlife Service 2008). These bats tend to forage in the same general area on successive nights, but may use more than one foraging area. Female Virginia big-eared bat often travel up to 4 to 6 mi (7 to 10 km) from the maternity cave to forage each night (U.S Fish and Wildlife Service 2008).

3.4.10.2 Environmental Consequences to Terrestrial Mammals

Impacts to terrestrial mammals would potentially result from vessel noise, ATON signal testing noise, tool noise, pile driving noise, construction, and brushing associated with the Proposed Action. As discussed in Table 3-3, vessel noise, ATON signal testing noise, and tool noise would be brief and intermittent and would not cause PTS or TTS in terrestrial mammals. There would be no impact to terrestrial mammals from fathometer and Doppler speed log noise, as it is outside the range of best hearing of terrestrial mammals. There would be no impact to terrestrial mammals from in-water stressors including vessel movement, bottom devices, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines. Therefore, the impacts of these stressors to terrestrial mammals will not be discussed further in this PEIS.

3.4.10.2.1 Vessel Noise

Terrestrial mammals would be exposed to in-air noise generated by vessels. As discussed in Appendix E, most terrestrial mammals are known have a wide range of hearing, covering four octaves in the high frequency range and nine octaves in the low frequency range. As a result, at least some terrestrial mammal species would be able to detect vessel noise, though some may hear it better than others. As discussed in Section 3.2.1.2, large vessels, like the WCC, would be expected to emit vessel noise with a frequency range of 20–300 Hz with a source level of 190 dB re 1 µPa at 1 m. Small vessels, like the cutter small boats, would be expected to emit vessel noise with a frequency range of 1–7 kHz with a source level of 175 dB re 1 µPa at 1 m.

Terrestrial mammals would not be exposed to vessel noise in the air for long durations of time, as the vessel would be moving throughout the proposed action areas on the waterways. Similar to birds, terrestrial mammals found along the shore may react to a vessel with a behavioral response, such as by flushing, fleeing, or freezing in place. Alternatively, the animal may be aware of the vessel's presence, but not consider it a threat, and therefore not alter its behavior. Vessel noise may cause startle responses and a temporary displacement of terrestrial mammals from an area. However, any behavioral response to vessel noise would be expected to be temporary and terrestrial mammals would be expected to return to the area once the source of disruption has moved away.

Mammals use sound to communicate. Communication may occur to find a mate, establish dominance, defend territory, or coordinate group behavior. Due to the broad range of behaviors in the terrestrial mammal group, these communications may be more important in some species than in others. However, masking of important sounds may occur. Because vessel noise would be short in duration as the vessel moves through a large proposed action area, it would not be expected that masking would occur for a long period of time. Therefore, masking may cause short term, temporary responses, such as adjusting vocal behavior, but would not likely disrupt normal behaviors such as breeding, feeding, or sheltering.

Although vessel presence raises the ambient levels of sound (Hildebrand 2009), it is expected that vessel noise associated with the Proposed Action would be similar to vessel noise from other ships in the proposed action areas and would not be expected to alter current levels of ambient sound, as the new WCC fleet would replace the current, aging WCC fleet. Vessel noise associated with the Proposed Action may affect individual mammals within the proposed action areas; however, responses to vessel noise would be short term and insignificant behavioral responses, and thus, would not be expected to have any population level impacts.

Any increase in ambient noise as a result of a WCC would be temporary and localized to the position of the vessel as it moves throughout the proposed action areas. Terrestrial mammals 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. Because vessel noise is transient as vessels move through very large proposed action areas, the effects of vessel noise would be expected to be limited to temporary behavioral effects and terrestrial mammals would be expected to return to normal behavior within minutes of a disruption.

3.4.10.2.2 ATON Signal Testing Noise

Terrestrial mammals could be exposed to in-air noise generated by ATON signals. As discussed in Appendix E, most terrestrial mammals have a wide range of hearing, covering four octaves in the high frequency range and nine octaves in the low frequency range. As a result, at least some terrestrial mammal species would be able to detect ATON signal testing noise, though some may hear it better than others. The frequency of ATON signals range from 300–850 Hz and the intensity can be from 118–140 dBA. While the signal is intense, the ATON signal testing noise is intermittent, either only occurring in certain types of weather conditions or only when triggered to sound, such as by a radio. The testing of these signals would only occur briefly to ensure they are in working order.

It is expected that ATON signal testing noise associated with the Proposed Action would be would be similar to current levels of noise in each proposed action area, as the new WCC fleet would continue to service the ATON that currently exist, as well as any new ATON that are established. ATON signal testing noise associated with the Proposed Action may affect individual mammals within the proposed action areas; however, responses to ATON signal testing noise would be short term and behavioral responses, such as flushing from the area adjacent to the ATON. These behavioral responses would be insignificant and thus, would not be expected to have any population level impacts.

Any temporary increase in ambient noise as a result of an ATON signal sounding would be temporary and localized to the position of the ATON and the surrounding area. Any masking would occur only briefly, and would cease when the ATON is not signaling. Terrestrial mammals are either not likely to respond to ATON signal testing 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. Because ATON signal testing noise is brief and intermittent, as well as scattered through very large proposed action areas, the effects of ATON signal testing noise would be expected to be limited to temporary behavioral effects and terrestrial mammals would be expected to return to normal behavior within minutes of a disruption.

3.4.10.2.3 Tool Noise

Terrestrial mammals could be exposed to in-air noise generated by tools. As discussed in Appendix E, most terrestrial mammals have a wide range of hearing, covering four octaves in the high frequency range and nine octaves in the low frequency range. As a result, at least some terrestrial mammal species would be able to detect tool noise, though some may hear it better than others. The frequency of tools and equipment used in construction and brushing are broadband noise, in which sound energy is distributed over a wide section of the audible range. The intensity can be from 74–116 dBA. While the tool noise can be moderately intense, the tool noise is intermittent and occurs only when ATON require construction, repairs, or brushing to maintain working order and visibility.

It is expected that tool noise associated with the Proposed Action would be would be similar to current levels of noise in each proposed action area, as the new WCC fleet would continue to service the ATON that currently exist, as well as any new ATON that are established. Tool noise associated with the Proposed Action may affect individual mammals within the proposed action areas; however, responses to tool noise would be short term and behavioral responses, such as flushing from the area adjacent to the activity by the ATON. These behavioral responses would be insignificant and thus, would not be expected to have any population level impacts.

Any temporary increase in ambient noise as a result of tool use would be temporary and localized to the position of the ATON and the surrounding area. Any masking would occur only briefly, and would cease when the tools are no longer in use. Terrestrial mammals are either not likely to respond to tool 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. Because tool noise is intermittent and infrequent, as well as scattered through very large proposed action areas, the effects of tool noise would be expected to be limited to temporary behavioral effects and terrestrial mammals would be expected to return to normal behavior within minutes of a disruption.

3.4.10.2.4 Pile Driving Noise

Pile driving noise may be detected by terrestrial mammals in air. As discussed in Appendix E, most terrestrial mammals have a wide range of hearing, covering four octaves in the high frequency range and nine octaves in the low frequency range. As a result, at least some terrestrial mammal species would be able to detect pile driving noise, though some may hear it better than others. Impacts to terrestrial mammals are not well understood; however, behavioral responses, physiological impacts such as TTS, or injury and mortality may occur.

Little is known about the how terrestrial mammals may respond to disturbance from pile driving. The response of a terrestrial mammal to an anthropogenic sound will 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. Distance from the sound source and whether it is perceived as approaching or moving away could also affect the way an animal responds. Potential behavioral responses to anthropogenic sound could include startle reactions, disruption of activities they are engaged in (e.g., feeding, traveling), alteration of speed or direction of travel, and area avoidance. Pile driving noise may disturb terrestrial mammals during pile driving operations, potentially interrupting the daytime sleep of nocturnal species or interfere with foraging in favored locations for diurnal species. It would be expected that terrestrial mammals would return to their normal behavior shortly after exposure.

In addition to the potential for behavioral response, higher sound exposure levels could lead to physiological effects (e.g., TTS). Rodents are known to be sensitive to sounds. Wild rodents subjected to continuous and intermittent noise from 78 to 120 dB showed temporary threshold shifts in hearing, increased adrenal weights, increased body weights, and anxiety-like behaviors (Manci et al. 1988). However, the frequency and duration of pile driving operations in any one location would be intermittent. Therefore, TTS would not be expected.

Any temporary increase in ambient noise as a result of pile driving would be temporary and localized to the position of the pile and the surrounding area. Any masking would occur only briefly, and would cease when the impact or vibratory hammer are no longer in use. Terrestrial mammals would not be likely to respond to pile driving noise in ways that would significantly disrupt normal behavior patterns which include, but are not limited to, migration, breeding, feeding, or sheltering. Because pile driving noise is intermittent and infrequent, as well as scattered through very large proposed action areas, the effects of pile driving noise would be expected to be limited to temporary behavioral effects and masking. Terrestrial mammals would be expected to return to normal behavior once pile driving has ceased.

3.4.10.2.5 Construction

Impacts to terrestrial mammals would be from the construction and maintenance of fixed ATON structures. These activities have the potential to impact terrestrial mammals by causing disturbance, which may result in behavioral responses by mammals. Similar to their responses to other physical or acoustic disturbances, it would be assumed that the most likely response of a terrestrial mammal to any disturbance is changing their direction of travel or fleeing the area as they detect an approaching person. However, short term behavioral responses to disturbance are not expected to result in long term impacts to individuals (such as chronic stress) or populations in the proposed action areas, given the diffuse fixed ATON structures spread throughout the proposed action areas. Avoidance of increased activity during the short duration of construction within an overall small footprint of disturbance is unlikely to cause abandonment or significant alteration of behavioral patterns, such as breeding, feeding, or sheltering.

In constructing an ATON at a site, a small percentage of habitat would be lost. No significant loss of habitat would occur, as vegetation would have the potential to regrow and would only impact a small percentage of habitat that is available to terrestrial mammals within each proposed action area.

Short term behavioral responses to construction are not expected to result in long term impacts to individuals (such as chronic stress) or populations in the proposed action area, given the diffuse ATON spread out throughout the proposed action areas. Avoidance of construction activity is unlikely to cause abandonment or significant alteration of behavioral patterns. If an ESA-listed terrestrial mammal were to encounter construction activity, any behavioral avoidance displayed would not result in significant disruption of breeding, feeding, or sheltering. Further, Coast Guard would follow SOPs (Appendix B) to be aware of ESA-listed terrestrial mammals near ATON they maintain and not to disturb them.

3.4.10.2.6 Brushing

Terrestrial mammals located on shore where brushing would take place could be impacted by disturbance, loss of habitat, injury, or mortality. Terrestrial mammals may be disturbed during brushing operations, causing behavioral responses such as fleeing the area. In clearing vegetation away in order to construct or maintain an ATON, a small percentage of habitat may be lost. Terrestrial mammals may also experience injury or mortality due to the use of tools and herbicides to clear away vegetation.

ATON brushing operations fall under the Coast Guard CATEX L38. The Coast Guard follows best management practices (U.S. Coast Guard 2017a) when conducting brushing operations, such as site surveys prior to arrival and commencing work (Appendix B). This includes knowledge about any potential ESA-listed species that may be on site prior to arrival and avoidance of these species during brushing activities.

Short term behavioral responses to brushing would not be expected to result in long term impacts to individuals (such as chronic stress) or populations in the proposed action areas, as fixed ATON structures are diffuse and spread throughout the proposed action areas. Terrestrial mammal avoidance of increased activity during the short duration and small footprint of brushing is unlikely to cause abandonment or significant alteration of behavioral patterns. No significant loss of habitat would occur, as vegetation would have the potential to regrow and brushing would only impact a small percentage of available habitat for terrestrial mammals. Although injury or mortality may occur, no long term population level impacts would be anticipated due to the small footprint of disturbance and given the diffuse fixed ATON structures spread throughout the proposed action areas.

ESA-listed terrestrial mammals may be affected by brushing activities. However, due to the low density of these ESA-listed species and the temporary presence of the team conducting these activities within any proposed action area, overlap between ESA-listed terrestrial mammals and brushing would be minimal. Therefore, brushing may cause short term, temporary behavioral responses, but these responses would not likely disrupt normal behaviors such as breeding, feeding, or sheltering. Brushing would not cause population level impacts to ESA-listed terrestrial mammals.

3.4.10.2.7 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, impacts to terrestrial mammals within the proposed action areas would be similar to what is currently present because the new WCC fleet would replace the capabilities of the existing inland tender fleet. In addition, WCC assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include the use of vessels, tools, and pile driving devices, as well as construction activities. Impacts to terrestrial mammals from the Proposed Action would be limited to small areas around ATON and vessels, and the disturbance to terrestrial mammals would be intermittent and brief in duration. Therefore, there would be no significant impact to terrestrial mammals as a result of Alternative 1.

Pursuant to the ESA, there would be no effect to ESA-listed terrestrial as a result of vessel movement, fathometer or Doppler speed log noise, bottom devices, unrecovered jet moorings, bottom devices and ATON retrieval devices, or tow lines. Vessel noise, ATON signal testing noise, tool noise, pile driving noise, pile driving, and construction, may affect, but are not likely to adversely affect ESA-listed terrestrial mammals (Table 3-38) under Alternative 1. Additionally, Alternative 1 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed terrestrial mammals (Section 3.4.12.2.8).

3.4.10.2.8 Impacts Under Alternatives 2–3

Under Alternatives 2–3, impacts to terrestrial mammals within the proposed action areas would be similar to what is currently present because the ship platforms would replace the capabilities of the existing inland tender fleet. In addition, ship platforms and their assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include the use of vessels, tools, and pile driving devices, as well as construction activities. Impacts to terrestrial mammals from the Proposed Action would be limited to small areas around ATON and vessels, and the disturbance to terrestrial mammals would be intermittent and brief in duration. Therefore, there would be no significant impact to terrestrial mammals as a result of Alternatives 2–3.

Pursuant to the ESA, there would be no effect to ESA-listed terrestrial mammals as a result of fathometer and Doppler speed log noise, vessel movement, bottom devices, pile driving, unrecovered jet moorings, ATON retrieval devices, or tow lines. Only land-based activities associated with the Proposed Action (construction and brushing) may affect, but are not likely to adversely affect ESA-listed terrestrial mammals (Table 3-38) under Alternative 1. Additionally, Alternative 1 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed terrestrial mammals (Section 3.4.12.1.8).

3.4.10.2.9 Impacts Under the No Action Alternative

Under the No Action Alternative, as the existing inland tender fleet is decommissioned and not replaced, the physical and acoustic stressors associated with the Proposed Action would not be introduced into the environment. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impact to terrestrial mammals with implementation of the No Action Alternative.

3.4.11 Marine Mammals

3.4.11.1 Affected Environment

Marine mammals are a diverse group of approximately 130 species. Most live predominantly in the marine habitat, although some species (e.g., seals, sea lions, walruses, and polar bears) spend time in terrestrial habitats and other marine mammals (e.g., certain species of dolphin) spend time in freshwater environments. The exact number of formally recognized marine mammal species changes periodically with new scientific information. The Society of Marine Mammalogy[24] maintains the most current species and subspecies list.

In the United States, all marine mammals are protected under the MMPA, and some are offered additional protection under the ESA. The MMPA defines a marine mammal "stock" as "a group of marine mammals of the same species or smaller taxon in a common spatial arrangement that interbreed when mature." For management purposes under the MMPA, a stock is considered an isolated population or group of individuals within a whole species that is found in the same area. However, generally due to a lack of sufficient information, management stocks defined by NMFS may include groups of multiple species, such as the six species grouped together as the Mesoplodon beaked whales management unit for the Pacific U.S. West Coast region (Carretta et al. 2020). In other cases, a single species may include multiple stocks recognized for management purposes (e.g., harbor porpoise (*Phocoena phocoena*) in Alaska; see (Muto et al. 2020)). NMFS maintains jurisdiction over whales, dolphins, porpoises, seals, and sea lions. The USFWS maintains jurisdiction over certain other marine mammal species, including sea otters (*Enhydra lutris*) and manatees (*Trichechus manatus*).

3.4.11.1.1 Major Groups of Marine Mammals within the Proposed Action Areas

Cetaceans (suborder Mysticeti and Odontoceti) and carnivores (including suborder Pinnipedia, and Mustelidea) may occur in the proposed action areas. This PEIS covers all marine mammals under both NMFS' and the USFWS' jurisdiction. Descriptions of ESA-listed marine mammals are discussed in Section 3.4.11.1.3. Any non-ESA listed species, including a non-ESA listed stock or DPS of an ESA-listed marine mammal is included in Section 3.4.11.1.4 with more species specific information provided in Appendix H. However, the analyses under Section 3.4.11.1.4 would be applicable to all, ESA or non-ESA-listed marine mammals. General information on marine mammal hearing and vocalization is discussed in Appendix E. This PEIS also presents information, when applicable, regarding subsistence hunting and whaling.

Several terms are used to describe different types of marine mammal distribution. Animals with a cosmopolitan distribution are those that are found all over the world, like many of the great whales. Circumpolar refers to a distribution in high latitudes around one of the poles. Some cetaceans have circumpolar distribution during only part of the year—these include populations of humpback whales (*Megaptera novaeangliae*), fin whales (*Balaenoptera physalus*), killer whales, and male sperm whales (*Physeter macrocephalus*).

A coastal distribution denotes an occurrence close to the coast and often includes adjacent waters over the continental shelf. Many marine mammals have a coastal distribution for part of all of their lives—these include many species of dolphins, porpoises, and some pinnipeds, as well as some baleen whales. The sea otter occurs almost exclusively in coastal waters. Species that occur in the open ocean, either year-round or for only a portion of the year, are pelagic. Any marine mammal whose distribution is partly to exclusively tied to ice is said to be pagophilic, or "ice-loving." Many of the pinnipeds breed and

[24] Society of Marine Mammalogy website: https://marinemammalscience.org/species-information/list-marine-mammal-species-subspecies/

feed on or around ice. It is also common to find aggregations of polar species in semi-permanent areas of open water, known as polynyas.

The entire list of marine mammal species, including a description of distribution and seasonality is provided in Appendix H. If a species is expected to be present in a proposed action area, it is identified by the DPS or MMPA stock expected in that geographic location. The term “NA” means that the geographic location is “not applicable” for that species—the species is not expected to be found in that geographic location where the activity specified is likely to occur (e.g., species is not expected to be present in the GoMEX proposed action area where pile driving is proposed), but is included for consistency.

3.4.11.1.2 Habitat Use

Many factors influence the distribution of marine mammals in the proposed action areas, primarily patterns of major ocean currents, bottom relief, and water temperature, which, in turn, affect prey distribution and productivity. The continuous movement of water from the ocean bottom to the surface creates a nutrient-rich, highly productive environment for marine mammal prey in upwelling zones (Jefferson et al. 2015); the equatorial upwelling in the western Pacific is one such area (Di Lorenzo et al. 2010; Helber and Weisberg 2001). While most baleen whales are migratory, some species have a year-round presence in certain proposed action areas (e.g., Rice’s whales [*Balaenoptera ricei*] in the GoMEX proposed action area). Many of the toothed whales do not migrate in the strictest sense, but some do undergo seasonal shifts in distribution. In general, seals, sea lions, sea otters, and manatees, also don’t migrate, but their distribution is influenced by prey availability and for those that require access to terrestrial habitats (e.g., haul out sites).

3.4.11.1.3 ESA-Listed Marine Mammals Potentially Present in the Proposed Action Areas

3.4.11.1.3.1 ESA-Listed Mysticetes

This section describes the status and management including critical habitat designations, geographic range and distribution, population abundance, and prey interactions of ESA-listed mysticete species or baleen whales that are expected to occur in the proposed action areas (Table 3-39). MMPA stock information is provided to establish distribution in proposed action areas.

Table 3-39. ESA-Listed Mysticete Species, MMPA stock, and DPS Presence in the WCC Proposed Action Areas

Common Name (Scientific Name)	***MMPA Stock, DPS and ESA-Listing Status[1]***	***Distribution of the Stock/DPS***	***Proposed Action Area(s)***	***Critical Habitat within Proposed Action Area(s)***
Blue whale (Balaenoptera musculus)	Western North Atlantic; Endangered	Western North Atlantic from Arctic to mid-latitude waters; Rare occurrences in Florida and Gulf of Mexico waters	USEC-MidATL; USEC-South; GoMEX and Mississippi River	None
	Eastern North Pacific; **Endangered**	Migrate between waters Gulf of California, Mexico and Costa Rica and the California Coast.	SEAK	None
Bryde's whale (Balaenoptera edeni)	Northern Gulf of Mexico, Gulf of Mexico DPS; Endangered	Northeastern Gulf of Mexico in the De Soto canyon, along continental shelf break between 100 m and 400 m depth.	GoMEX and Mississippi River	None
Fin whale (Balaenoptera physalus)	Western North Atlantic; Endangered	Offshore waters of Cape Hatteras north to Nova Scotia.	USEC-MidATL; USEC-South	None
	Northeast Pacific; **Endangered**	Alaskan waters, including the Bering Sea and Gulf of Alaska (Central Alaskan Coast, Aleutian Islands).	SEAK	None
Gray whale (Eschrichtius robustus)	Western North Pacific DPS; Endangered	Okhotsk Sea, Russia and Bering Sea (summer) and eastern Asia (winter).	SEAK	None
Humpback whale[2] (Megaptera novaeangliae)	Western North Pacific stock (Hawaii DPS; Western North Pacific DPS- **Endangered)**	Migrate between feeding grounds in Alaska (Gulf of Alaska, Bering Sea, west along the Aleutian Islands to the Kamchatka Peninsula) and wintering grounds in Hawaii and Asia.	SEAK	Proposed Rule: 84 FR 54354, October 9, 2019
	Central North Pacific stock (Hawaii DPS; Mexico DPS- **Threatened**)	Feeding areas of this stock overlap with Western North Pacific stock in British Columbia to Bering Sea. Dispersed between Alaskan and Hawaiian waters.	SEAK	Proposed Rule: 84 FR 54354, October 9, 2019
North Atlantic right whale	Western Stock; Endangered	Coastal waters of southeastern U.S. to New England waters and the	USEC-MidATL; USEC-South	81 FR 4837, January 27, 2016

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status[1]*	*Distribution of the Stock/DPS*	*Proposed Action Area(s)*	*Critical Habitat within Proposed Action Area(s)*
(Eubalaena glacialis)		Canadian Bay of Fundy, Scotian Shelf and Gulf of St. Lawrence.		
North Pacific right whale (Eubalaena japonica)	Eastern North Pacific; **Endangered**	Gulf of Alaska and Bering Sea, along the California coast to Baja California, Mexico.	SEAK	73 FR 19000, April 08, 2008
Sei whale (Balaenoptera borealis)	Nova Scotia; Endangered	Continental shelf waters of the northeastern U.S. and extends northwestward to south of Newfoundland, Canada.	USEC-MidATL; USEC-South	None

[1] All marine mammals in the United States are offered protection under the Marine Mammal Protection Act. Some species are offered further protection under the Endangered Species Act.

[2] NOAA identified 14 DPS worldwide and revised ESA listings (81 FR 62259, September 8, 2016). The DPS that occur in waters under U.S jurisdiction do not necessarily equate to exiting MMPA stocks. No changes to current stock structures are proposed at the time of the drafting of this document.

3.4.11.1.3.1.1 Blue Whale

The blue whale (*Balaenoptera musculus*) was listed as endangered under the Endangered Species Preservation Act of 1969 (35 FR 18319; December 2, 1970), the predecessor to the ESA. When the ESA was passed in 1973, the blue whale was listed as endangered throughout its range. It is also designated as "depleted" and classified as a strategic stock under the MMPA. No critical habitat is currently designated for this species. Blue whales occur worldwide in all major oceans, except the Arctic. Blue whales may be found in the USEC-MidATL, USEC-South, and GoMEX and Mississippi River proposed action areas, although their occurrence within 12 nm of the shore is considered rare in these proposed action areas.

In general, blue whales are found in the open ocean, but they do come close to shore to feed and possibly to mate and breed. Blue whales feed primarily on various species of krill (euphausiids). They are observed from tropical waters to pack ice edges in both hemispheres, but are believed to avoid equatorial waters. Calves are born in winter, apparently in tropical/subtropical breeding areas (the specific locations of which are not known for most populations). For the MMPA, the Western North Atlantic stock and the Eastern North Pacific (ENP) stock overlap with the proposed action areas and therefore may be encountered during WCC proposed action activities. No other blue whale stocks would not expected to overlap with other proposed action areas. Information on each MMPA stock is provided below.

North Atlantic stock

The distribution of the blue whale in the western North Atlantic generally extends from the Arctic to at least mid-latitude waters. They are most frequently sighted in waters off eastern Canada, with the majority of records from the Gulf of St. Lawrence (Sears et al. 1987). The blue whale is considered to be an occasional visitor to the U.S. Atlantic EEZ waters, which may represent the southern limit of its feeding range (CETAP 1982; Wenzel et al. 1988). Yochem and Leatherwood (1985) summarized records that suggested an occurrence of this species south to Florida and Gulf of Mexico, although the actual southern limit of the species' range is unknown. Using the U.S. Navy's Sound Surveillance System (SOSUS) program, blue whales have been detected and tracked acoustically in much of the North Atlantic, including in subtropical waters north of the West Indies and in deep water east of the U.S. Atlantic EEZ, indicating the potential for long-distance movements (Clark 1995b). Most of the acoustic detections were around the Grand Banks area of Newfoundland and west of the British Isles, but recordings in the Gully Marine Protected Area at the outer edge of the Scotian Shelf had a higher percentage of blue whale vocalizations in the summer than in the winter (Marotte and Moors-Murphy 2015). Blue whale vocalizations in offshore areas of the New York Bight were recorded mostly during winter (Muirhead et al. 2018). Historical blue whale observations collected by Reeves et al. (2004) show a broad longitudinal distribution in tropical and warm temperate latitudes during the winter months, with a narrower, more northerly distribution in summer.

Pacific Ocean – Eastern North Pacific stock

North Pacific blue whales were once thought to belong to as many as five separate populations (Reeves et al. 1998), but acoustic evidence suggests only two populations occur, in the eastern and western north Pacific (McDonald and 2006; Monnahan 2014; Stafford 2003; Stafford et al. 2001). North Pacific blue whales produce two distinct acoustic calls, referred to as "northwestern" and "northeastern" types. It has been proposed that these represent distinct populations with some degree of geographic overlap (Monnahan 2014; Stafford 2003; Stafford et al. 2001). The northeastern call predominates in the Gulf of Alaska, the U.S. West Coast, and the eastern tropical Pacific, while the northwestern call predominates from south of the Aleutian Islands to the Kamchatka Peninsula in Russia, though both call types have been recorded concurrently in the Gulf of Alaska (Stafford 2003; Stafford et al. 2001). Photographs of blue whales in California have also been matched to individuals photographed off the Queen Charlotte Islands in northern British Columbia and to one individual photographed in the northern Gulf of Alaska (Calambokidis et al. 2009a). Based on northeastern call type locations, some whales in the ENP stock may range as far west as Wake Island and as far south as the equator (Stafford et al. 2001; Stafford 1999).

The U.S. West Coast is certainly one of the most important feeding areas in summer and fall (Bailey et al. 2009; Calambokidis et al. 2009a; Calambokidis et al. 2015; Mate et al. 2015), but increasingly, blue whales from the ENP stock have been found feeding to the north and south of this area during summer and fall. Nine 'biologically important areas' (BIAs) for blue whale feeding are identified, but all are off the California Coast (Calambokidis et al. 2015) and would not overlap with the proposed action areas. Most of this stock is believed to migrate south to spend the winter and spring in high productivity areas off Baja California, in the Gulf of California, and on the Costa Rica Dome (Calambokidis et al. 2009a). Satellite telemetry deployments (Hazen et al. 2016) indicate that most blue whales are outside U.S. West Coast waters from about November to March. Blue whales observed in the spring, summer, and fall off California, Washington, and British Columbia are known to be part of a group that returns to feeding areas off British Columbia and Alaska (Calambokidis 2004; Calambokidis et al. 2009b; Gregr et al. 2000; Mate et al. 1999; Stafford 1999), where they may overlap with the SEAK proposed action area.

Subsistence or Whaling

There are no reported takes of blue whales by Native subsistence hunters in the proposed action areas. There are also no known takes of blue whales from current whaling practices.

3.4.11.1.3.1.2 Bryde's Whale

All Bryde's whales (*Balaenoptera edeni*) are protected under the MMPA, including the Gulf of Mexico subspecies[25]. In 2019, the Gulf of Mexico Bryde's whale was listed as endangered under the ESA (84 FR 15446; April 15, 2019). This stock is also designated as "depleted" and classified as a strategic stock under the MMPA. No critical habitat is currently designated for the Gulf of Mexico subspecies. The following description includes some general information about Bryde's whales and specific information relevant to the Gulf of Mexico subspecies, since it overlaps with the GoMEX and Mississippi River proposed action area and therefore may be encountered during WCC operations, although their occurrence, based on current information on their distribution within 12 nm (22 km) of the shore, would be unlikely in this proposed action area. No other Bryde's whale stocks would be expected to overlap with other proposed action areas.

Bryde's whales are found in warm, temperate oceans from 40° S to 40° N. Some populations of Bryde's whales undertake seasonal migrations, while others do not migrate. They are typically observed alone or in small numbers, although there have been reports of up to 20 whales loosely grouped together in feeding areas. Their diet consists of krill, copepods, red crabs, shrimp, and schooling fish. Research suggests that Bryde's whales likely spend the majority of their time within 50 ft (15 m) of the water's

[25] Rosel, P.E. et al. (2021). Supports the existence of an undescribed species of *Balaenoptera* from the Gulf of Mexico, called Rice's whale. Should the Society for Marine Mammalogy Committee of Taxonomy accepts the new name of Rice's whale, then NOAA will update the listing and change this listing status from the Bryde's whale Gulf of Mexico subspecies. At the time of the writing of this PEIS/POEIS, this change has not been made, so the ESA-listed species will be referred to as the Bryde's whale subpopulation in the Gulf of Mexico.

surface. The peak of breeding and calving season occurs in autumn, and females give birth to a single calf every two to three years.

Sighting records and acoustic detections of Bryde's whales in the U.S. Gulf of Mexico occur almost exclusively in the northeastern Gulf in the De Soto Canyon area, along the continental shelf break between 328 and 1,313 ft (100 and 400 m) depth (Hansen and Windsor 2006; Maze-Foley and Mullin 2006; Mullin and Hoggard 2000; Mullin and Fulling 2004; Rice et al. 2014; Rosel et al. 2016; Rosel and Wilcox 2014; Širović et al. 2014; Soldevilla et al. 2017). Bryde's whales have been sighted in all seasons within the De Soto Canyon area (Maze-Foley and Mullin 2006; MMIQT 2015; Mullin 2007; Mullin and Hoggard 2000). However, the geographic extent for this stock has not been fully identified and thus, may overlap with Proposed Action activities. Historical whaling records from the 1800s suggest Bryde's whales may have been more common in the U.S. waters of the north central Gulf of Mexico and in the southern Gulf of Mexico in the Bay of Campeche (Reeves et al. 2011). However, there have yet to be any confirmed sightings in the north central or western Gulf (Hansen et al. 1996; Maze-Foley and Mullin 2006; Mullin and Hoggard 2000; Mullin and Fulling 2004).

Subsistence or Whaling

No subsistence or hunting of Bryde's whales occurs in the United States. Whalers have recently hunted Bryde's whales off the coasts of Indonesia and the Philippines. Additionally, some hunters in Japan continue to take Bryde's whales.

3.4.11.1.3.1.3 Fin Whale

The fin whale (*Balaenoptera physalus*) was listed as endangered under the Endangered Species Preservation Act of 1969 on December 2, 1970 (35 FR 18319), the predecessor to the ESA. When the ESA was passed in 1973, the fin whale was listed as endangered throughout its range. It is also designated as "depleted" and classified as a strategic stock under the MMPA. No critical habitat is currently designated for the fin whale. The fin whale is a cosmopolitan species with a generally anti-tropical distribution centered in the temperate zones and inhabiting oceanic waters. Locations of breeding and calving grounds for the fin whale are largely unknown, but they typically migrate seasonally to higher latitudes to feed and migrate to lower latitudes to breed (Campbell et al. 2015; Kjeld et al. 2006; Macleod et al. 2006; Mizroch et al. 2009). The Western North Atlantic and the Northeast Pacific stocks designated under the MMPA would overlap with the USEC-MidATL, USEC-South, and SEAK proposed action areas; and therefore may be encountered during WCC Proposed Action activities.

Three subspecies of fin whales (*Balaenoptera physalus*) are currently recognized, including the northern fin whale (*B.p. physalus*), the southern fin whale (*B.p. quoyi*), and the pygmy fin whale (*B.p. patachonica*). Results from Archer et al. (2019) indicated that North Pacific fin whales should be further separated and recognized as a separate subspecies with the name *B.p. velifera*.

Fin whale populations exhibit differing degrees of mobility, presumably depending on the stability of access to sufficient prey resources throughout the year. Most groups are thought to migrate seasonally, in some cases over distances of thousands of kilometers. They feed intensively at high latitudes in summer and fast, or at least greatly reduce their food intake, at lower latitudes in winter. Some groups apparently move over shorter distances and can be considered resident in areas with a year-round supply of adequate prey. They are relatively rare in tropical waters or near pack ice in the polar seas. Fin whales typically, if observed nearshore, are in deeper water as they approach the coast. They exhibit a poleward shift to feeding areas in the summer and towards the tropics in the winter for breeding. Calving does not appear to take place in distinct nearshore areas and not much is known of the social or mating system of fin whales. However, there are some resident groups observed in specific geographic areas (Jefferson et al. 2014). Fin whales feed on small invertebrates (euphausiids and copepods), schooling fish (capelin [*Mallotus villosus*], herring, mackerel, sandlance, and blue whiting [*Micromesistius poutassou*]), and squid.

Western North Atlantic stock

Fin whales are common in waters of the U.S. Atlantic EEZ, principally from Cape Hatteras, North Carolina northward to Cape Cod, Massachusetts. Edwards et al. (2015) found evidence to confirm the presence of fin whales in every season throughout much of the U.S. EEZ north of 35° N; however, densities vary seasonally. Acoustic detections of fin whale "singers" augment and confirm these visual sighting conclusions for males. Recordings from Massachusetts Bay, New York Bight, and deep ocean areas detected some level of fin whale singing from September through June (Clark and Gagnon 2002; Morano et al. 2012b; Watkins et al. 1987). These acoustic observations from both coastal (potentially overlapping with the Proposed Action) and deep ocean regions support the conclusion that male fin whales are broadly distributed throughout the western North Atlantic for most of the year.

New England waters represent a major feeding ground for fin whales. There is evidence of site fidelity by females, and perhaps some segregation by sexual, maturational, or reproductive class in the feeding area (Agler et al. 1993). The authors suggested that fin whales on these grounds exhibited patterns of seasonal occurrence and annual return. This was reinforced by Clapham and Seipt (1991), who showed maternally-directed site fidelity for fin whales in the Gulf of Maine.

Hain et al. (1992) suggested that calving takes place from October to January in latitudes of the U.S. mid-Atlantic region; however, it is unknown where calving, mating, and wintering occur for most of the population. Results from the Navy's Sound Surveillance System or SOSUS program (Clark and Gagnon 2002; Clark 1995a) indicated a substantial deep ocean distribution of fin whales. It is likely that fin whales occurring in the U.S. Atlantic EEZ undergo migrations into Canadian waters, open ocean areas, and perhaps even subtropical or tropical regions (Edwards et al. 2015).

Pacific Ocean-Northeast Pacific stock

Within the U.S. waters of the Pacific Ocean, fin whales are found seasonally off the coast of North America and in the Bering Sea during the summer. Information on seasonal fin whale distribution has been assembled from the acoustic detection of fin whale calls along the U.S. Pacific Coast, in the central North Pacific, and in the western Aleutian Islands (Moore et al. 1998; Moore et al. 2006; Širović et al. 2013; Soule and Wilcock 2013; Stafford et al. 2007; Watkins et al. 2000). Moore et al. (Moore et al. 1998; 2006), Watkins et al. (2000), and Stafford et al. (2007) documented a higher rate of fin whale calls from August/September through February along the U.S. Pacific Coast, suggesting that these may be important feeding areas during the winter. While peaks in call rates occurred during late summer, fall, and winter in the central North Pacific and the Aleutian Islands, there were only occasional acoustic detections during summer months. Fin whales have been acoustically detected in the Gulf of Alaska year-round, with highest occurrence rates from August to December and lowest call rates from February through July (Moore et al. 2006; Stafford et al. 2007). Fin whale calls were recorded in the shelf and slope regions of the north-central Gulf of Alaska during all months (potentially overlapping with the Proposed Action in the SEAK proposed action area), with a peak in calling occurrence from late August until the end of December (Baumann-Pickering et al. 2012). Year-round fin whale occurrence in the Alaska waters is likely, although the abundance and distribution of animals both inshore and offshore would be seasonal and in response to prey availability.

Subsistence or Whaling

No subsistence or hunting of fin whales occurs in the United States. Although the IWC banned commercial whaling, there are still some countries that do whale, particularly in the Southern Ocean. A certain number of fin whales are killed each year from current whaling practices.

3.4.11.1.3.1.4 Gray Whale

Two genetically distinct population segments of gray whales (*Eschrichtius robustus*) are currently recognized (Reilly et al. 2008): (1) the ENP DPS and (2) the Western North Pacific (WNP) DPS (Bonner 1986; LeDuc et al. 2002; Weller et al. 2013). The ENP gray whale was delisted from the ESA in 1994 (59 FR 31094; June 16, 1994). The WNP DPS is listed as endangered under the ESA and is also designated as "depleted" and classified as a strategic stock under the MMPA. The WNP DPS is the only ESA-listed gray whale population with the potential to occur and encountered during WCC Proposed Action activities within the SEAK proposed action area. No critical habitat is currently designated for the WNP gray whale.

Gray whales occur along the eastern and western margins of the North Pacific and are restricted to shallow continental shelf waters for feeding, living most of their lives within a few tens of kilometers of shore. In the western North Pacific, gray whales feed during summer and fall in the Okhotsk Sea off northeast Sakhalin Island, Russia, and off southeastern Kamchatka in the Bering Sea (Burdin et al. 2017; Tyurneva et al. 2010; Vertyankin et al. 2004; Weller et al. 2012; Weller et al. 1999). Information from tagging, photo-identification, and genetic studies show that some whales identified in the WNP off Russia have been observed in the eastern North Pacific, including coastal waters of Canada, the United States, and Mexico (Lang 2010; Mate et al. 2015; Urbán et al. 2013; Weller et al. 2012). Some whales that feed off Sakhalin Island in summer migrate east across the Pacific to the West Coast of North America in winter, while others migrate south to waters off Japan and China (Weller et al. 2016). Observations indicate that not all gray whales in the WNP share a common wintering ground (Cooke et al. 2015, 2017; IUCN 2018; Lang et al. 2011; LeDuc et al. 2002; Weller et al. 2016). Brüniche-Olsen et al. (2018) reassessed the genetic differentiation of gray whales feeding off Sakhalin and ENP whales from the Mexican breeding lagoons and suggested that gray whale population structure is not currently determined by simple geography and may be in flux as a result of emerging migratory dynamics. Ferguson et al. (2015) identified biologically important areas in Alaska including one in southeast Alaska that overlaps with the outer boundary of the SEAK proposed action area, with greatest gray whale densities from May to November and a gray whale migratory corridor from November to May.

Subsistence or Whaling

Subsistence hunters in Russia and the United States have traditionally harvested whales from the ENP gray whale stock in the Bering Sea; however, only the Russian hunt has persisted in recent years (Huelsbeck 1988; Reeves 2002). In 2005, the Makah Indian Tribe requested authorization from NOAA/NMFS under the MMPA and the Whaling Convention Act to resume limited hunting of gray whales for ceremonial and subsistence purposes in the coastal portion of their usual and accustomed fishing grounds off Washington State (73 FR 26375; May 9, 2008). The Makah Tribe hunting area is outside of the SEAK proposed action area and, therefore, no subsistence hunting of WNP gray whales is expected in the SEAK proposed action area.

3.4.11.1.3.1.5 Humpback Whale

The humpback whale (*Megaptera novaeangliae*) was originally listed as endangered under the Endangered Species Preservation Act of 1969 on December 2, 1970 (35 FR 18319), the predecessor to the ESA. When the ESA was passed in 1973, the humpback whale was listed as endangered throughout its range. Since then, NMFS published a final rule designating fourteen DPSs (Figure 3-2) with four identified as endangered (Cape Verde Islands/Northwest Africa, Western North Pacific, Central America, and Arabian Sea) and one as threatened (Mexico) (81 FR 62260; September 8, 2016). Three ESA-listed DPSs of humpback whales have ranges that extend into U.S. waters—the threatened Mexico DPS, the endangered Central America DPS, and the endangered WNP DPS. Only the Mexico and WNP DPSs maybe be found in the SEAK proposed action area. NMFS is evaluating the stock structure of humpback whales under the MMPA, but no changes to current stock structure are presented at this time. Along the U.S. West Coast, NMFS currently recognizes one humpback whale stock that includes two separate feeding groups: (1) a California and Oregon feeding group of whales that includes whales from the endangered Central America and threatened Mexico DPSs, and (2) a northern Washington and southern British Columbia feeding group that primarily includes whales from the threatened Mexico DPS, but also small numbers of whales from the non-ESA-listed Hawaii and endangered Central America DPSs (Barlow et al. 2011; Calambokidis et al. 2008; Wade et al. 2016; Wade 2017). Only the Central North Pacific MMPA stock would overlap with the ESA-listed DPSs and the SEAK proposed action area. Seasonal "biologically important areas" for humpback whale feeding in the SEAK proposed action area include the spring (March to May), summer (June to August), and fall (September to November) (Ferguson et al. 2015). Critical habitat has been proposed for all three of the DPSs (Section 3.4.12.1.9). Humpback whales (ESA-listed and non-ESA listed) may be found in the SEAK proposed action area and therefore may be encountered during WCC Proposed Action activities. No other humpback whale stocks are expected to overlap with other proposed action areas.

Humpbacks mostly inhabit coastal and continental shelf waters. They winter at low latitudes, where they calve and nurse, and summer at high latitudes, where they feed. Humpbacks exhibit a wide range of foraging behaviors and feed on a range of prey types including small schooling fishes, euphausiids, and other large zooplankton (Bettridge et al. 2015).

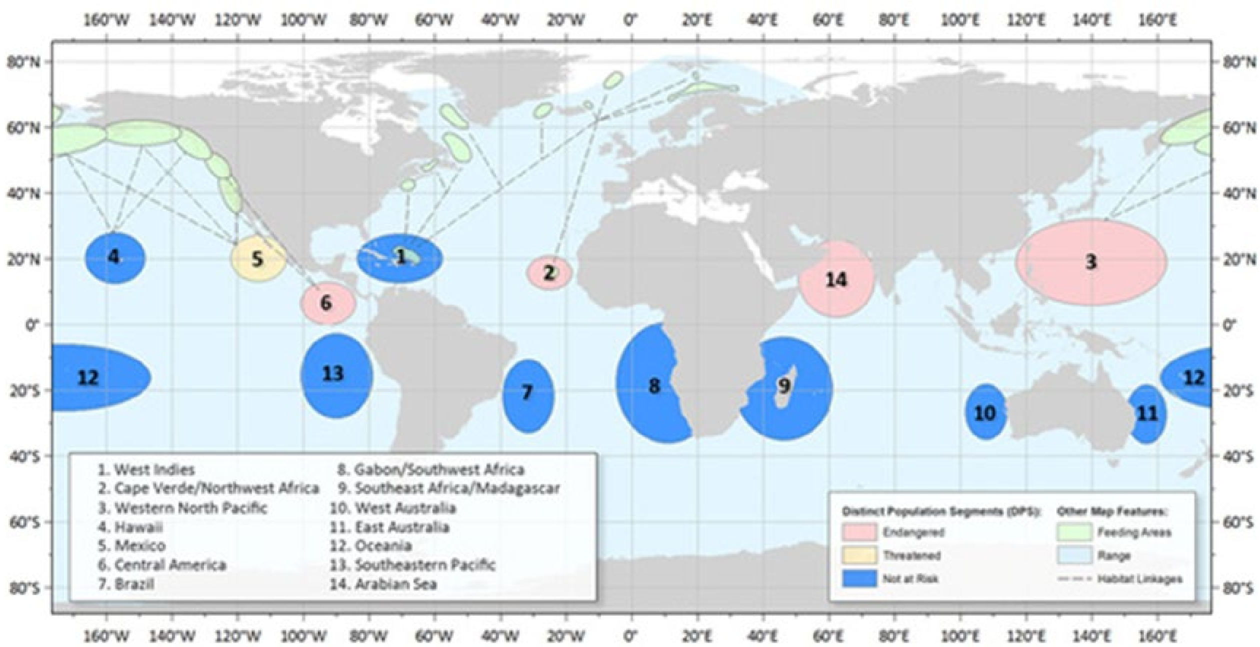


Figure 3-2. DPSs of Humpback Whales, Based on Breeding, Range, and Feeding Areas
Source: (Bettridge et al. 2015)

Western North Pacific DPS

NMFS concluded that combining the two putative DPSs (Okinawa/Philippines and Second West Pacific (Bettridge et al. 2015) into one DPS (Western North Pacific) was the most consistent with the best available scientific and commercial information (81 FR 62259; September 8, 2016). It is not known where the ‘‘Second West Pacific’’ population breeds; however, the existence of this breeding population is inferred from sightings of whales in Aleutian Islands area feeding grounds (Bettridge et al. 2015). Some of these humpback whales may transit the Ogasawara area en route to unknown breeding grounds further south. This population appears to feed primarily in a marine ecosystem (the Aleutian Islands) that is rarely used by whales from other populations (Bettridge et al. 2015). Animals from the Okinawa/Philippines DPS migrate to feeding grounds in the northern Pacific, primarily off the Russian coast.

Mexico DPS

The Mexico DPS consists of whales that breed along the Pacific Coast of mainland Mexico, the Baja California Peninsula and the Revillagigedos Islands. The Mexican DPS feeds across a broad geographic range from California to the Aleutian Islands, with concentrations in California-Oregon, northern Washington-southern British Columbia, northern and western Gulf of Alaska and Bering Sea feeding grounds (Figure 3-2; (Bettridge et al. 2015)). This DPS was determined to be discrete based on significant genetic differentiation as well as evidence for low rates of movements among breeding areas in the North Pacific based on sighting data. It also differs from some other North Pacific populations in the ecological characteristics of its feeding areas.

Subsistence or Whaling

No subsistence or whaling of humpback whales occurs in the United States, but humpback whales may be killed under "aboriginal subsistence whaling" and "scientific permit whaling" provisions of the IWC.

3.4.11.1.3.1.6 Right Whale

Right whales in the three major ocean basins (North Pacific, North Atlantic, and Southern Ocean) represent separate lineages. Only the North Atlantic right whale, *Eubalaena glacialis*, and the North Pacific right whale, *E. japonica*, would be expected in the USEC-MidATL, USEC-South, and SEAK proposed action areas and therefore may be encountered during WCC Proposed Action activities.

North Atlantic right whale (*Eubalaena glacialis*)

Since 1970, North Atlantic right whales have been listed as endangered under the Endangered Species Preservation Act of 1969, the predecessor to the ESA. When the ESA was passed in 1973, the right whale was listed as endangered throughout its range. In 2008, NMFS listed the North Atlantic right whale and the North Pacific right whale as two separate, endangered species (73 FR 12024; March 06, 2008). It is also designated as "depleted" and classified as a strategic stock under the MMPA. Critical habitat has been proposed for the North Atlantic right whale (Section 3.4.12.1.9).

North Atlantic right whales from two populations primarily inhabit temperate and subpolar waters of the North Atlantic Ocean. Historically, the two populations were presumably largely isolated from each other, and the eastern stock is now thought to be functionally extinct. The Western Atlantic stock breeds off the southeastern U.S. (Florida and Georgia) and feeds in the Gulf of Maine and off eastern Canada, as far north as Nova Scotia. The location of much of the population is unknown during the winter. Davis et al. (2017) documented broad-scale use of much more of the U.S. eastern seaboard than previously believed and that there has also been an apparent shift in habitat use patterns. Surveys flown in an area from 20 mi to 99 mi (31 to 160 km) from the shoreline off northeastern Florida and southeastern Georgia report the majority of right whale sightings occur within 56 mi (90 km) of the shoreline. One sighting occurred roughly 87 mi (140 km) offshore (Hayes et al. 2020) and an offshore survey in March 2010 observed the birth of a right whale in waters 47 mi (75 km) off Jacksonville, Florida (Foley et al. 2011). Although habitat models predict that right whales are not likely to occur farther than 56 mi (90 km) from the shoreline (Gowan and Ortega-Ortiz 2014), the frequency with which right whales occur in offshore waters in the southeastern U.S. remains unclear.

There are seven areas where western North Atlantic right whales aggregate seasonally: the coastal waters of the southeastern U.S.; the Great South Channel; Jordan Basin; Georges Basin along the northeastern edge of Georges Bank; Cape Cod and Massachusetts Bays; the Bay of Fundy; and the Roseway Basin on the Scotian Shelf (Brown et al. 2000; Cole et al. 2013). Since 2013, increased detections in the Gulf of St. Lawrence indicate right whale presence in late spring through early fall (Cole et al. 2016; Khan et al. 2018). Right whales are also present year-round in the Gulf of Maine (Bort et al. 2015; Morano et al. 2012a), New Jersey (Whitt et al. 2013), and Virginia (Salisbury et al. 2016). Movements within and between habitats are extensive, and the area off the Mid-Atlantic States is an important migratory corridor.

New England waters are important feeding habitats for right whales, where they feed primarily on copepods (largely of the genera *Calanus* and *Pseudocalanus*). Right whales must locate and exploit extremely dense patches of zooplankton to feed efficiently (Mayo and Marx 1990). These dense zooplankton patches are likely a primary characteristic of the spring, summer, and fall right whale habitats (Kenney et al. 1986; Kenney et al. 1995). Analysis of sighting data show that there is a strong seasonal component to right whale use of habitat areas (Baumgartner et al. 2007; Baumgartner et al.

2003; Baumgartner and Mate 2003; Pace and Merrick 2008) while other studies also highlight the high interannual variability in right whale use of some habitats (Ganley et al. 2019; Pendleton et al. 2009).

North Pacific right whale (*Eubalaena japonica*)

Since 1970, North Pacific right whales (*Eubalaena japonica*) have been listed as endangered under the Endangered Species Preservation Act of 1969, the predecessor to the ESA. When the ESA was passed in 1973, the right whale was listed as endangered throughout its range. In 2008, NMFS listed the North Atlantic right whale and the North Pacific right whale as two separate, endangered species (73 FR 12024; March 06, 2008). It is also designated as "depleted" and classified as a strategic stock under the MMPA. Critical habitat has been proposed for the North Pacific right whale (Section 3.4.12.1.9).

Once distributed widely across the North Pacific from North America to the Far East, North Pacific right whales are today among the world's rarest marine mammals (Wade et al. 2011). The species is comprised of an eastern and western populations that are largely or wholly discrete (Brownell Jr. et al. 2001; LeDuc et al. 2012). The summer range of the Eastern stock includes the Gulf of Alaska and the Bering Sea, while the Western stock is believed to feed in the Okhotsk Sea and in pelagic waters of the northwestern North Pacific. The winter calving grounds of both stocks remain unknown.

There have been far fewer sightings of right whales in the Gulf of Alaska than in the Bering Sea (Brownell Jr. et al. 2001) and there have been only a few acoustic detections (Mellinger et al. 2004; Širović et al. 2015). Right whales were acoustically detected in Barnabus Trough and on the shelf and in deeper waters to the south and east of Kodiak Island, but were not visually observed (Rone et al. 2014; Rone et al. 2017). Although illegal Soviet catches of right whales occurred in offshore areas, including a large area east and southeast of Kodiak Island (Doroshenko 2000; Ivashchenko and Clapham 2012), the sightings and acoustic detection of right whales in coastal waters east of Kodiak Island indicate at least occasional use of this area. However, the lack of visual detections of right whales indicates that right whales may today be extremely rare in the Gulf of Alaska. Although their historical distribution overlaps with the SEAK proposed action area (extending 12 nm [22 km] off the coast) (Muto et al. 2020), consistent presence of right whales is unlikely in areas where WCCs would be servicing ATON.

Migratory patterns of North Pacific right whales are unknown, although it is thought they migrate from high-latitude feeding grounds in summer to more temperate waters during the winter, possibly including offshore waters (Braham and Rice 1984; Clapham et al. 2004; Scarff 1986). A right whale sighted off Maui in April 1996 (Salden and Michelsen 1999) was identified 119 days later and 2,554 mi (4,111 km) north in the Bering Sea (Kennedy et al. 2012); to date this is the only low- to high-latitude match of an individually identified right whale in the eastern North Pacific. There is one other modern record from Hawaii of a right whale—an animal seen twice in March and April 1979 (Herman et al. 1980; Rowntree et al. 1980).

Subsistence or Whaling

There are no reported takes of North Atlantic or North Pacific right whales by Native subsistence hunters in the proposed action areas. There are also no known takes of North Atlantic or North Pacific right whales from current whaling practices.

3.4.11.1.3.1.7 Sei Whale

The sei whale (*Balaenoptera borealis*) was listed as endangered under the Endangered Species Preservation Act of 1969 on December 2, 1970 (35 FR 12222; 30 July 1970), the predecessor to the ESA. When the ESA was passed in 1973, the sei whale was listed as endangered throughout its range. It is also designated as “depleted” and classified as a strategic stock under the MMPA. No critical habitat is currently designated for the sei whale. Only the Nova Scotia stock is discussed below as it would overlap with the USEC-MidATL and USEC-South proposed action areas and therefore may be encountered during WCC Proposed Action activities. However, based on current information on their distribution, the likelihood that sei whales would be observed within 12 nm [22 km] of the shore in the proposed action areas is low. No other sei whale stocks would be expected to overlap with other proposed action areas.

Sei whales have a global distribution and occur in the North Atlantic Ocean, North Pacific Ocean, and Southern Hemisphere, but are not often seen near the coast and occur from the tropics to polar zones in both hemispheres. Sei whales are more restricted to the mid-latitude temperate zone and undergo seasonal migrations. They have largely unpredictable patterns, but when they are present, they tend to be present in numbers (i.e., not singletons). Currently, the population structure of sei whales has not been adequately defined; therefore, populations are often divided on an ocean basin level (NMFS 2011). Two subspecies have been identified (although not yet confirmed with empirical evidence): the northern sei whale (*Balaenoptera borealis borealis*) and southern sei whale (*Balaenoptera borealis schleglii*) (Rice 1998), although definitive conclusions regarding this classification cannot be made but the ranges of these populations are not known to overlap (Rice 1998). Calving occurs in the midwinter, in low latitude portions of the species’ range.

Nova Scotia stock

The range of the Nova Scotia sei whale stock includes the continental shelf waters of the northeastern U.S. and extends northeastward to south of Newfoundland. Data supports a migratory corridor between animals foraging in the Labrador Sea and the Azores and a separate foraging ground in the Gulf of Maine and Nova Scotia (Prieto et al. 2014). Habitat suitability analyses suggest that the distribution patterns of sei whales in U.S. waters appear to be related to waters that are cool (< 50 °F [10 °C]), with high levels of chlorophyll and inorganic carbon, and where the mixed layer depth is relatively shallow (164 ft [<50m]) (Chavez-Rosales et al. 2019; Palka et al. 2017). Sei whales have often been found in the deeper waters characteristic of the continental shelf edge region (Hain et al. 1985; Mitchell 1975). During the spring/summer feeding season, existing data indicate that a major portion of the Nova Scotia sei whale stock is centered in northerly waters, perhaps on the Scotian Shelf (Mitchell and Chapman 1977). Mitchell (1975) described two "runs" of sei whales, in June–July and in September–October and speculated that the sei whale stock migrates from south of Cape Cod and along the coast of eastern Canada in June and July, and returns on a southward migration again in September and October; however, the details of such a migration remain unverified.

The southern portion of the species' range during spring and summer includes the northern portions of the U.S. Atlantic EEZ—the Gulf of Maine and Georges Bank. Spring is the period of greatest abundance in U.S. waters, with sightings concentrated along the eastern margin of Georges Bank, into the Northeast Channel area, south of Nantucket, and along the southwestern edge of Georges Bank (CETAP 1982; Cholewiak et al. 2018; Kraus et al. 2016; Palka et al. 2017; Roberts et al. 2016a). However, the wintering habitat for sei whales remains largely unknown.

The general offshore pattern of sei whale distribution is disrupted during episodic incursions into shallower, more inshore waters, where they may overlap with WCC Proposed Action activities. North Atlantic sei whales are largely planktivorous, feeding primarily on euphausiids and copepods (Flinn et al. 2002). A review of prey preferences by Horwood (1987) showed that, in the North Atlantic, sei whales seem to prefer copepods over all other prey species. Sei whales are reported in some years in more inshore locations and such episodes, often punctuated by years or even decades of absence from an area (Jonsgård and Darling 1977).

Subsistence or Whaling

There are no reported takes of sei whales by Native subsistence hunters in the proposed action areas. In 1986, the IWC banned commercial whaling; however, there are still some countries that do whale, particularly in the Southern Ocean. There are no known takes of sei whales from current whaling practices.

3.4.11.1.3.2 ESA-Listed Odontocetes

This section describes the status and management including critical habitat designations, geographic range and distribution, population and abundance and prey interactions of ESA-listed odontocete species that are expected to occur in the proposed action areas (Table 3-40). MMPA stock information is provided to establish distribution in proposed action areas.

Table 3-40. ESA-Listed Odontocete Species, MMPA stock, and DPS Presence in the WCC Proposed Action Areas

Common Name (Scientific Name)	***MMPA Stock, DPS and ESA-Listing Status[1]***	***Distribution of the Stock/DPS***	***Proposed Action Area(s) with Overlap***	***Critical Habitat within Proposed Action Area(s)***
Sperm whale (Physeter macrocephalus)	North Pacific; **Endangered**	From the Canadian/ Washington border through the Gulf of Alaska, out the Aleutian chain, and North in the Bering Sea to St. Matthews Island	SEAK	None

[1] All marine mammals in the United States are offered protection under the Marine Mammal Protection Act. Some species are offered further protection under the Endangered Species Act.

3.4.11.1.3.2.1 Sperm Whale

The sperm whale (*Physeter macrocephalus*) is listed as endangered under the ESA throughout its range (35 FR 18319, December 2, 1970). It is also designated as “depleted” under the MMPA. There is no designated critical habitat for this species. Sperm whales are divided into six stocks: (1) California-Oregon-Washington; (2) Hawaii; (3) North Pacific; (4) North Atlantic; (5) Northern Gulf of Mexico; and (6) Puerto Rico and U.S. Virgin Islands. Only the North Pacific stock may overlap with the SEAK proposed action area, and therefore may be encountered during WCC Proposed Action activities. However, based on current information on their distribution, the likelihood that sperm whales would be observed within 12 nm [22 km]of the shore in the SEAK proposed action area is low. No other sperm whale stocks would be expected to overlap with other proposed action areas.

Male sperm whales are found from tropical to polar waters in all oceans of the world, between approximately 70° N and 70° S (Rice 1998). The female distribution is more limited and corresponds approximately to the 40° parallels but extends to 50° N in the North Pacific (Whitehead 2003). Sperm whales are somewhat migratory. General shifts occur during summer months for feeding and breeding, while in some tropical areas, sperm whales appear to be largely resident (Rice 1998; Whitehead 2003; Whitehead et al. 2008). Pods of females with calves remain on breeding grounds throughout the year, between 40° N and 45° N (Rice 1998; Whitehead 2003), while males migrate between low-latitude breeding areas and higher-latitude feeding grounds (Pierce et al. 2007). In the northern hemisphere, "bachelor" groups (males typically 15–21 years old and bulls [males] not taking part in reproduction) generally leave warm waters at the beginning of summer and migrate to feeding grounds that may extend as far north as the perimeter of the arctic zone. In fall and winter, most return south, although some may remain in the colder northern waters during most of the year (Pierce et al. 2007). Sperm whales show a strong preference for deep waters (Rice 1998; Whitehead 2003). Their distribution is typically associated with waters over the continental shelf break, over the continental slope, and into deeper waters.

Sperm whales socialize for predator defense and foraging purposes. Sperm whales forage during deep dives that routinely exceed a depth of 1,300 ft (400 m) and 30-minute duration (Watkins et al. 2002). Sperm whales feed on squid, other cephalopods, and bottom-dwelling fish and invertebrates (Davis et al. 2007; Marcoux et al. 2007; Rice 1989).

North Pacific stock

In the North Pacific, sperm whales are distributed widely. Although females and young sperm whales were thought to remain in tropical and temperate waters year-round. Mizroch and Rice (2006) and Ivashchenko et al. (2014) showed that there were extensive catches of female sperm whales above 50°N; Soviet catches of females were made as far north as Olyutorsky Bay (62° N) in the western Bering Sea, as well as in the western Aleutian Islands. Mizroch and Rice (2013) also showed movements by females into the Gulf of Alaska and western Aleutians. During summer, males are found in the Gulf of Alaska, Bering Sea, and waters around the Aleutian Islands (Ivashchenko et al. 2014; Kasuya and Miyashita 1988; Mizroch and Rice 2013). Surveys also found sperm whales to be the most frequently sighted large cetacean in the coastal waters around the central and western Aleutian Islands (Muto et al. 2020). Acoustic surveys detected the presence of sperm whales year-round in the Gulf of Alaska, although they appear to be more common in summer than in winter (Mellinger et al. 2004). This seasonality of detections is consistent with the hypothesis that sperm whales generally move to higher latitudes in summer and to lower latitudes in winter (Whitehead and Arnbom 1987). Recovered data from historical tagging studies of sperm whales confirmed extensive movements of sperm whales throughout their range (Mizroch and Rice 2013; Straley et al. 2014).

Subsistence or Whaling

There are no reported takes of sperm whales by Native subsistence hunters in the proposed action areas. The IWC accorded sperm whales complete protection from commercial whaling by member states beginning with the 1981–1982 pelagic season and subsequently with the 1986 coastal season (IWC 1982). Currently, Japan takes a small number of sperm whales each year under an exemption for scientific research. Norway and Iceland have formally objected to the IWC ban on commercial whaling and are therefore free to resume whaling of sperm whales under IWC rules, but neither country has expressed an interest in taking sperm whales.

3.4.11.1.3.3 ESA-Listed Pinnipeds, Sirenians, Ursids, and Mustelids

This section describes the status and management including critical habitat designations, geographic range and distribution, population abundance, and prey interactions of ESA-listed, sea lions, manatees, and sea otter that are expected to occur in the proposed action areas (Table 3-41). MMPA stock information is provided to establish distribution in proposed action areas.

Table 3-41. ESA-Listed Pinnipeds, Sirenians, Carnivores (Mustelids) Species, MMPA Stock, and DPS Presence in the Proposed Action Areas

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status[1]*	*Distribution of the Stock/DPS*	*Proposed Action Area(s)*	*Critical Habitat within Proposed Action Area(s)*
Pinnipeds - Otariids				
Steller sea lion (Eumetopias jubatus)	Western DPS, **Endangered:**	West of 144˚W (although mixing of stocks occurs in Southeast Alaska). Haulouts occur in Aleutians and to Russia and northern Japan.	SEAK	58 FR 45269, August 27, 1993
Sirenians				
West Indian manatee (Trichechus manatus)	Florida; Threatened	Range includes southeastern U.S. (primarily Florida), east coast of Mexico, Central America, northeastern South America, Cuba, Hispaniola, Puerto Rico and Jamaica as well as Trinidad and Tobago.	USEC-MidATL; USEC-South; GoMEX and Mississippi River	42 FR 47840, September 22, 1977
Carnivores - Mustelids				
Sea otter (Enhydra lutris)	Northern sea otter (Southcentral Alaska, Southeast Alaska*, Southwest Alaska, Washington); Southwest Alaska DPS- **Endangered**	Southcentral stock extends from Cape Yakatag to Cook Inlet, including Prince William Sound , the Kenai Peninsula coast, and Kachemake Bay; Southeast stock extends from Dixon Entrance to Cape Yakataga; and Southwest stock include Alaska Peninsula and Bristol Bay coasts and the Aleutian, Barren, Kodiak, and Pribilof Islands.	SEAK*	74 FR 51988, October, 8, 2009

[1] All marine mammals in the United States are offered protection under the Marine Mammal Protection Act. Some species are offered further protection under the Endangered Species Act.
* Stock boundaries likely to overlap with SEAK proposed action area.

3.4.11.1.3.3.1 Steller Sea Lion

The Steller sea lion (*Eumetopias jubatus*) is listed as a threatened species under the ESA (55 FR 126451; April 5, 1990) due to substantial declines in the western portion of the range. In 1997, NMFS designated two DPSs of Steller sea lions under the ESA: a Western DPS and an Eastern DPS (62 FR 24345 and 62 FR 30772; May 5, 1997). Due to persistent decline, the Western DPS was reclassified as endangered, while the increasing Eastern DPS remained classified as threatened. In 2013, the Eastern DPS was delisted (78 FR 66140; November 4, 2013) under the ESA. Critical habitat has been designated (58 FR 45269; August 27, 1993; Section 3.4.12). Steller sea lions would be expected in the SEAK proposed action area and therefore may be encountered during WCC Proposed Action activities.

The present range of Steller sea lions extends around the North Pacific Ocean rim from northern Japan, the Kuril Islands and Okhotsk Sea, through the Aleutian Islands and Bering Sea, along Alaska's southern coast, and south to California (Burkanov and Loughlin 2005; Kenyon and Rice 1961; Loughlin et al. 1992; Loughlin et al. 1984) with centers of abundance and distribution in the Gulf of Alaska and Aleutian

Islands. Most adult Steller sea lions occupy rookeries during the pupping and breeding season, which extends from late May to early July (Gisiner 1985; Pitcher and Calkins 1981). As a result, peak abundance occurs during the summer breeding season. Major haulout sites and rookeries are centered in the Aleutian Islands and at islands and mainland sites in the Gulf of Alaska (Loughlin et al. 1984). Seal Rocks, which is near the entrance to Prince William Sound, is the northernmost rookery while Año Nuevo Island off central California is the southernmost rookery (37°06' N). Steller sea lions from the Western DPS breed on the Pribilof and Aleutian Islands (Schusterman 1981). Steller sea lions that breed in Asia are also considered part of the Western DPS (Muto et al. 2020).

Steller sea lions are not known to migrate annually, but individuals may widely disperse outside of the breeding season (late-May to early-July) (Jemison et al. 2013; Jemison et al. 2018; Muto et al. 2020). There is an exchange of sea lions across the stock boundary (144° W), especially due to the wide-ranging seasonal movements of juveniles and adult males (Baker et al. 2005; Jemison et al. 2013; Jemison et al. 2018). Colonization events in the northern part of the Eastern DPS indicate movement of Western DPS sea lions into this area, but the mixed part of the range remains small (Jemison et al. 2013), and the overall discreteness of the Eastern from the Western stock remains distinct. During the breeding season, sea lions return to their natal rookery to breed and pup (Hastings et al. 2017; Raum-Suryan et al. 2002); however, mixing of breeding females from Prince William Sound to Southeast Alaska established two mixed-stock rookeries (Gelatt et al. 2007; Jemison et al. 2013; Jemison et al. 2018; O'Corry-Crowe et al. 2014), which have been predominately established by Western stock females (Jemison et al. 2013; Jemison et al. 2018; Rehberg et al. 2018). The Steller sea lion is the largest otariid and shows marked sexual dimorphism with males larger than females.

Steller sea lions are widely distributed along the shelf break and coastal waters, where they may overlap with the SEAK proposed action area, but are also found offshore, outside of the SEAK proposed action area, in waters greater than 6,562 ft (2,000 m) (Bonnell et al. 1983; Fiscus 1983; Kajimura and Loughlin 1988; Kenyon and Rice 1961). Foraging habitat is primarily shallow, nearshore, and continental shelf waters (Reeves et al. 1992; Robson 2002). Steller sea lions often feed 4–13 nm (7–24 km) offshore on a variety of fish species such as capelin, cod, herring, mackerel, pollock, rockfish, salmon, and sand lance (Fiscus et al. 1976). They also prey upon squid, octopus, bivalves, and gastropods.

Subsistence

Steller sea lions are hunted for subsistence and information on the subsistence harvest of Steller sea lions comes from the Alaska Department of Fish and Game, the Ecosystem Conservation Office of the Aleut Community of St. Paul Island, and the Kayumixtax Eco-Office of the Aleut Community of St. George Island (Muto et al. 2020).

3.4.11.1.3.3.2 West Indian Manatee

The West Indian manatee (*Trichechus manatus*) includes two distinct subspecies: the Florida manatee (*T. manatus latirostris*) and the Antillean manatee (*T. manatus manatus*). Manatees were listed as endangered under the ESA in 1967 (32 FR 4061; March 11, 1967) and are now listed as threatened under the ESA (82 FR 16668; April 5, 2017). Critical habitat was designated for the Florida subspecies (42 FR 47840; September 22, 1977; Section 3.4.12) and is within the GoMEX and Mississippi River (Figure 2-6) and USEC-South proposed action areas (Figure 2-3). Manatees would be expected to overlap with the GoMEX and Mississippi River, USEC-South, and USEC-MidATL proposed action areas and may be encountered during WCC Proposed Action activities.

Manatees live in marine, brackish, and freshwater systems in coastal and riverine areas throughout their range (U.S Fish and Wildlife Service 1986; U.S. Fish & Wildlife Service 1980, 1999b, 2001a; UNEP 2010). Preferred habitats include areas near the shore featuring underwater vegetation like seagrass and eelgrass. They are herbivores that feed opportunistically on a wide variety of marine, estuarine, and freshwater plants, including submerged, floating, and emergent vegetation (Alves-Stanley et al. 2010; Etheridge et al. 1985). Manatees have also been known to eat small fish from nets (Powell Jr 1978). Manatees require fresh water for drinking (Favero et al. 2020).

Manatees are found in the southeastern U.S., eastern Mexico, Guatemala, Belize, Honduras, Costa Rica, Panama, Nicaragua, Colombia, Venezuela, Guyana, Suriname, French Guiana, Brazil, Trinidad and Tobago, Jamaica, Cuba, Haiti, the Dominican Republic, Puerto Rico, and in the Bahamas. In the U.S. manatees can be found in Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, Puerto Rico, South Carolina, and Texas (U.S Fish and Wildlife Service 1986; U.S. Fish & Wildlife Service 1980, 1999b, 2001a; UNEP 2010). Florida manatees can be found throughout Florida for most of the year. However, they cannot tolerate temperatures below 68° F (20° C) for extended periods of time, and during the winter months these cold temperatures keep the population concentrated in peninsular Florida (Linzey 2020). Many manatees rely on the warm water from natural springs and power plant outfalls.

During the summer manatees expand their range, and on rare occasions are seen as far north as Massachusetts on the Atlantic Coast and as far west as Texas on the Gulf Coast. Manatees may travel hundreds of miles during a year's time, preferring to travel along channels and shorelines (Linzey 2020).

Subsistence

There are no reported takes of manatees by Native subsistence hunters in the proposed action areas.

3.4.11.1.3.3.3 Sea Otter

The sea otter (*Enhydra lutris*) is divided into two distinct subspecies: the Southern sea otter (*Enhydra lutris nereis*), also known as California sea otters, and the northern sea otter (*E. lutris kenyoni*), or the Southwest Alaska DPS. Only the northern sea otter may overlap with the SEAK proposed action area. Northern sea otters are listed as threatened (70 FR 46366; August 9, 2005) under the ESA. Critical habitat has been designated for the northern sea otter (74 FR 51988; October 8, 2009; Section 3.4.12). Northern sea otters may be encountered during WCC Proposed Action activities.

The sea otter (*Enhydra lutris*) is a species that ranges around the North Pacific Ocean rim, from Baja California, Mexico to the east coast of the Russian Kamchatka peninsula and the Kuril Islands towards Japan. Sea otters inhabit nearshore waters. Typically, due to water depths, foraging would occur closer to shore and resting may occur nearshore or further offshore (Laidre et al. 2009). Due to their benthic foraging, sea otter distribution is largely limited by their ability to dive to the seafloor (Bodkin et al. 2004). Depending on factors such as habitat, sex, reproductive status, and per-capita prey availability, obtaining this quantity of food requires that sea otters spend 20–50 percent of the day foraging.

Mating and pupping occur throughout the year, but on average across the range, a peak period of pupping occurs from October to January, with a secondary peak in March and April (Chinn et al. 2016). Females typically give birth to a single pup, with care provided solely by the pup's mother for the approximately 6 months until weaning. Pup rearing and provisioning impose high energetic costs on females, requiring them to increase foraging effort during this period.

Northern sea otter

The northern sea otter is found in the Aleutian Islands, Southern Alaska, British Columbia, and Washington. They inhabit coastal, shallow waters with sandy or rocky bottoms, which include bays, inlets, fiords, and harbors. They rarely come ashore and when they do, they remain close to the water. In Alaska there are three stocks of northern sea otters: the Southwest, Southcentral, and Southeast stocks. The Southwest stock, which includes otters in the Aleutian Archipelago, the Alaska Peninsula, and Kodiak Island, is listed as threatened under the ESA. The Southcentral and Southeast Alaska stocks are not listed under the ESA. This species is most commonly observed within the 12.2 ft (40 m) depth contour because the animals require frequent access to benthic foraging habitat in subtidal and intertidal zones (Riedman and Estes 1990). Actual home range sizes of adult otters is relative small, with male territories ranging from 10.5 to 28.5 square miles ([mi^2] 4 to 11 square kilometers [km^2] and female home ranges from a few 62 mi^2 (24 km^2) (Garshelis and Garshelis 1984; Jameson 1989; Ralls et al. 1988).

Due to their benthic foraging, sea otter distribution is largely limited by their ability to dive to the sea floor (Bodkin et al. 2004). Off the coast of Washington, Laidre et al. (2009) found that adult females spent 60 percent of their time foraging in habitats no more than 33 ft (10 m) deep and were rarely found foraging in waters 98 ft (30 m) deep. Males in the same study spent most of their time (32–34 percent) foraging in habitats 33–98 ft (10–30 m) deep. Beyond 131 ft (40 m) deep, foraging was minimal (1–2 percent of time) for both sexes (Laidre et al. 2009).

Subsistence

Data for subsistence harvest of sea otters in Southeast Alaska are collected by a mandatory Marking, Tagging and Reporting Program administered by the USFWS since 1988. Unlawful takes also occur and records are maintained by the USFWS.

3.4.11.1.4 Non-ESA-Listed Marine Mammals Potentially Present in the Proposed Action Areas

For a list of each species, MMPA stock, and presence in proposed action area refer to Appendix H. Like their ESA-listed counterparts, non-ESA listed mysticetes, odontocetes, and pinnipeds are found exclusively or primarily in waters of a particular depth, temperature range, and oceanographic regime. For most species, little is known of the particular factors that cause them to be found in one area and not in another, but one major factor affecting their distribution pattern is the pattern of major ocean currents influencing productivity and prey availability. Therefore, non-ESA listed marine mammals are expected in all proposed action areas. Some may be considered residents, while others may be seasonal or migratory. A complete list of non-ESA listed marine mammals that may overlap with the proposed action areas can be found in Appendix H. Environmental consequences (Section 3.4.11.2) evaluated for ESA-listed species would also be applicable for non-ESA-listed marine mammals.

3.4.11.1.4.1 Cetaceans (Mysticetes and Odontocetes)

Many baleen whales (i.e., mysticetes) migrate between temperate summer grounds and tropic or subtropic winter grounds (Waring et al. 2008). Toothed whales (i.e., odontocetes) do not have the fasting capability of mysticetes, so their distribution is strongly linked to seasonal shifts in prey abundance, rather than undertaking long migrations to breeding grounds. Additionally, small scale hydrographic fronts may act as convergent zones with greater productivity that attracts marine mammals (Mendes et al. 2002). In contrast, pelagic dolphins may form large groups that forage nearer to the surface than the deep diving whales and have shorter periods of submergence (Reeves et al.

2002). Dolphins may be seen more easily because of their large group size and their aerial behaviors that increase their visibility, such as porpoising and bow-riding (Reeves et al. 2002).

A diverse group of cetaceans may be found in throughout the proposed action areas. Many cetaceans migrate long distances, often following food sources. Cetaceans migrating long distances may be seeking out abundant food sources, or they may migrate between locations best suited for feeding and reproduction (Heithaus and Dill 2009). Because of their migrations, many cetacean species are only found in more northern waters in spring and summer, moving to lower latitudes for the winter (LaBrecque et al. 2015). However, not all individuals migrate, and some cetaceans may be found in the proposed action areas throughout the year (LaBrecque et al. 2015). Mysticete species commonly feed upon copepods, euphausiids, and small fishes (LaBrecque et al. 2015). Odontocetes approach closer to shore (LaBrecque et al. 2015), and commonly feed upon fishes and squid with some species having a more diverse diet (Watwood and Buonantony 2012).

3.4.11.1.4.2 Pinnipeds

Non-ESA-listed pinnipeds that may be found in the proposed action areas include species of seals and sea lions. Long-ranging movements are quite common in pinnipeds, as they depend on the seasonality of prey distribution (Forcada 2002). All pinniped species purposefully leave the water to periodically haul out on land or ice to molt, rest, mate, thermoregulate, or avoid marine predators (Riedman 1990).

Pinnipeds are widely distributed and include seals (phocids), sea lions and fur seals (otariids), and walruses (odobenids). Several pinniped species can be found along the U.S. coastline either in water or hauled out and would be expected in several proposed action areas. Although they spend most of their lives in water, they do come ashore to mate, give birth, molt, or escape from predators. They mainly live in the marine environment, but can also be found in freshwater. The feed largely on fish and marine invertebrates. Pups are typically born in the spring and summer months and females nurse their young until they are weaned (usually within weeks). Pinnipeds can produce a variety of vocalizations and their hearing ranges are markedly different in air versus underwater (Appendix E).

3.4.11.2 Environmental Consequences to Marine Mammals

Impacts to marine mammals would potentially result from fathometer noise, vessel noise, pile driving noise, vessel movement, bottom devices, pile driving, ATON retrieval devices, and tow lines associated with the Proposed Action. As discussed in Appendix E, most marine mammal species can hear sounds between 7 Hz and 160 kHz. Therefore, marine mammals would not be able to detect Doppler speed log noise, as the frequency range (270–284 kHz) is well above their hearing range. As discussed in Table 3-3, due to SOPs (Appendix B), the risk of entanglement in ATON retrieval devices or tow lines would be discountable. Vessel noise would be brief and intermittent and would not cause PTS or TTS in marine mammals. Pinnipeds hauled out of the water could be exposed to detectable levels of sound from ATON signals. However, the sound pressure levels are not expected to be high enough to produce auditory effects to the animals exposed. Further, many pinniped species haul out on ATON, indicating that the sound signal produced by the ATON is not a deterrent for the animal to use the area. If it were a deterrent, the animal would be expected to simply avoid the immediate area where the ATON is located and seek alternative habitat a short distance away. There would be no impact to marine mammals from ATON signal testing noise, tool noise, construction, or brushing as these stressors would occur on land, away from most marine mammals. Therefore, the impacts from these stressors to marine mammals will not be discussed further in this PEIS. There would also be no impact to marine mammals from unrecovered jet cone moorings (Table 3-3) or the Doppler speed log (Section 3.2.1.1).

Marine mammal species would only be located in marine portions of the proposed action areas, which include the USEC-MidATL, USEC-South, GoMEX and Mississippi River, and SEAK proposed action areas. There would be no marine mammals present in the Great Lakes and they would only occasionally be present in the PNW proposed action area, as it does not extend into the oceanic environment. In addition, much of the GoMEX and Mississippi River proposed action area is freshwater that would not be typical marine mammal habitat. In coastal areas (within 12 nm [22 km] from shore) or in areas that are inshore of the 328-ft (100-m) isobath, the likelihood of encountering many of the large whale species is low. Therefore, many of the ESA-listed marine mammals would not be commonly encountered in high densities in most of the proposed action areas, which the exception of sea otters in the SEAK proposed action area and West Indian manatees in the USEC-South proposed action area.

3.4.11.2.1 Fathometer Noise

The fathometer (i.e., single beam echosounder) used for navigation aboard WCCs is discussed in detail in Section 3.2.1.1 and detailed in Table 2-5. The frequency range of the echosounder is from 50–200 kHz (Section 3.2.1.1). As discussed in Section 3.2.1.1, the single beam echosounder would be considered a *de minimis* acoustic source. This determination by Coast Guard is based on the Navy's definition of a *de minimis* source (Navy 2013). The operational characteristics of the source exclude the possibility of any significant impact to a species.

The source level associated with the echosounder (205 dB, Table 2-5) is a maximum level that was taken directly next to the source. However, the Coast Guard would not operate the echosounder at the maximum level during the Proposed Action. As a result, the received sound levels are expected to be much lower than the criteria for onset of TTS and PTS provided in Section 3.2.1.6.2 and Table 3-10. Therefore, fathometer noise would not be expected to cause any injury to mysticetes (LF cetaceans), odontocetes (MF and HF cetaceans), pinnipeds (PW in-water), or otariids, sirenians (manatee), and sea otters (OW in water) that may be within the proposed action areas. In addition, the level of sound diminishes significantly outside of the downward-focused, narrow beam width of sound directly below the vessel. Because the nature of the noise is transient and both vessels and marine mammals would be moving throughout vast proposed action areas, source levels associated with the Proposed Action would not be expected to cause any non-auditory physiological effects or injuries to mysticetes, odontocetes, pinnipeds, sirenians, or sea otters that may be within the proposed action areas. Therefore, any potential impact to marine mammals as a result of fathometer noise would be limited to masking or behavioral responses.

As discussed in Appendix E, most marine mammal species can hear sounds between 7 Hz and 160 kHz. The fathometer operates in a wide range of frequencies (between 50 and 200 kHz). Although there is a lack of audiometry data, 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 2016b; Southall et al. 2007b). Watkins (1986) stated that humpback whales often react to frequencies from 15 Hz to 28 kHz, but did not react to frequencies above 36 kHz. Fin and right whales also often react to frequencies from 15 Hz to 28 kHz, but did not react frequencies above 36 kHz (Watkins 1986). Therefore, mysticetes are unlikely to detect or react to any frequency used by the fathometer. Similarly, sea lions and fur seals hear best between 60 Hz to 39 kHz (Kastak and Schusterman 1998; Moore and Schusterman 1987; Schusterman et al. 1972; Southall 2005), and are unlikely to detect any frequency used by the fathometer. Controlled sound exposure trials on southern sea otters indicate that those otters can hear frequencies between 125 Hz to 38 kHz with best sensitivity between 1.3 and 27 kHz (Ghoul and Reichmuth 2014); therefore, sea otters would not be expected to be able to detect fathometer noise. Because fathometer noise is outside the range of best hearing for mysticetes, sea lions, fur seals, and sea otters, the operation of the fathometer would not likely mask sounds that are biologically important to these species.

As discussed in Appendix E, most phocids can hear frequencies between 50 Hz and 86 kHz (National Marine Fisheries Service 2016b; Southall et al. 2007b), but can detect sounds up to 140 kHz although sensitivity is low (Cunningham and Reichmuth 2016). Thus, it is possible that a phocid could detect fathometer noise if the animal were swimming within or near the vertical beam, but only if the navigational system was operating at a frequency within their hearing range. The overlap between the echosounder's frequency and the phocid best hearing range is limited to 50–86 kHz, which would be at the echosounder's lower operational frequencies. Although phocids can hear frequencies between 50 Hz and 86 kHz, sensitivity to noise decreases at the low and high ends of this range (Perrin and Wursig 2009). Sills et al. (2015) determined that hearing abilities for ringed seals are actually better than what Terhune and Ronald (1975) previously reported (from 2–50 kHz) with best sensitivity at 49 dB re 1 µPa (12.8 kHz in water) and critical ratio measurements ranging from 14 dB at 0.1 kHz to 31 dB at 25.6 kHz. Since the lowest operational frequency for the echosounder only overlaps with the high end of the range of best hearing for a phocid, the sensitivity to the echosounder is expected to be poor because of the ear's decreased sensitivity to extreme low and high frequency noise. Data suggest that exposures of pinnipeds to sources between 90 and 140 dB re 1 µPa at 1 m do not elicit strong behavioral responses (Southall et al. 2007b). In contrast, data on grey (*Halichoerus grypus*) and harbor seals (*Phoca vitulina*) indicate avoidance responses at received levels of 135–144 dB re 1 µPa at 1 m and high frequency sonar (Götz and Janik 2010).

Gerstein et al. (1999) obtained behavioral audiograms for two West Indian manatees and found an underwater hearing range of approximately 400 Hz to 76 kHz, with best sensitivity around 16 to 18 kHz. Thus, similar to phocids, manatees could detect fathometer noise if the animal were swimming within or near the vertical beam, but a manatees best hearing sensitivity is outside of the normal operational frequency of the echosounder.

Pinnipeds and manatees are expected to exhibit no more than short-term and inconsequential responses to the echosounder given the device's *de minimis* characteristics (e.g., narrow downward-directed beam, which is focused directly beneath the vessel). However, any masking or behavioral response to the echosounder, although unlikely, is expected to be short term, any disturbance is expected to be temporary, and any individual that may respond would be expected to return to its normal behavior after the vessel departs the area.

The maximum potential impact would be to odontocetes, as their range of best hearing is from 150 Hz to 160 kHz (Appendix E), which could overlap with low- and medium-frequency echosounder signals (Table 2-5). However, in the unlikely event that an odontocete is within the proposed action areas and within a range to detect the echosounder, it would be expected to exhibit no more than a short term response to the echosounder given the device's *de minimis* characteristics.

In addition, Coast Guard SOPs (Appendix B) would initiate adaptive mitigation responses to marine mammal presence to minimize the impact 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. In addition, Coast Guard would support the recovery of protected living marine resources through internal compliance with laws designed to preserve marine protected species, including planning passage around marine sanctuaries, such as federally-designated critical habitat. These actions would minimize the impact of fathometer noise to marine mammals and federally-designated critical habitat (Section 3.4.12).

Any increase in ambient sound (Section 3.3.2) as a result of fathometer noise would be temporary and localized to the position of the vessel as it moves throughout the proposed action areas. Marine mammals are either not likely to respond to fathometer 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. Because fathometer noise is downward-directed and transient as vessels move through very large proposed action areas, the effects of fathometer noise would be expected to be limited to temporary behavioral effects and marine mammals would be expected to return to normal behavior within minutes. As described above, fathometer noise associated with the Proposed Action may result in minor to moderate avoidance responses of phocids, manatees, and odontocetes over short and intermittent periods of time.

3.4.11.2.2 Vessel Noise

Sound emitted from large vessels, such as shipping and cruise ships, is the principal source of low-frequency noise in the ocean today, and marine mammals are known to react to or be affected by that noise (Foote et al. 2004a; Hatch and Wright 2007; Hildebrand 2005; Holt et al. 2008; Kerosky et al. 2013; Melcon et al. 2012; Richardson et al. 1995). Coast Guard vessels used during ATON activities are a small component of overall vessel traffic and vessel noise in most areas where they operate.

As discussed in Appendix E, marine mammal hearing has been grouped into generalized hearing ranges. The noise created by vessels is detailed in (Table 2-5). In general, small vessel noise (e.g., cutter small boat noise) would be expected to range from 1–7 kHz and large vessel (e.g., WCC vessel noise) would be expected to range from 20–300 Hz; therefore, marine mammals may be able to detect vessel noise associated with the Proposed Action. The received levels from vessel noise (Table 2-5) from the Proposed Action are expected to be below the onset of TTS and PTS for all marine mammal groups provided in Section 3.2.1.6.2 and Table 3-10, including mysticetes, odontocetes, pinnipeds, sea otters, and manatees that may be within the proposed action areas. Potential impacts of vessel noise to marine mammals includes masking and behavioral responses. However, it is difficult to differentiate between behavioral responses to just a vessel sound or just the visual cues associated with the presence of a vessel; thus, it is assumed that both play a role in prompting reactions from animals (Richardson et al. 1995).

Marine mammal species would only be located in marine portions of the proposed action areas, and because some marine mammal species haul out, marine mammal species could be exposed to both in-air noise and in-water noise generated by vessels.

Underwater sound from vessels is generally at relatively low frequencies, usually between 5 and 500 Hz (Hildebrand 2009; NRC 2003; Urick 1983; Wenz 1962). The dominant noise source is usually propeller cavitation which has peak power near 50–150 Hz (at blade rates and their harmonics), but also radiates broadband power at higher frequencies, at least up to 100,000 Hz (Arveson and Vendittis 2000; Gray and Greeley 1980; Ross 1976). While propeller singing is caused by blades resonating at vortex shedding frequencies and emits strong tones between 100 and 1,000 Hz, propulsion noise is caused by shafts, gears, engines, and other machinery and has peak power below 50 Hz (Richardson et al. 1995). Overall, larger vessels generate more noise at low frequencies (<1,000 Hz) because of their relatively high power, deep draft, and slower-turning (<250 rotations per minute) engines and propellers (Richardson et al. 1995). Based on this information, underwater vessel noise from a WCC or cutter small boat could overlap with the same low-frequency sounds that many whales use for communication for feeding and mating, and therefore, could cause masking. Auditory response curves for odontocetes show maximum auditory sensitivity near where toothed whale signals have peak power (Mooney et al. 2012; Tougaard et al. 2014) at about 1,000–2,000 Hz for social sounds and 10,000–100,000 Hz or higher for echolocation. NMFS (2016; 2018) characterized MF cetaceans (Appendix E) with a generalized hearing range from 150 Hz to 160 kHz, and pinnipeds as PW with a generalized hearing range from 50 Hz to 86 kHz or otariids, sirenians (manatee), and sea otters (OW in water) with a generalized hearing range from 60 Hz to 39 kHz (Appendix E). Each group is discussed in more detail below.

Since many marine mammals rely on sound to find prey, moderate social interactions, and facilitate mating (Tyack 2008), vessel noise may interfere with these functions by masking biologically important sounds (if the vessel noise overlaps with the hearing sensitivity of the marine mammal and the important sound) (Clark et al. 2009; Hatch et al. 2012; Southall et al. 2007b). The potential impact from vessel noise from auditory masking is missing biologically relevant sounds that marine organisms may rely on, as well as eliciting behavioral responses such as an alert, avoidance, or other behavioral reaction (NRC 2003, 2005; Williams et al. 2015). The impact from 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. 2004b; Parks et al. 2011; Southall et al. 2000).

Vessel noise also has the potential to disturb marine mammals and elicit an alert, avoidance, or other behavioral reaction (Huntington et al. 2015; Pirotta et al. 2015a; 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. 2015a; Richardson et al. 1995; Williams et al. 2014). In cases where vessels actively approached marine mammals (e.g., whale watching), scientists have documented that animals exhibit altered behavior such as increased swimming speed, erratic movement, and active avoidance behavior (Acevedo 1991; Baker and MacGibbon 1991; Bursk 1983; Constantine et al. 2003; New et al. 2015; Parsons 2012; Pirotta et al. 2015a; 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. 2015a), and the shift of behavioral activities which may increase energetic costs (Constantine et al. 2003; Constantine et al. 2004). These reactions could be caused by vessel noise or the presence of the vessel itself. Some species respond negatively by retreating or responding to the vessel antagonistically, while other animals seem to ignore vessel noises altogether (Watkins 1986). Marine mammals are frequently exposed to vessels due to research, ecotourism, commercial and private vessel traffic, and government activities.

While most mysticetes hear best at low frequencies, blue whales have been observed reacting to mid-frequency sound in the range of 3.5–3.6 kHz (Goldbogen et al. 2013). However, the responses varied across individuals and the responses themselves were strongly affected by the whale's behavioral state at the time of exposure, with surface feeding animals typically showing no change in behavior. By contrast, responses from deep feeding and non-feeding whales ranged from termination of deep foraging dives to prolonged mid-water dives. The potential impacts of vessel noise can be assessed more confidently in odontocetes because they constitute mid-frequency or high-frequency functional hearing groups (Southall et al. 2007b) in which auditory response curves have been obtained for many species. These curves show maximum auditory sensitivity near the frequencies where toothed whale signals have peak power (Mooney et al. 2012; Tougaard et al. 2014)—at about 1–20 kHz for social sounds and 10–100 kHz or higher for echolocation.

Other baleen whales, like the humpback whale, has exhibited varied responses to vessels, ranging from approaching to avoiding (Au and Green 2000; Baker and Herman 1989; Bauer and Herman 1986; Stamation et al. 2009). Vertical avoidance was observed within 1 mi (2 km), while horizontal avoidance occurred from 1–2 mi (2–4 km) away (Baker and Herman 1989; Baker et al. 1983). Humpback whales are less likely to react if actively engaged in feeding (Krieger and Wing 1984, 1986), although Blair et al. (2016) reported that humpback whales significantly changed foraging behavior in response to high levels of ship noise in the North Atlantic. Although vessels could cause some short-term changes in behavior, any disturbance is expected to be temporary and any exposed baleen whale is expected to return to its normal behavior after the vessel moves through the area.

Vocal changes in response to anthropogenic noise can occur across the repertoire of sound production modes used by marine mammals, including odontocetes, such as whistling, echolocation click production, calling, and singing. Changes to vocal behavior and call structure may result from a need to compensate for an increase in background noise. In cetaceans, vocalization changes have been reported from exposure to anthropogenic sources such as sonar, vessel noise, and seismic surveying. Veirs et al. (2016) measured ship noise in Puget Sound, Washington, and determined that median received spectrum levels of noise from 2,809 isolated transits are elevated relative to median background levels not only at low frequencies (20-30 dB re 1 mPa^2/Hz from 100 to 1,000 Hz), but also at high frequencies (5–13 dB from 10,000 to 96,000 Hz). Based on these results, noise received from ships at ranges less than 1.86 mi (3 km) could extend to frequencies used by odontocetes. As WCCs would enter shallow waters and traverse the estuarine habitat typically occupied by major ports, the noise they radiate may impact coastal marine life. However, impacts would be temporary and intermittent since WCCs would be transiting through these areas as they traveled from their homeport to ATON and between ATON. Behavioral responses to boat (as opposed to ship) noise have been documented in odontocetes. Bottlenose dolphins whistle (at 4–20 kHz) less when exposed to boat noise at 500–12,000 Hz (Buckstaff 2004) and Indo-Pacific bottlenose dolphins lower their 5–10 kHz whistle frequencies when noise is increased by boats in a band from 5,000 to 18,000 Hz (Morisaka et al. 2005). Smaller odontocetes, including some dolphins and porpoises and other smaller toothed whales (and occasionally sea lions and fur seals), interact with vessels by bow riding when a vessel is moving. Bow-riding is when the animals position themselves in such a manner as to be lifted up and pushed forward by the circulating water generated to form a bow pressure wave of an advancing vessel (Hertel 1969; Lang 1966). Although vessels could cause some short term changes in behavior, any disturbance is expected to be temporary and any exposed odontocete is expected to return to its normal behavior after the vessel moves through the area.

Pinnipeds could react to vessels when hauled out, and thus reacting to both the in-air sound of a vessel as well as to the visual cue from the vessel itself. In 1997, Henry and Hammill (2001) conducted a study to measure the impact of small boats (i.e., kayaks, canoes, motorboats and sailboats) on harbor seal haul out behavior in Metis Bay, Quebec, Canada and noted that the most frequent disturbances were caused by lower speed, lingering kayaks, and canoes as opposed to motorboats conducting high speed passes. The study concluded that boat traffic at current levels had only a temporary effect on the haul out behavior of harbor seals in the Metis Bay area because once the animals were disturbed, there did not appear to be any significant lasting effect on the recovery of numbers to their pre-disturbance levels.

Pinnipeds may also react to vessels while they are in the water, from hearing just the in-water vessel noise or hearing the in-water vessel noise and the sight of the vessel approaching (only likely if the pinniped's head is above water). Richardson et al. (1995) stated that for in-water vessel reactions only, pinnipeds are much less likely to react to vessels if they are in water and not hauled out. While in water, pinnipeds show a high tolerance to vessels, though it is not known if these incidents cause them stress, despite their tolerance (Richardson et al. 1995). Johnson and Acevedo-Gutierrez (2007) evaluated the efficacy of buffer zones for watercraft around harbor seal haulout sites on Yellow Island, Washington. The authors estimated the minimum distance between the vessels and the haulout sites, categorized the vessel types, and evaluated seal responses to the disturbances. During the course of the seven-weekend study, the authors recorded 14 human-related disturbances, which were associated with stopped powerboats and kayaks. During these events, hauled out seals became noticeably active and moved into the water. The flushing occurred when stopped kayaks and powerboats were at distances as far as 453 and 1,217 ft (138 and 371 m), respectively. The authors note that the seals were unaffected by passing powerboats, even those approaching as close as 128 ft (39 m), possibly indicating that the animals had become tolerant of the brief presence of the vessels and ignored them. The authors reported that on average, the seals quickly recovered from the disturbances and returned to the haulout site in less than or equal to 60 minutes. The study concluded that the return of seal numbers to pre-disturbance levels and the relatively regular seasonal cycle in abundance throughout the study area, counter the idea that disturbances from powerboats may result in site abandonment (Johnson and Acevedo-Gutiérrez 2007). Frequent and close disturbances may cause abandonment of a haulout site (Allen et al. 1984), but are not likely to occur from infrequent exposure to boats passing by the haulout. In general, from the available information, pinnipeds exposed to intense (approximately 110 to 120 dB re 20 μPa @ 1 m) non-pulsed sounds often leave haulout areas and seek refuge temporarily (minutes to a few hours) in the water (Southall et al. 2007b). Although vessels could cause some short term changes in behavior, any disturbance is expected to be temporary and any exposed pinniped is expected to return to its normal behavior after the vessel moves through the area.

Manatees responded to boats by changing their orientation, depth, and fluking behavior most often when a boat approached closely less than 32 ft (<10 m) (Rycyk et al. 2018a). Manatees were also more likely to change their depth when not on a seagrass bed and when actively fluking before the boat passed. The boat speed did not appear to impact the occurrence of intensity of the manatee response. However, compared to fast approaches, slower passes did allow the manatee more time to respond and the behavioral response occurred earlier relative to the time of the boat's closest point of approach. Manatees have also been shown to respond to acoustically simulated boat approaches (Miksis-Olds et al. 2007). These playbacks elicited faster swimming and greater variability in respiration rate in response to the sound of the faster boats. Although vessels could cause some short term changes in behavior, any disturbance is expected to be temporary and any exposed manatee is expected to return to its normal behavior after the vessel moves through the area.

Sea otters are generally non-migratory and generally do not disperse over long distances (Garshelis and Garshelis 1984). However, sound frequencies produced by vessels would fall within the hearing range of sea otters. Controlled sound exposure trials on southern sea otters indicate that those otters can hear frequencies between 125 Hz to 38 kHz with best sensitivity between 1.3 and 27 kHz (Ghoul and Reichmuth 2014). Because sea otter hearing abilities and sensitivities have not been fully evaluated, the Coast Guard relied on functionally similar hearing information from other species to evaluate the potential impacts of noise exposure. California sea lions (*Zalophus californianus*) have shown frequency ranges of hearing most functionally similar to the sea otter (Ghoul and Reichmuth 2014) and provide the closest proxy for which data are available. Available studies on northern and southern sea otter behavior indicate that sea otters are somewhat more resistant to the effects of sound than other marine mammals (Ghoul and Reichmuth 2012a, 2012b; Riedman 1983, 1984). Southern sea otters off the

California coast showed only mild interest in boats passing within hundreds of meters and appeared to have habituated to boat traffic (Curland 1997; Riedman 1983). Sea otters in Alaska have shown signs of disturbance (escape behaviors) in response to the presence and approach of vessels. Behaviors included diving or actively swimming away from a boat, hauled out sea otters entering the water, and groups of otters dispersing and swimming in multiple different directions (Udevitz et al. 1995). Sea otters in Alaska have also been shown to avoid areas with heavy boat traffic, but return to those same areas during seasons with less traffic (Garshelis and Garshelis 1984). It is not known if these responses were caused by vessel movement or to vessel noise. Although vessels could cause some short term changes in behavior, any disturbance is expected to be temporary and any exposed sea otter is expected to return to its normal behavior after the vessel moves through the area.

Masking impacts would be similar to what is currently present in the proposed action areas, because the Proposed Action activities are not expected to change the current ambient noise levels. Coast Guard would follow SOPs (Appendix B) to minimize the impact of vessel noise by monitoring the presence of marine mammals and maintaining or increasing distance between the vessel and a marine mammal. The noise generated by these vessels are not expected to elicit significant behavioral responses to exposed individuals. Such reactions would not be expected to significantly disrupt behavioral patterns such as migration, breathing, nursing, breeding, feeding and sheltering to a point where the behavior pattern is abandoned or significantly altered or result in reasonably foreseeable takes of marine mammals. Coast Guard would support the recovery of protected living marine resources through internal compliance with laws designed to preserve marine protected species, including planning passage around marine sanctuaries, such as federally-designated critical habitat (Section 3.4.12). These actions would minimize the impact of vessel noise to marine mammals and federally-designated critical habitat.

The vessel activity associated with the proposed action (and the noise emitted from those vessels) is infrequent, of short duration, and a small component of overall vessel traffic and vessel noise in most areas where they operate. For behavioral responses to result in energetic costs that result in long term impacts, such disturbances would likely need to be sustained for a significant duration or extent where individuals exposed would not be able to select alternate habitat to recover and feed. Coast Guard WCC activities would not likely result in such prolonged exposures and preclusion of individuals from feeding, breeding, or sheltering habitat. Individuals that exhibit a temporary behavioral response will return to baseline behavior immediately following exposure to the vessel noise. Further, the available information suggests that ESA-listed marine mammals are either not likely to respond to vessel noise from WCC vessels or are not likely to measurably respond in ways that would significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Therefore, the effects of vessel noise on ESA-listed marine mammals is insignificant and not likely to adversely affect these species (Section 3.4.14).

3.4.11.2.3 Pile Driving Noise

As discussed in Appendix E, marine mammal hearing has been grouped into generalized hearing ranges. The noise created by pile driving and the potential distance at which PTS, TTS, and behavioral responses could occur are detailed in Table 3-42. Section 3.2.1.6.2 provides a general description of TTS and PTS and an evaluation of hearing thresholds for biological resources in the proposed action areas (see also Appendix C and Appendix D). Based on the Coast Guard's analysis, pile driving noise may cause a hearing threshold shift due to the intensity of the sound generated by pile driving (Table 3-42). The potential impacts of pile driving noise to biological resources include injury (Section 3.2.1.6.1), hearing threshold shift (Section 3.2.1.6.2), masking (Section 3.2.1.6.3), and behavioral responses (Section 3.2.1.6.5). While underwater sound levels for a variety of piles are available (Table 3-7), in certain instances, the exact piles that the Coast Guard would be expected to drive were not available, thus, the Coast Guard used sound measurements for "proxy" piles taken at a distance of 10 m (CalTrans 2020), that were more similar to the Proposed Action.

The majority of energy in the impact hammer pulses is at frequencies below 500 Hz, with near source (within 32 ft [10 m]) peak sound pressure levels underwater ranging up to 220 dB and beyond (University of Rhode Island 2019). Table 3-7 provides sound ranges from impact pile driving of different pile materials in a variety of sizes, which coincide with those most typically used in fixed ATON structures. The continuous sounds produced from a vibratory hammer would likely be similar in frequency to the impact hammer, except the levels are expected to be much lower than the impact hammer (University of Rhode Island 2019). Ranges of the sound level produced by vibratory pile driving different pile materials are listed in Table 3-7.

As mentioned above, pile driving noise has the potential to impact marine mammals by causing behavioral responses and physiological impacts such as PTS and TTS, and injury. Non-auditory physiological effects or injuries that theoretically could occur in marine mammals exposed to strong underwater sound include stress, neurological effects, and other types of organ or tissue damage (Cox et al. 2006; Southall et al. 2007a). Such effects, if they occur, would be limited to short distances from the sound source and to activities that extend over a prolonged period. When marine mammals are exposed to high intensity sound repeatedly or for prolonged periods, they may also experience auditory physiological effects such as PTS and TTS.

Masking may also result from pile driving activities. Masking can interfere with the detection of acoustic signals such as communication calls, echolocation sounds, and environmental sounds important to marine mammals and may reduce the effective communication distance of a marine mammal, if the frequency of the source overlaps with marine mammal vocalization(s) or hearing capabilities (Richardson et al. 1995).

Behavioral responses to pile driving noise may result in changes in behavioral state, startle responses, and habitat displacement. Observed responses of wild marine mammals to loud pulsed sound sources (typically seismic guns or acoustic harassment devices, but includes pile driving) have been varied, but often consist of avoidance behavior or other behavioral changes (Morton and Symonds 2002; Nowacek et al. 2007; Thorson and Reyff 2006; Wartzok et al. 2003). Responses to continuous sound, such as a vibratory pile driver, have not been documented as well as responses to pulsed sounds. Potential behavioral responses of marine mammals to anthropogenic sound will 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.

The limited duration of Coast Guard pile driving events reduces the potential for marine mammals to be exposed. Coast Guard pile driving will not result in prolonged periods of elevated underwater sound since each pile driving event only lasts, at most, a few hours. The Coast Guard will employ a 3,281-ft (1,000-m) safety zone around each pile (Appendix B), which encompasses the entire PTS zone for impact and vibratory pile driving. In the unlikely event that a marine mammal is observed within this safety zone, pile driving would not commence or would be shut down until the properly trained lookout is confident that the animal has moved out of the area on its own volition. These safety zones are based on the estimated ranges to effects as listed in Table 3-42 and sightability of marine mammals at distance.

The peak sound level PTS threshold would not be exceeded for any marine mammal hearing group during Coast Guard pile driving activities considered in this PEIS, so only the cumulative sound exposure level threshold is considered further for PTS. Table 3-42 details the calculated range in meters to the PTS and TTS cumulative sound exposure level threshold for each marine mammal hearing group and the distance to the behavioral threshold, expressed in RMS for behavioral disturbance. Of all the marine mammal hearing groups, only those that are found nearshore and in coastal environments, such as pinnipeds, sea otters, manatees, and dolphins would have the potential to overlap with pile driving activities in the proposed action areas.

Pinnipeds would need to be within 951 ft (290 m; or closer) of a pile being driven with an impact hammer, and remain within that distance from the pile during the duration of the pile driving event, in order to suffer PTS. Coast Guard would not expect this to occur due to the use of soft-start or ramp-up procedures which are expected to result in animals moving away from the pile before the sound becomes loud enough to be injurious, the shutdown zones that would be implemented, and the high likelihood that any individuals that may enter the safety zone undetected would quickly leave due to the sounds within that zone (Appendix B). The range for low-frequency cetaceans is higher (e.g., up to 1,775 ft [541 m] for low-frequency cetaceans); however, WCCs are not expected to conduct any pile driving activities in areas that overlap with low-frequeny cetaceans. In addition, this is still within the observable shutdown zone for impact pile driving (Appendix B). Due to the high sightability of low-frequency cetaceans (e.g., median sighting distance of 1,969 ft [600 m] from the source (Barkaszi et al. 2012), particularly in shallow water areas where pile driving is conducting, ramp-up procedures, the safety zones implemented during pile driving, and the assumption (based on empirical evidence that low-frequency cetaceans avoid loud sounds; e.g., (Morton and Symonds 2002; Nowacek et al. 2007; Thorson and Reyff 2006; Wartzok et al. 2003) that any low-frequency cetaceans within these zones would leave shortly after entering, the Coast Guard would not expect low-frequency cetaceans to suffer PTS. Mid-frequency cetaceans and phocids would need to be within 69 ft [21 meters; or closer) of a pile driven with an impact hammer in order to suffer PTS; however, for the same reasons described above for pinnipeds (non-phocids) and low-frequency cetaceans, the Coast Guard would not expect mid-frequency cetaceans of phocids to suffer PTS. Additionally, any more severe injuries to marine mammals (e.g., lung injury) would only be expected to occur at even closer distances than the ranges to effect for PTS, if they could occur at all. Because Coast Guard does not expect PTS, more severe injuries are not expected to occur.

A less serious auditory effect than PTS is TTS. The safety zone (3,281 ft [1,000 m]) encompasses the TTS zone for all pile driving activities and all hearing groups with the exception of steel structures driven in areas where low-frequency cetaceans could occur. Low-frequency cetacean species considered in this proposed action have large geographic ranges and can travel long distances on a daily basis, so would not likely remain in close proximity to a pile driving event for the duration of a pile driving event or an extended period of time. In the unlikely event that a low-frequency cetacean species is present, an individual would need to remain within the range to TTS for the duration of the pile driving event, for a marine mammal to suffer TTS from Coast Guard pile driving. Similar to the discussion above regarding PTS and Coast Guard safety measures (Appendix B), the Coast Guard does not expect TTS and more severe injuries are not expected to occur.

The safety zone encompasses the entire behavioral disturbance zone for impact pile driving and a portion of the behavioral disturbance zone for vibratory pile driving. Although, properly trained Coast Guard lookouts would be expected to detect many marine mammals that may enter the estimated zones of disturbance, some may enter undetected, particularly during vibratory pile driving where the disturbance zone extends beyond where one can reasonably assume marine mammals could be sighted.

Some ESA-listed marine mammals considered in this PEIS (i.e., blue whales, fin whales, right whales, sei whales, and WNP gray whales) could be exposed to underwater sound when they occur in coastal habitats, though these animals have large geographic ranges and can travel long distances on a daily basis, so would not likely remain in close proximity to a pile driving event for an extended period of time. Additionally, ESA-listed large whales are highly visible, particularly in relatively shallow water coastal habitats where pile driving will be conducted, increasing the likelihood that these species would be observed by properly trained Coast Guard lookouts. Western DPS Steller sea lions spend substantial time in nearshore, coastal habitats where pile driving activities occur, and are less visible than large whales at distance. This indicates that these species would be more likely to be exposed to underwater sounds from Coast Guard pile driving activities. However, the Coast Guard drives a limited number of piles annually in each of these species' range, limiting the likelihood of exposure. During maintenance, the Coast Guard averages up to 15 piles in District 17 where Western DPS Steller sea lions reside. Further, only a subset of pile driving events occurring in each district would occur in the geographic range of each of these species.

The ranges to behavioral disturbance for marine mammals during vibratory pile driving are equal to or extend beyond the shutdown zones required. As such, there is a greater probability that marine mammals will be exposed to pile driving noise that could cause behavioral disturbance if the Coast Guard uses a vibratory hammer. If marine mammals are exposed to pile driving noise within either zone, it may result in masking or a behavioral response. However, as explained below, any instances of masking or a behavioral response from Coast Guard pile driving are not expected to create the likelihood of injury to affected animals by disturbing them to such an extent as to significantly disrupt normal behavioral patterns.

Any masking that could occur from Coast Guard pile driving would be temporary, lasting only as long as the duration of the pile driving event (i.e., less than a few hours). Coast Guard pile driving would not result in prolonged periods of time when masking could occur, reducing the likelihood of the Proposed Action causing masking that could result in any long term, population level impacts to marine mammals. Animals within the behavioral disturbance zone may experience short term behavioral responses (e.g., a startle response, changes in respiration, alteration of swim speed or direction) or temporary habitat displacement. However, any instances of disturbance would be expected to be temporary, with the animal resuming normal behaviors or returning to the area shortly after pile driving is complete (i.e., only a few hours at the most). In instances where a marine mammal avoids the area where pile driving is occurring, this would be expected to result in an energy expenditure to move away from the area and possibly, the temporary loss of use of a preferred habitat. However, the distance the animal would need to travel would be short and the energetic cost would be minimal, similar to that typically incurred while an animal is seeking optimal habitat for foraging or sheltering. If an animal were to avoid an area where they had previously been feeding or resting, pile driving would also have the potential to result in lost feeding or resting opportunities. However, to result in fitness consequences for the animal, it would be expected that an individual marine mammal could not compensate for the short loss in feeding opportunities by either immediately feeding at another location, by feeding shortly after cessation of acoustic exposure, or by feeding at a later time. Further, Coast Guard would follow SOPs (Appendix B) to maintain properly trained lookouts and soft start protocols to minimize impacts. The Coast Guard has determined that impacts from pile driving noise may affect, but are not likely to adversely affect ESA-listed marine mammals (Section 3.4.14).

Table 3-42. Estimated Range to Effects for Each Marine Mammal Hearing Group from Impact and Vibratory Pile Driving

Hearing Group	*Pile Characteristics (# piles; pile size; material)*	*Impact Pile Driving*			*Vibratory Pile Driving*		
		Distance to PTS	*Distance to TTS*	*Distance to Behavioral Threshold*	*Distance to PTS*	*Distance to TTS*	*Distance to Behavioral Threshold*
LF cetaceans	1; 12 in (30 cm); wood	20. 7 ft (6.3 m)	207.0 ft (63.1 m)	96.1 ft (29.3 m)	0.6 ft (0.2 m)	15.1 ft (4.6 m)	7,066.9 ft (2,154 m)
	4; 12 in (30 cm); wood	52.2 ft (15.9 m)	521.6 ft (159 m)		1.6 ft (0.5 m)	38.1 ft (11.6 m)	
	12; 12 in (30 cm); wood	108.6 ft (33.1 m)	1,085.3 ft (330.8 m)		3.6 ft (1.1 m)	79.4 ft (24.2 m)	
	1; 18 in (45 cm); steel	704.7 ft (214.8 m)	7,047.6 ft (2,148.1 m)	2070.5 ft (631.1 m)	4.3 ft (1.3 m)	92.2 ft (28.1 m)	11,204.1 ft (3,415 m)
	4; 18 in (45 cm); steel	1,775.9 ft (541.3 m)	17,758.5 ft (5,412.8 m)		10.8 ft (3.3 m)	232. 6 ft (70.9 m)	
	1; 10 in (25 cm); Steel H	130.2 ft (39.7 m)	1,302.2 ft (396.9 m)	328 ft (100 m)	1.3 ft (0.4 m)	26.9 ft (8.2 m)	2069.5 ft (630.8 m)
	4; 10 in (25 cm); Steel H	328.1 ft (100.0 m)	3,281.5 ft (1,000.2 m)		3.3 ft (1.0 m)	68.2 ft (20.8 m)	
	1; 14 in (36 cm); Concrete [square]	11.2 ft (3.4 m)	111.9 ft (34.1 m)	-	-	-	-
	4; 14 in (36 cm); Concrete [square]	28.2 ft (8.6 m)	281.8 ft (85.9 m)		-	-	
MF cetaceans	1; 12 in (30 cm); wood	0.7 ft (0.2 m)	7.2 ft (2.2 m)	96.1 ft (29.3 m)	0 ft (0 m)	1.3 ft (0.4 m)	7,066.9 ft (2,154 m)
	4; 12 in (30 cm); wood	2.0 ft (0.6 m)	18.7 ft (5.7 m)		0 ft (0 m)	3.3 ft (1.0 m)	
	12; 12 in (30 cm); wood	3.9 ft (1.2 m)	38.7 ft (11.8 m)		0.3 ft (0.1 m)	6.9 ft (2.1 m)	
	1; 18 in (45 cm); steel	24.9 ft (7.6 m)	250.6 ft (76.4 m)	2070.5 ft (631.1 m)	0.3 ft (0.1 m)	8.2 ft (2.5 m)	11,204.1 ft (3,415 m)
	4; 18 in (45 cm); steel	63.3 ft (19.3 m)	631.5 ft (192.5 m)		1.0 ft (0.3 m)	20.7 ft (6.3 m)	
	1; 10 in (25 cm); Steel H	4.6 ft (1.4 m)	46.3 ft (14.1 m)	328 ft (100 m)	0 ft (0 m)	2.3 ft (0.7 m)	2069.5 ft (630.8 m)
	4; 10 in (25 cm); Steel H	11.8 ft (3.6 m)	116.8 ft (35.6 m)		0.3 ft (0.1 m)	5.9 ft (1.8 m)	
	1; 14 in (36 cm); Concrete [square]	0.3 ft (0.1 m)	3.9 ft (1.2 m)	-	-	-	-
	4; 14 in (36 cm); Concrete [square]	1.0 ft (0.3 m)	10.2 ft (3.1 m)		-	-	
PW	1; 12 in (30 cm); wood	11.2 ft (3.4 m)	110.9 ft (33.8 m)	96.1 ft (29.3 m)	0.3 ft (0.1 m)	9.2 ft (2.8 m)	7,066.9 ft (2,154 m)

Hearing Group	*Pile Characteristics (# piles; pile size; material)*	*Impact Pile Driving*			*Vibratory Pile Driving*		
		Distance to PTS	*Distance to TTS*	*Distance to Behavioral Threshold*	*Distance to PTS*	*Distance to TTS*	*Distance to Behavioral Threshold*
	4; 12 in (30 cm); wood	27.9 ft (8.5 m)	279.2 ft (85.1 m)		1.0 ft (0.3 m)	23.3 ft (7.1 m)	
	12; 12 in (30 cm); wood	58.1 ft (17.7 m)	580.7 ft (177 m)		2.3 ft (0.7 m)	48.2 ft (14.7 m)	
	1; 18 in (45 cm); steel	377.3 ft (115.0 m)	3,771.6 ft (1,149.6 m)	2070.5 ft (631.1 m)	2.6 ft (0.8 m)	56.1 ft (17.1 m)	11,204.1 ft (3,415 m)
	4; 18 in (45 cm); steel	950.5 ft (289.7 m)	9,503.6 ft (2,896.7 m)		6.5 ft (2.0 m)	141.4 ft (43.1 m)	
	1; 10 in (25 cm); Steel H	69.6 ft (21.2 m)	696.8 ft (212.4 m)	328 ft (100 m)	0.6 ft (0.2 m)	16.4 ft (5.0 m)	2069.5 ft (630.8 m)
	4; 10 in (25 cm); Steel H	175.5 ft (53.5 m)	1,756.2 ft (535.3 m)		1.9 ft (0.6 m)	41.3 ft (12.6 m)	
	1; 14 in (36 cm); Concrete [square]	5.9 ft (1.8 m)	59.7 ft (18.2 m)	-	-	-	-
	4; 14 in (36 cm); Concrete [square]	15.1 ft (4.6 m)	150.9 ft (46 m)		-	-	
OW	1; 12 in (30 cm); wood	0.7 ft (0.2 m)	8.2 ft (2.5 m)	96.1 ft (29.3 m)	0 ft (0 m)	0.6 ft (0.2 m)	7,066.9 ft (2,154 m)
	4; 12 in (30 cm); wood	2.0 ft (0.6 m)	20.3 ft (6.2 m)		0 ft (0 m)	1.6 ft (0.5 m)	
	12; 12 in (30 cm); wood	4.3 ft (1.3 m)	42.3 ft (12.9 m)		0 ft (0 m)	3.3 ft (1.0 m)	
	1; 18 in (45 cm); steel	27.6 ft (8.4 m)	274.6 ft (83.7 m)	2070.5 ft (631.1 m)	0.3 ft (0.1 m)	3.9 ft (1.2 m)	11,204.1 ft (3,415 m)
	4; 18 in (45 cm); steel	69.2 ft (21.1 m)	691.9 ft (210.9 m)		0.3 ft (0.1 m)	9.8 ft (3.0 m)	
	1; 10 in (25 cm); Steel H	4.9 ft (1.5 m)	50.8 ft (15.5 m)	328 ft (100 m)	0 ft (0 m)	1.3 ft (0.4 m)	2069.5 ft (630.8 m)
	4; 10 in (25 cm); Steel H	12.8 ft (3.9 m)	127.9 ft (39 m)		0 ft (0 m)	2.9 ft (0.9 m)	
	1; 14 in (36 cm); Concrete [square]	0.3 ft (0.1 m)	4.3 ft (1.3 m)	-	-	-	-
	4; 14 in (36 cm); Concrete [square]	1.0 ft (0.3 m)	10.8 ft (3.3 m)		-	-	

3.4.11.2.4 Vessel Movement

Vessels associated with the Proposed Action include the WCCs and cutter small boats as discussed in Section 2.2.1. In general, vessels associated with the Proposed Action could operate at speeds between 8–30 knots, but typically operate at the average speed of 10 knots when conducting ATON maintentance (Section 2.2.1). Marine mammals in the proposed action areas may be exposed to vessel movement associated with the proposed action, but only in marine portions of the USEC-MidATL, USEC-

South, GoMEX and Mississippi River, and SEAK proposed action areas. Vessels have the potential to impact marine mammals by disturbing them in the water column or causing mortality or serious injury from vessel collisions. Because some marine mammal species haul out, these species would have reduced encounters with vessels in the water. While it is difficult to differentiate between behavioral responses to vessel sound and visual cues associated with the presence of a vessel, it is assumed that both play a role in prompting reactions from animals. Although marine mammals would likely hear and see approaching vessels, a risk of a vessel collision with a marine mammal exists due to the co-occurrence of marine mammals and vessels.

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. 2006a; Hewitt 1985; Jefferson et al. 2009; Kraus et al. 1986; Magalhães et al. 2002; Nowacek et al. 2004a; Richter et al. 2008; Richter et al. 2003; Williams et al. 2009). In some circumstances, marine mammals respond to vessels with the same behavioral repertoire and tactics they employ when they encounter predators. It is not clear what environmental cues marine mammals might respond to—the sound of water being displaced by the vessels, the sound of engines, or a combination of environmental cues vessels produce while they transit.

Vessel collisions are a well-known source of mortality in marine mammals, and can be a significant factor affecting some large whale populations (Berman-Kowalewski et al. 2010; Jensen and Silber 2003; Knowlton and Kraus 2001; Laist et al. 2001; Neilson et al. 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. 2004a). During a review of data on vessel strike, Laist et al. (2001) compiled historical records of ship strikes, which contained 58 anecdotal accounts. It was noted that in the majority of cases, the whale was either not observed or seen too late to maneuver in an attempt to avoid collision. Another important variable is ship speed, as lethal vessel collisions are more likely at higher vessel speeds (Gende et al. 2011; Vanderlaan and Taggart 2007; Wiley et al. 2011). Laist et al. (2001) noted that most severe and fatal injuries to marine mammals occurred when the vessel was traveling in excess of 14 knots; meanwhile, Vanderlaan and Taggart (2007) found that the greatest risk of a lethal strike was when the vessel reached speeds of 8.6 to 15 knots. However, while slow speed does decrease the chance of a fatal collision, it will not eliminate the risk of a collision. In addition, any collision could result in serious injury or mortality, depending on circumstance. Vanderlaan and Taggart (2007) concluded that at speeds below 8 knots, there was still a 20 percent risk of death from blunt trauma. Vessels associated with the Proposed Action would typically operate at slower speeds (between 8–11 knots; Section 2.2.1) when conducting ATON maintenance (average of 10 knots). Generally, vessel speed at the maintenance site or between adjacent ATON sites is relatively slow due to the precision with which vessels must operate during these activities.

Marine mammals such as dolphins, porpoises, and pinnipeds do not appear to be as susceptible to vessel collisions, though the risk of a collision still exists for these species. Few authors have specifically described the responses of pinnipeds to vessels, and most of the available information on reactions to boats concerns pinnipeds hauled out on land (or ice). Brueggeman et al. (1992) stated ringed seals hauled out on the ice showed short-term escape reactions when they were within 0.1553 to 0.311 miles (0.25 to 0.5 km) of a vessel. From the limited data available, it appears that pinnipeds are not as susceptible to vessel collisions as other marine mammal species. This may be due, at least in part, to the large amount of time they spend hauled out (especially when resting and breeding) and their high maneuverability in the water. However, pinniped carcasses also do not typically wash up in an area where they can be reported to the local stranding network, or a necropsy is unable to be performed to determine cause of death, so incidents of reporting a vessel collision as cause of death are low.

Schoeman et al. (2020) conducted a global review of vessel collisions with marine animals and determined that reports of collisions with smaller animals are scarce, but this is due to reporting bias. The risk of collision with seals and sea otters has been documented (Byard et al. 2012; Kreuder et al. 2003; Wilson et al. 2017), but clearly not to the extent of vessel collisions with large whales. Behaviors such as resting, foraging, nursing, and socializing likely distract animals from risk detection (Dukas 2002). Little is known about the extent of collision indices with sea otters. The probability of collision between a vessel and marine animal increases with a higher vessel and/or animal density (e.g., (Bezamat et al. 2014; Di-Méglio et al. 2018; Lagueux et al. 2011; Nichol et al. 2017; Priyadarshana et al. 2015; Redfern et al. 2013; Redfern et al. 2019; Rockwood et al. 2017)). Although, a vessel collision with a sea otter is possible, particularly in coastal regions where the majority of sea otters would occur, WCC presence would be intermittent and only as they transit to ATON requiring maintenance, which would be typically in areas of regular vessel activity.

Of particular concern to manatees is mortality that results from collisions with boats, which are responsible for approximately 25 percent of all reported manatee deaths (Deutsch and Reynolds III 2012). In the most recent and comprehensive population viability analysis of the Florida manatee, Runge et al. (2017) concluded that an increase in watercraft-related mortality could substantially increase the risk of quasi- extinction over the next 100 years. However, the details of manatee-boat collisions are rarely reported; from 1978 to 2006, only 21 vessel operators or witnesses reported the details of a lethal collision with a manatee (Calleson and Frohlich 2007). Of these reports, vessel size ranged from 16 to 120 ft (5 to 37 m) and the speed of the vessel ranged from 2.5 to 40 mph (2 to 35 knots) (Calleson and Frohlich 2007). To reduce encounter rates, management tools such as boat speed restrictions, manatee sanctuaries (e.g., no-vessel, no-motor zones), and local plans and reviews of boat facility siting (e.g., marinas). Slowing down ocean-going vessels has been found to reduce the probability of lethal ship strikes with North Atlantic right whales (Vanderlaan and Taggart 2007) and the number of known manatee deaths from watercraft collisions has declined after the imposition of speed zones (Laist and Shaw 2006). Although the risk of vessel collision with a manatee exists in the USEC-South and GoMEX and Mississippi River proposed action areas, WCCs and cutter small boats would follow Coast Guard SOPs (Appendix B) as they transit coastal areas to ATON requiring maintenance or homeports.

Available literature suggests that, based on their smaller body size, maneuverability, larger group sizes, and hearing capabilities, odontocetes are not as likely to be struck by vessels as larger, slower moving marine mammals. The marine mammals most vulnerable 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 (Nowacek et al. 2004a; Nowacek et al. 2004b; Vanderlaan et al. 2009). Large, slow moving marine mammals (with the exception of manatees) are not encountered frequently in the shallow, coastal waters of the proposed action areas. Manatees may attempt to avoid vessels by diving, turning, or swimming away, but the reaction is often slow and may not begin until the vessel is less than 164–328 ft (50–100 m) away (Hartman 1979; Rycyk et al. 2018b; Weigle et al. 1993). Smaller cetaceans and pinnipeds, which are the most maneuverable species, are more likely to encounter a WCC or cutter small boats conducting operations in these areas. Vessel movement has been linked to behavioral responses in marine mammals, although it is difficult to separate responses to the physical presence from reactions to the noise of the vessel, which is discussed for marine mammals in 3.4.11.2.2. In some cases, small cetaceans may be attracted to vessels. Incidents of attraction include bottlenose dolphins bow riding and jumping in the wake of a vessel (Norris and Prescott 1961; Ritter 2002; Shane et al. 1986; Würsig et al. 1998). However, the presence of vessels has also been shown to interrupt feeding behavior in delphinids (Meissner et al. 2015; Pirotta et al. 2015b). Most studies of the behavioral responses to vessel traffic of bottlenose dolphins have documented at least short term changes in behavior, activities, or vocalization patterns when vessels are near, although the distinction between vessel noise and vessel movement has not been made clear (Acevedo-Gutiérrez 1991; Arcangeli and Crosti 2009; Berrow and Holmes 1999; Gregory and Rowden 2001; Janik and Thompson 1996; Lusseau 2004; Mattson et al. 2005; Scarpaci et al. 2000). Steckenreuter et al. (2011) found bottlenose dolphin groups to feed less, become more tightly clustered, and have more directed movement when approached to 164 ft (50 m) than groups approached to 492 ft (150 m). The authors speculated that repeated interruptions of the dolphins' foraging behaviors could lead to long term implications for the population. Bejder et al. (2006b) studied responses of bottlenose dolphins to vessel approaches and found stronger and longer lasting reactions in populations of animals that were exposed to lower levels of vessel traffic overall.

Since 1998, the Coast Guard has reported 14 collisions with whales in the waters of the U.S. EEZ. Between 2006 and 2020, Coast Guard vessels have reported ten collisions with whales in the waters of the U.S. EEZ. The Coast Guard has also improved watchstander training (e.g., lookout training), placing an emphasis on marine protected species awareness to decrease the risk of a marine-mammal-vessel collisions. As a federal agency and co-investigator with NMFS, Coast Guard is required to report all collisions with whales to NMFS. There have been no reported collisions between the existing inland tender fleet (i.e., vessel operations in the immediate vicinity of the ATON and transit between adjacent ATON) and any marine mammals (e.g, no reports of a strike with an ESA-listed whale or pinniped).

The most likely response of a marine mammal to vessel movement is a behavioral reaction. If a mammal were to encounter a vessel, any behavioral avoidance displayed would be expected to be short term and inconsequential. Short term behavioral responses to vessel movement are not expected to result in long term impacts to individuals (such as chronic stress) or populations in the proposed action area, given the diffuse vessel presence spread out throughout the proposed action areas. Avoidance of vessel activity is unlikely to cause abandonment or significant alteration of behavioral patterns. If a marine mammal were to encounter the vessel, any behavioral avoidance displayed would not result in significant disruption of breeding, feeding, or sheltering. The probability of a vessel encountering a marine mammal is expected to be low, which decreases the likelihood of vessels striking marine mammals. While the risk of a vessel collision with a marine mammal exists, a vessel strike between a WCC and a marine mammal is not reasonably expected to occur. The Coast Guard has determined that the likelihood of WCC collision with a marine mammal is so low that it is discountable.

The vessel activity associated with the proposed action (and the noise emitted from those vessels (Section 3.4.11.2.2) is infrequent, of short duration, and a small component of overall vessel traffic and in most areas where they operate. For behavioral responses to result in energetic costs that result in long term impacts, such disturbances would likely need to be sustained for a significant duration or extent where individuals exposed would not be able to select alternate habitat to recover and feed. Coast Guard WCC activities would not likely result in such prolonged exposures and preclusion of individuals from feeding, breeding, or sheltering habitat. Individuals that exhibit a temporary behavioral response will return to baseline behavior immediately following exposure to the vessel noise. Further, the available information suggests that ESA-listed marine mammals are either not likely to respond to vessel noise from ATON vessels or are not likely to measurably respond in ways that would significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering.

In addition, Coast Guard would follow SOPs (Appendix B) to maintain properly trained lookouts and would not purposefully approach marine mammals, particularly those that are visible at the surface, especially ESA-listed marine mammals. For these reasons, vessel collisions may affect, but are not likely to adversely affect marine mammals (Section 3.4.14). These actions would also minimize the impact of vessel movement to marine mammals and federally-designated critical habitat (Section 3.4.12.2.9).

In addition, vessel crews would be trained in marine mammal identification and would alert the Commanding Officer of the presence of marine mammals, initiate adaptive mitigation responses, and would follow SOPs (Appendix B). Mitigation measures include reducing vessel speed, posting additional dedicated lookouts to assist in monitoring marine mammal locations, avoiding sudden changes in speed and direction, or, if a swimming marine mammal is spotted, attempting to parallel the course and speed of the moving animal so as to avoid crossing its path, and avoiding approaching sighted marine mammals head-on or directly from behind. Coast Guard would support the recovery of protected living marine resources through internal compliance with laws designed to preserve marine protected species, including planning passage around marine sanctuaries, such as federally-designated critical habitat. These actions would minimize the impact of vessel movement to marine mammals. In addition, in the extremely unlikely event of a vessel collision with a marine mammal, the Coast Guard would immediately contact the NMFS regional stranding coordinator and the appropriate Regional Office.

3.4.11.2.5 Bottom Devices and ATON Retrieval Devices

Bottom disturbance has the potential to impact marine mammals. For marine mammals within the proposed action areas, bottom disturbance caused by the establishment, maintenance, and discontinuance of floating ATON, as well as spudding, anchoring, and wreckage recovery performed by the WCC may potentially impact species through disturbance and alteration of habitat. ATON operations and wreckage recovery have the potential to cause disturbance and habitat alterations to marine mammals within the proposed action areas. ATON operations and wreckage recovery may cause disturbance as the ATON is established and discontinued, while dragging an ATON to relocate it, or the use of a grapnel hook or wire sweeping method of recovery. Similar to how marine mammals would be expected to avoid slow moving vessels, marine mammals would have the ability to swim away from the moving devices. Habitat may be altered during ATON operations and wreckage recovery; however, these operations are isolated and only occur in a small area compared to the size of the proposed action areas. Once operations have completed, marine mammals would be expected to return to the area.

The most likely response to the use of bottom devices and ATON retrieval devices would be a behavioral response, which would be expected to be similar to those if a vessel were operating nearby (Section 3.4.11.2.4). It is assumed that due to their ability to detect approaching vessels, marine mammals would change their direction of travel or temporarily leave the area before WCC operations begin. Anchoring and spudding may impact marine mammals feeding benthically near the footprint of the devices. Anchor placement and spudding would be brief and only in use during ATON operations. In addition, the impact to marine mammals from increased turbidity during ATON operations, anchoring, spudding, and wreckage recovery is unlikely to cause injury or mortality to individuals, as increases would be temporary and suspended sediments would settle quickly.

Short term behavioral responses to the use of bottom devices and ATON retrieval devices would not be expected to result in long term impacts to individuals (such as chronic stress) or populations in the proposed action areas, given the diffuse vessel presence spread throughout the proposed action areas. Avoidance of increased activity during the short duration and small footprint of bottom disturbance is unlikely to cause abandonment or significant alteration of behavioral patterns. If a marine mammal were to encounter the devices in use, any behavioral avoidance displayed would not result in significant disruption of breeding, feeding, or sheltering. Further, Coast Guard would follow SOPs (Appendix B) to maintain properly trained lookouts and would not purposefully approach ESA-listed marine mammals, particularly those that are visible at the surface. Therefore, the likelihood of a collision between any devices and a marine mammal would be low. The Coast Guard has determined that impacts from any bottom devices or ATON retrieval devices may affect, but are not likely to adversely affect marine mammals (Section 3.4.14)

3.4.11.2.6 Pile Driving

For marine mammals within the proposed action areas, pile driving may impact species through bottom or habitat disturbance, vibrations, strike, injury, mortality, or behavioral response. While the likelihood of striking an individual is extremely remote, pile driving may cause injury or mortality if struck when installing a pile if an individual is within its footprint. Due to the size of marine mammals and the Coast Guard SOPs (Appendix B), strike, injury, or mortality would be unlikely and no population level impacts would be expected. Pile driving operations may cause an increase in turbidity; however, the impact to marine mammals from increased turbidity is unlikely to cause injury or mortality to individuals, and impacts to populations would be inconsequential due to the short term increases in turbidity, the infrequency of pile driving, and the large size of the proposed action areas. It would be anticipated that suspended sediments caused by pile driving operations would resettle quickly.

Any short term behavioral responses to pile driving are not expected to result in long term impacts to individuals (such as chronic stress) or populations in the proposed action areas, given the diffuse ATON locations spread throughout the proposed action areas. Any avoidance of pile driving activity is unlikely to cause abandonment or significant alteration of behavioral patterns. In the extremely unlikely event that an ESA-listed marine mammal were to encounter pile driving, any behavioral avoidance displayed would not result in significant disruption of breeding, feeding, or sheltering. Further, Coast Guard would follow SOPs (Appendix B) to maintain properly trained lookouts and would not purposefully approach ESA-listed marine mammals, particularly those that are visible at the surface. Therefore, the likelihood of disturbance to a marine mammal would be extremely low.

3.4.11.2.7 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, impacts to marine mammals within the proposed action areas would be similar to what is currently present because the new WCC fleet would replace the capabilities of the existing inland tender fleet. In addition, WCC assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include the use of vessels, bottom devices, and pile driving devices. Impacts to marine mammals from the Proposed Action would be limited to small areas around ATON and vessels, and the disturbance to marine mammals would be intermittent and brief in duration. Therefore, there would be no significant impact to marine mammals as a result of Alternative 1.

Pursuant to the ESA, there would be no effect to ESA-listed marine mammals as a result of land-based activities associated with the Proposed Action (ATON signal testing noise, tool noise, or brushing), unrecovered jet cone moorings, or tow lines. Activities associated with the Proposed Action, including fathometer noise, vessel noise, pile driving noise, vessel movement, bottom devices and ATON retrieval devices, and pile driving, may affect, but are not likely to adversely affect ESA-listed marine mammals (Section 3.4.11.1.3) under Alternative 1. Additionally, Alternative 1 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed marine mammals (Section 3.4.12.1.9).

3.4.11.2.8 Impacts Under Alternatives 2–3

Under Alternatives 2–3, impacts to marine mammals within the proposed action areas would be similar to what is currently present because ship platforms would replace the capabilities of the existing inland tender fleet. In addition, ship platforms and their assets would not be expected to alter current levels of ATON maintenance in any given location, which would be spread over very large proposed action areas. ATON maintenance would include the use of vessels, bottom devices, and pile driving devices. Impacts to marine mammals from the Proposed Action would be limited to small areas around ATON and vessels, and the disturbance to marine mammals would be intermittent and brief in duration. Therefore, there would be no significant impact to marine mammals as a result of Alternatives 2–3.

As discussed in Section 3.4.11.2.7, pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect ESA-listed marine mammals (Section 3.4.11.1.3). Additionally, Alternatives 2-3 would not result in the destruction or adverse modification of federally-designated critical habitat for ESA-listed riverine vegetation (Section 3.4.12.1.9).

3.4.11.2.9 Impacts Under the No Action Alternative

Under the No Action Alternative, as the existing inland tender fleet is decommissioned and not replaced, the physical and acoustic stressors associated with the Proposed Action would not be introduced into the environment. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impact to marine mammals with implementation of the No Action Alternative.

3.4.12 Federally-Designated Critical Habitat

3.4.12.1 Affected Environment

Within the proposed action areas, critical habitat has been federally-designated for one species of riverine vegetation, four species of marine vegetation, two species of insects, eight species of aquatic invertebrates, six species of birds, eleven species of marine fish, two species of reptiles, six species of terrestrial mammals, and two species of marine mammals. No ESA-listed amphibians have critical habitat that overlaps with the proposed action areas.

For the purposes of the Proposed Action, these have been divided into terrestrial, fresh water, or marine areas within each proposed action area. Outside of operations, the transit of WCCs would occur most frequently into and out of the WCC homeports. Since the exact location of each WCC's homeport is unknown, overlap with critical habitat is also uncertain. Depending on the date that the critical habitat was designated, the Services detail either "primary constituent elements" (PCEs) of the critical habitat, or "physical or biological features" (PBFs) that are essential to the conservation of the species in the designation. PCEs and PBFs are discussed, where applicable. Table 3-43 describes federally-designated critical habitat and where it is distributed within WCC proposed action areas.

Table 3-43. Federally-Designated Critical Habitat in the Proposed Action Areas

Species	*FR Citation*	*Description*	*Proposed Action Area(s)*	*Distribution*
Riverine Vegetation				
Short's bladderpod	79 FR 50989; August 26, 2014	Approximately 925.5 acres (373 hectares) in 20 units in Posey County, Indiana; Clark, Franklin, and	GoMEX and Mississippi River	Terrestrial

Species	*FR Citation*	*Description*	*Proposed Action Area(s)*	*Distribution*
		Woodford Counties, Kentucky; and Cheatham, Davidson, Dickson, Jackson, Montgomery, Smith, and Trousdale Counties, Tennessee		
Marine Vegetation				
Aboriginal prickly apple	January 22, 2016; 81 FR 3865	Units are in Manatee, Charlotte, Sarasota, and Lee Counties in Florida and consist of coastal strand, coastal grassland, coastal berm, maritime hammock, and shell mound habitats	USEC-South	Terrestrial
Cape sable thoroughwort	January 8, 2014; 79 FR 1551	10,968 acres (4,439 hectares) in Miami-Dade and Monroe Counties in Florida	USEC-South	Terrestrial
Florida semaphore cactus	January 22, 2016; 81 FR 3865	Units are in Miami-Dade and Monroe Counties in Florida and consist of coastal berm, rockland hammock, and buttonwood forest habitat	USEC-South	Terrestrial
Johnson's seagrass	65 FR 17786; April 5, 2000	Shallow waters in the inlets and bays of the East Coast of Florida	USEC-South	Marine
Insects				
Bartram's hairstreak butterfly	79 FR 47179; August 12, 2014	7 units in: Everglades National Park, Wells Pineland Preserve, Camp Owaissa Bauer, Richmond Pine Rocklands, Big Pine Key, No Name Key, and Little Pine Key, Florida	USEC-South	Terrestrial
Hine's emerald dragonfly	75 FR 21394; April 23, 2010	37 units in Cook, DuPage, and Will Counties in Illinois; Alpena, Mackinac, and Presque Isle Counties in Michigan; Crawford, Dent, Iron, Phelps, Reynolds, Ripley, Washington, and Wayne Counties in Missouri; and Door and Ozaukee Counties in Wisconsin	GoMEX and Mississippi River	Terrestrial
Aquatic Invertebrates				
Boulder star coral	85 FR 76302; November 27, 2020	Southeast Florida from Lake Worth Inlet in Palm Beach County to the Dry Tortugas; FGB; Puerto Rico; USVI; Navassa Island	USEC-South	Marine
Elkhorn coral	73 FR 72209; November 26, 2008	Four specific areas in Florida, Puerto Rico, St. John/St. Thomas, and St. Croix. The Florida area is off of Palm Beach, Broward, Miami-Dade, and Monroe Counties	USEC-South	Marine
Lobed star coral	85 FR 76302; November 27, 2020	Southeast Florida from Lake Worth Inlet in Palm Beach County to the	USEC-South	Marine

Species	*FR Citation*	*Description*	*Proposed Action Area(s)*	*Distribution*
		Dry Tortugas; FGB; Puerto Rico; USVI; Navassa Island		
Mountainous star coral	85 FR 76302; November 27, 2020	Southeast Florida from Saint Lucie Inlet in Martin County to the Dry Tortugas; FGB; Puerto Rico; USVI; Navassa Island	USEC-South	Marine
Pillar coral	85 FR 76302; November 27, 2020	Southeast Florida from Lake Worth Inlet in Palm Beach County to the Dry Tortugas; Puerto Rico; USVI; Navassa Island	USEC-South	Marine
Rabbitsfoot	80 FR 24691; April 30, 2015	in 31 areas where the mussel is found, comprising approximately1,437 river miles in Alabama, Arkansas, Indiana, Illinois, Kansas, Kentucky, Mississippi, Missouri, Ohio, Oklahoma, Pennsylvania and Tennessee	GoMEX and Mississippi River	Riverine
Rough cactus coral	85 FR 76302; November 27, 2020	Southeast Florida from Broward County to the Dry Tortugas; Puerto Rico; USVI; Navassa Island	USEC-South	Marine
Staghorn coral	73 FR 72209; November 26, 2008	Four specific areas in Florida, Puerto Rico, St. John/St. Thomas, and St. Croix. The Florida area is off of Palm Beach, Broward, Miami-Dade, and Monroe Counties	USEC-South	Marine
Fish				
Atlantic sturgeon	82 FR 39160; August 17, 2017	in rivers stretching from Maine to Florida	USEC-MidATL; USEC-South	Riverine
Bull trout	70 FR 56211; September 26, 2005	in 3,828 mi (6,161 km) of streams and 143,218 acres (57,958 hectares) of lakes in Idaho, Montana,	PNW	Riverine
Chinook salmon	65 FR 7764; February 16, 2000	in areas of Oregon, Washington, and California, including portions of the Columbia River	PNW	Riverine
Chum salmon	65 FR 7764; February 16, 2000	within the states of Washington and Oregon, including portions of the Columbia River	PNW	Riverine
Coho salmon	65 FR 7764; February 16, 2000	within freshwater rivers and tributaries in Washington, Oregon, and California, including portions of the Columbia River	PNW	Riverine
Eulachon	76 FR 65324; October 20, 2011	in a combination of freshwater creeks and rivers and their associated estuaries, including the Columbia River, Umpqua River, Quinault River, Elwha River, Klamath River, Redwood Creek, and Mad River	PNW	Riverine

Species	FR Citation	Description	Proposed Action Area(s)	Distribution
Green sturgeon	74 FR 52300; October 9, 2009	in portions of coastal marine waters from California to Washington, including in the lower Columbia River estuary	PNW	Riverine and marine
Gulf sturgeon	68 FR 13370; March 19, 2003	in 14 geographic areas from Florida to Louisiana	USEC-South; GoMEX and Mississippi River	Riverine and marine
Smalltooth sawfish	74 FR 45353; October 02, 2009	along the southwestern coast of Florida between Charlotte Harbor and Florida Bay	USEC-South	Marine
Sockeye salmon	65 FR 7764; February 16, 2000	located in interior Washington State	PNW	Riverine
Spring pygmy sunfish	84 FR 24987; May 30, 2019	6.7 mi (10.9 km) of streams and 1,330 acres (538 hectares) in Limestone and Madison Counties in Alabama	GoMEX and Mississippi River	Riverine
Steelhead trout	65 FR 7764; February 16, 2000	in rivers and streams of the Columbia River basin	PNW	Riverine
Birds				
Everglade snail kite	42 FR 47840; September 22, 1977	includes areas in Arthur R. Marshall Loxahatchee National Wildlife Refuge, Everglades National Park, Lake Okeechobee, the Strazzulla and Cloud Lake reservoirs in St. Lucie County, and portions of the St. Johns Marsh in Indian River County	USEC-South	Terrestrial
Marbled murrelet	81 FR 51348; August 4, 2016	Includes areas in Washington, Oregon, and California	PNW	Terrestrial
Northern spotted owl	77 FR 71875; December 4, 2012	Includes 11 units in Washington, Oregon, and California, some overlapping with the areas near the Columbia River	PNW	Terrestrial
Piping plover (Great Lakes breeding population)	66 FR 22938; May 7, 2001	Great Lakes shoreline covering 26 counties in MN, WI, MI, IL, IN, OH, PN, and NY	Great Lakes	Terrestrial
Piping plover (wintering population)	66 FR 36137; July 10, 2001	In coastal areas of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas	USEC-MidATL; USEC-South; GoMEX and Mississippi River	Terrestrial
Streaked horned lark	78 FR 61505; October 3, 2013	Areas in counties in Washington and Oregon	PNW	Terrestrial
Whooping crane	43 FR 20938; May 15, 1978	Includes small areas in Colorado, Idaho, Kansas, Nebraska, New Mexico, Oklahoma, and coastal Texas.	GoMEX and Mississippi River	Terrestrial

Species	*FR Citation*	*Description*	*Proposed Action Area(s)*	*Distribution*
Reptiles				
American crocodile	42 FR 47840; September 22, 1977	An area that includes the southern tip of Florida and some of the Florida Keys	USEC-South	Marine
Loggerhead sea turtle (Northwest Atlantic Ocean DPS)	79 FR 39855; July 10, 2014	Nearshore reproductive habitat, winter area, breeding areas, constricted migratory corridors, and/or Sargassum habitat in the Atlantic Ocean and Gulf of Mexico	USEC-MidATL; USEC-South; GoMEX and Mississippi River	Terrestrial and marine
Terrestrial Mammals				
Alabama beach mouse	72 FR 4330; January 30, 2007	approximately 1,211 acres (ac) (490 hectares (ha)) of coastal dune and scrub habitat in Baldwin County, Alabama	GoMEX and Mississippi River	Terrestrial
Choctawhatchee Beach mouse	71 FR 60237; October 12, 2006	units are in Okaloosa, Walton, and Bay Counties in Florida	USEC-South	Terrestrial
Indiana bat	41 FR 41914; September 24, 1976	habitat is caves and mines in Illinois, Indiana, Kentucky, Missouri, Tennessee, and West Virginia	GoMEX and Mississippi River	Terrestrial
Perdido Key beach mouse	71 FR 60237; October 12, 2006	units are located in Escambia County, Florida and Baldwin County, Alabama	USEC-South; GoMEX and Mississippi River	Terrestrial
Silver rice rat	58 FR 46030; August 31, 1993	in Monroe County, Florida	USEC-South	Terrestrial
St. Andrew beach mouse	71 FR 60237; October 12, 2006	units are in Bay and Gulf Counties in Florida	USEC-South	Terrestrial
Marine Mammals				
Humpback whale	86 FR 21082; April 21, 2021	contains 59,411 square nm of marine habitat in the North Pacific Ocean, including areas in the Bering Sea and Gulf of Alaska	SEAK	Marine
North Atlantic right whale	81 FR 4837; February 26, 2016	contains 29,763 square nm in the Gulf of Maine and Georges Bank region, as well as off the southeast U.S. Coast	USEC-MidATL; USEC-South	Marine
West Indian manatee	42 FR 47840; September 22, 1977	contains habitat along the Florida coast in marine, riverine, and estuarine areas	USEC-South	Marine

3.4.12.1.1 Critical Habitat for ESA-Listed Riverine Vegetation

Federally-designated critical habitat for ESA-listed riverine vegetation is within the GoMEX and Mississippi River proposed action area for Short’s bladderpod (Figure 3-7). This critical habitat is located on shore, adjacent to waterways that the WCC may operate on.

Primary constituent elements (PCEs) of the critical habitat for Short's bladderpod include types of rock, soils, and forest communities that are ideal for growth of this species. The critical habitat does not include manmade structures (79 FR 50989; August 26, 2014).

3.4.12.1.2 Critical Habitat for ESA-Listed Marine Vegetation

Federally-designated critical habitat for ESA-listed marine vegetation is on shore within the USEC-South proposed action area for the aboriginal prickly apple (Figure 3-5), Cape Sable thoroughwort, and Florida semaphore cactus (Figure 3-4). These critical habitats are located on shore, adjacent to marine areas that the WCC may operate on. Federally-designated critical habitat for the ESA-listed Johnson's seagrass is in coastal marine waters within the USEC-South proposed action area (Figure 3-5).

PCEs of the aboriginal prickly apple critical habitat include coastal strand, coastal grassland, coastal berm, maritime hammocks, and shell mound habitats. The PCEs detail canopy and substrate features that are ideal for growth of this species. The critical habitat does not include manmade structures (81 FR 3865; January 22, 2016).

PCEs of the Cape Sable thoroughwort critical habitat include coastal berm, coastal rock barren, coastal hardwood hammock, rockland hammocks, and buttonwood forest habitats. The PCEs detail canopy and substrate features that are ideal for growth of this species. The critical habitat does not include manmade structures (79 FR 1551; January 8, 2014).

PCEs of the Florida semaphore cactus critical habitat include coastal berm, rockland hammocks, and buttonwood forest habitats. The PCEs detail canopy and substrate features that are ideal for growth of this species. The critical habitat does not include manmade structures (81 FR 3865; January 22, 2016).

Critical habitat for Johnson's seagrass is designated to include substrate and water in ten portions of the Indian River Lagoon and Biscayne Bay within the current range of the species (65 FR 17786; April 5, 2000). There are no PCEs or PBFs listed for Johnson's seagrass.

3.4.12.1.3 Critical Habitat for ESA-Listed Insects

Federally-designated critical habitat for ESA-listed insects is within the USEC-South and GoMEX and Mississippi River proposed action areas for Hine's emerald dragonfly (Figure 3-7) and Bartram's hairstreak butterfly (Figure 3-5), respectively. These critical habitats are located on shore, adjacent to waterways that the WCC may operate on.

PCEs of the Bartram's hairstreak butterfly critical habitat include pine rockland habitat, and in some locations, associated rockland hammocks and hydric pine flatwood habitats. The PCEs detail canopy and substrate features, as well as plant communities, that are ideal for growth of this species. The critical habitat does not include manmade structures (79 FR 47179; August 12, 2014).

PCEs of the Hine's emerald dragonfly critical habitat include habitats that are ideal for egg deposition and larval growth and development. The PCEs of egg and larval habitats include specific soil, water, vegetation, prey, and the presence of burrows. There is also habitat required for adult foraging, reproduction, dispersal, and refuge necessary for roosting, for resting, for adult females to escape from male harassment, and for predator avoidance. The PCEs of adult habitats includes specific plant types and a prey base for the species. The critical habitat does not include manmade structures (75 FR 21394; April 23, 2010).

3.4.12.1.4 Critical Habitat for ESA-Listed Aquatic Invertebrates

Federally-designated critical habitat for ESA-listed aquatic invertebrates is in the coastal marine waters of the USEC-South proposed action area for the elkhorn, lobed star, mountainous star, and staghorn corals (Figure 3-5). Proposed critical habitat for the Boulder star, rough cactus, and pillar corals would overlap with the USEC-South proposed action area (85 FR 76302; Novemeber 26, 2020). Since critical habitat for these corals is still proposed, NOAA has not released GIS data to develop maps, and therefore Coast Guard was unable to develop maps at the time of publishing this document. Therefore, the Coast Guard reviewed the designations based on depth contours available at: https://www.fisheries.noaa.gov/action/proposed-rule-designate-critical-habitat-threatened-caribbean-corals. Federally-designated critical habitat for the ESA-listed rabbitsfoot is located in freshwater areas of the GoMEX and Mississippi River proposed action area (Figure 3-7).

The physical feature essential to the conservation of elkhorn and staghorn corals is substrate of suitable quality and availability to support larval settlement and recruitment, as well as the reattachment and recruitment of asexual fragments. This includes hard substrate or dead coral skeleton that is free from fleshy or turf macroalgae cover and sediment cover. The physical or biological feature essential to the conservation of boulder star, lobed star, mountainous star, pillar, and rough cactus corals is a substrate of suitable quality that supports larval settlement and recruitment, in association with warm, aragonite-supersaturated, oligotrophic, clear marine water. This includes consolidated hard substrate or dead coral skeleton free of algae and sediment. All areas containing existing (already constructed) federally authorized or permitted manmade structures, including ATON, are not included in critical habitat. All waters identified as existing federally authorized channels and harbors are also excluded from this designation (73 FR 72209; November 26, 2008).

PCEs of the rabbitsfoot critical habitat include habitat with geomorphically stable river channels and banks that support a diversity of mussels and native fish and a hydrologic flow regime necessary to maintain benthic habitats where the species are found. Ideal water and sediment quality conditions and fish assemblages that should be present are also detailed. Rabbitsfoot also requires a low population of invasive species to survive. The critical habitat does not include manmade structures (80 FR 24691; April 30, 2015).

3.4.12.1.5 Critical Habitat for ESA-Listed Fish

Federally-designated critical habitat for ESA-listed fish is within freshwater areas of the PNW proposed action area for the bull trout, chinook salmon, chum salmon, coho salmon, eulachon, sockeye salmon, and steelhead trout (Figure 3-9). Federally-designated critical habitat for the ESA-listed Atlantic sturgeon is within freshwater areas of the USEC-MidATL (Figure 3-3) and USEC-South (Figure 3-5) proposed action areas. Federally-designated critical habitat for the ESA-listed spring pygmy sunfish is within freshwater areas of the GoMEX and Mississippi River proposed action area (Figure 3-7).

Federally-designated critical habitat for the ESA-listed Gulf sturgeon is within freshwater and marine areas of the USEC-South (Figure 3-5) and GoMEX and Mississippi River (Figure 3-6) proposed action areas. Green sturgeon critical habitat is within estuarine and freshwater areas of the PNW proposed action area (Figure 3-9). Federally-designated critical habitat for the ESA-listed smalltooth sawfish is in marine areas of the USEC-South proposed action area (Figure 3-5).

PCEs of the Atlantic sturgeon critical habitat (for the Gulf of Maine, New York Bight, Chesapeake Bay Carolina, and South Atlantic DPSs) include habitat components that support successful reproduction and recruitment. Ideal substrate, salinity, and depth ranges are detailed. Atlantic sturgeon also require unimpeded movement of adults to and from spawning sites. The critical habitat does not include manmade structures that do not provide the physical features, including ATON or pilings within the legal boundaries of designated critical habitat (82 FR 39160; August 17, 2017).

PCEs of bull trout critical habitat include habitat components that are essential for the primary biological needs 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 (70 FR 56211; September 26, 2005).

PCEs of chinook, chum, coho, and sockeye salmon critical habitat include an array of essential habitat types including: (1) juvenile rearing areas, (2) juvenile migration corridors, (3) areas for growth and development to adulthood, (4) adult migration corridors, and (5) spawning areas (65 FR 7764; February 16, 2000). Within these areas, essential features of critical habitat include 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 (65 FR 7764; February 16, 2000).

The physical and biological features (PBFs) of eulachon critical habitat include freshwater spawning and incubation sites, freshwater and estuarine migration corridors, and nearshore and offshore marine foraging habitat. Ideal water flow (free of barriers), water quality, temperature conditions, and prey species presence are detailed (76 FR 65324; October 20, 2011).

PCEs for green sturgeon critical habitat are different depending on whether the habitat is in freshwater riverine systems, estuarine areas, and nearshore marine waters. The ideal conditions include abundant food resources, a specific range of substrate types and sizes, sufficient water flow, suitable sediment and water quality, a specific depth range, and an unimpeded migratory corridor (74 FR 52300; October 9, 2009).

PCEs for Gulf sturgeon critical habitat are ideal conditions including abundant food resources, the presence of riverine spawning sites, sufficient water flow, suitable sediment and water quality, and an unimpeded migratory corridor (68 FR 13370; March 19, 2003).

PBFs of the U.S. DPS of smalltooth sawfish include nursery areas comprised of red mangroves and euryhaline habitats characterized by shallow water. All areas containing existing (already constructed) federally authorized or permitted manmade structures, including ATON, are not included in critical habitat. All waters identified as existing federally authorized channels and harbors are also excluded from this designation (74 FR 45353; October 02, 2009).

PBFs of the spring pygmy sunfish critical habitat includes a stable, low-gradient spring system; water quality with a specific range of temperatures, dissolved oxygen, and suspended solids; a flow regime that maintains spring habitats; the presence of a food base; and adequate vegetation for breeding, rearing young, providing cover, and supporting prey. The critical habitat does not include manmade structures (84 FR 24987; May 30, 2019).

3.4.12.1.6 Critical Habitat for ESA-Listed Birds

Federally-designated critical habitat for ESA-listed birds is within terrestrial areas of the PNW proposed action area for the marbled murrelet, northern spotted owl, and streak horned lark. Federally-designated critical habitat for the ESA-listed piping plover is located in the Great Lakes (Figure 3-8), USEC-MidATL (Figure 3-3), USEC-South (Figure 3-4), and GoMEX and Mississippi River (Figure 3-6) proposed action areas. Federally-designated critical habitat for the ESA-listed Everglade snail kite is located in the USEC-South proposed action area (Figure 3-5) and for the whooping crane in the GoMEX and Mississippi River proposed action area (Figure 3-6). These critical habitats are located on shore, adjacent to waterways that the WCC may operate on.

Critical habitat for the Everglade snail kite is designated in areas in Florida within the current range of the species (42 FR 47840; September 22, 1977). There are no PCEs or PBFs listed for the Everglade snail kite.

The PCEs for marbled murrelet critical habitat includes individual trees with nesting platforms and the forested areas within 0.5 mi (km) of these trees (61 FR 26256; May 24, 1996).

PBFs for the northern spotted owl critical habitat include specific forest types and habitat within these that provides for nesting, roosting, and foraging (77 FR 71875; December 4, 2012).

In the Great Lakes region, the PCEs for piping plover critical habitat include beach habitats with certain characteristics. These include sand beaches of a certain size, with sparse vegetation, some protective cover for nests and chicks, and low levels of human disturbance. The dynamic ecological processes that create and maintain piping plover habitat are also considered PCEs (66 FR 22938; May 7, 2001).

For the wintering population, PCEs for piping plover critical habitat are different. They include habitat components that support foraging, roosting, and sheltering, such as intertidal beaches and flats and associated dune systems, sparsely vegetated backbeach and salterns (66 FR 36137; July 10, 2001).

PCEs of streak horned lark critical habitat are areas with more than 16 percent bare ground, and only short (under 13 in [33 cm]) vegetation. The areas should be large and flat, with visual access to open water for fields. The critical habitat does not include manmade structures (78 FR 61505; October 3, 2013).

PBFs of whooping crane critical habitat include areas with space for growth, nutritional and physiological requirements, cover or shelter, sites for breeding and reproduction, and areas protected from disturbance (43 FR 20938; May 15, 1978).

3.4.12.1.7 Critical Habitat for ESA-Listed Reptiles

Federally-designated critical habitat for ESA-listed reptiles is within marine areas of the USEC-South proposed action area for the American crocodile. Critical habitat for the ESA-listed loggerhead sea turtle is on terrestrial beaches and in marine areas in the USEC-MidATL (Figure 3-3), USEC-South (Figure 3-4), and GoMEX and Mississippi River (Figure 3-6) proposed action areas.

Critical habitat for the American crocodile is designated in areas in Florida within the current range of the species (42 FR 47840; September 22, 1977). There are no PCEs or PBFs listed for the American crocodile. The critical habitat does not include manmade structures.

The PBFs and PCEs of loggerhead sea turtle critical habitat are for habitat areas that include nearshore reproductive habitat, foraging habitat, winter habitat, and breeding habitat. The nearshore reproductive habitat required is in the waters adjacent to nesting beaches, which should be free from obstruction to allow the passage of hatchlings and females laying eggs. It is noted in this description that waters should contain minimal submerged structures (79 FR 39855; July 10, 2014). Foraging habitats are sites on the continental shelf or estuarine waters that have sufficient, quality prey and temperatures above 50 °F (10 °C). Winter habitat includes warm waters (with a temperature of more than 50 °F [10 °C]) south of Cape Hatteras, North Carolina. These waters are near the Gulf Stream and range in depth from 66–328 ft (20–100 m). The PCEs of the breeding habitat are areas that contain a high density of reproductive males and females with close proximity to the Florida migratory corridor and Florida nesting grounds. Migratory habitat are areas that are constricted (limited in width) by land on one side and the edge of the continental shelf and Gulf Stream on the other side that allow passage of loggerhead sea turtles (79 FR 39855; July 10, 2014).

3.4.12.1.8 Critical Habitat for ESA-Listed Terrestrial Mammals

Federally-designated critical habitat for ESA-listed terrestrial mammals is within terrestrial areas of the USEC-South proposed action area for the silver rice rat (Figure 3-4), Choctawhatchee beach mouse, and St. Andrew beach mouse (Figure 3-5) and the GoMEX and Mississippi River proposed action area for the Alabama beach mouse (Figure 3-6). Critical habitat for the ESA-listed Perdido Key beach mouse is within both the USEC-South (Figure 3-5) and GoMEX and Mississippi River (Figure 3-6) proposed action areas. Critical habitat for the ESA-listed Indiana bat is located in the GoMEX and Mississippi River proposed action area (Figure 3-7).

PCEs of Alabama beach mouse, Choctawhatchee, Perdido Key, and St. Andrew beach mouse critical habitats include specific types of vegetation and dune structure that provide areas for foraging, cover, and burrows; sea oats; scrub oaks; unobstructed habitat connections; and a natural light regime (72 FR 4330; January 30, 2007).

Critical habitat for the Indiana bat is designated in mines and caves in Illinois, Indiana, Kentucky, Missouri, Tennessee, and West Virginia (41 FR 41914; September 24, 1976). There are no PCEs or PBFs listed for the Indiana bat. The critical habitat does not include manmade structures.

The PCEs of silver rice rat critical habitat include areas containing specific types of vegetation, such as those found in mangrove swamps, salt marshes, freshwater marshes. Areas that support nesting, foraging, cover, and dispersal of the silver rice rat would be considered PCEs (58 FR 46030; August 31, 1993).

3.4.12.1.9 Critical Habitat for ESA-Listed Marine Mammals

Federally-designated critical habitat for ESA-listed marine mammals is within marine areas of the SEAK proposed action area for the humpback whale (Figure 3-10) and the USEC-South proposed action area for the West Indian manatee (Figure 3-5). The ESA-listed North Atlantic right whale has federally-designated critical habitat in the USEC-MidATL (Figure 3-3) and USEC-South (Figure 3-4) proposed action areas.

The PCEs of humpback whale critical habitat (for all DPSs) include prey of sufficient quality, abundance, and accessibility within humpback whale feeding areas to support feeding and population growth. The prey species for humpback whales primarily include euphausiids, but also include small pelagic schooling fishes (86 FR 21082; April 21, 2021).

PCEs for North Atlantic right whale critical habitat include areas for foraging and calving. The PCEs in the foraging area are physical oceanographic conditions and structures of the Gulf of Maine and Georges Bank region that combine to distribute and aggregate the preferred prey of right whales (81 FR 4837; February 26, 2016). In the calving area, the PCEs are a specific range of sea state (less than 4) and range of temperatures and water depths that are suitable for calving, nursing, and rearing (81 FR 4837; February 26, 2016). PCEs would not be impacted by WCC operations.

Critical habitat is designated for the Florida subspecies of the West Indian manatee (42 FR 47840; September 22, 1977) in multiple inland rivers and coastal waterways throughout Florida and only overlaps with USEC-South and GoMex and Mississippi proposed action areas. The designation does not define any PCEs. Critical habitat includes areas of the of inland rivers and coastal waters of the following counties Miami-Date, Broward, Palm Beach, Martin; the entire inland section of the Indian River from Volusia County to Martin County; the entire inland section of the Banana River and all waterways between Indian and Banana Rivers, Brevard County; the Saint Johns River from Duval to Saint Johns counties; and sections of the Intracoastal Waterway in Nassau and Duval counties. Critical habitat includes areas also includes inland rivers and coastal waters of the following counties: Citrus, Manatee, Sarasota, Charlotte, Lee, Collier and Monroe counties.

3.4.12.1.10 Critical Habitat Maps

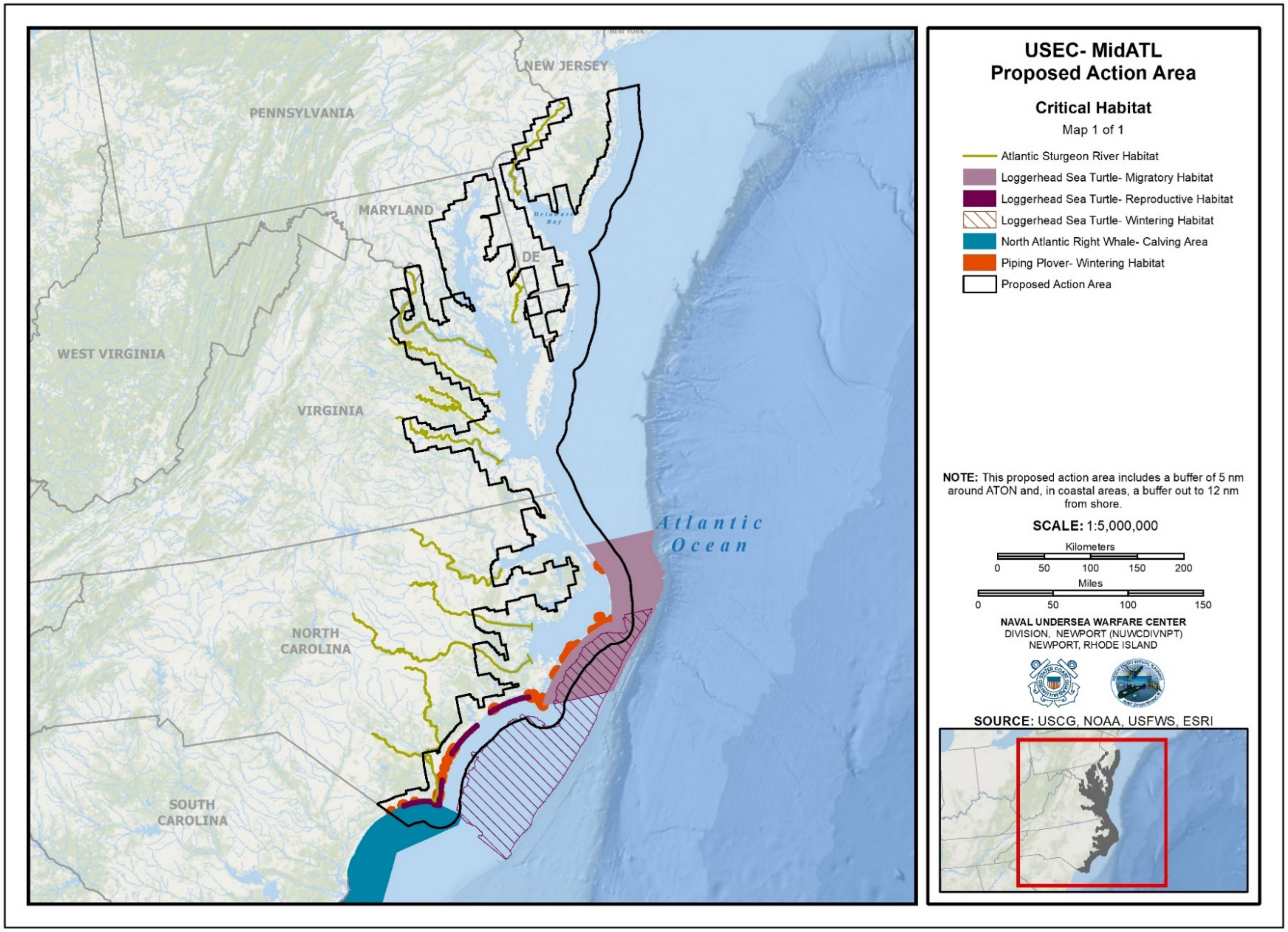


Figure 3-3. Critical Habitat in the USEC-MidATL Proposed Action Area

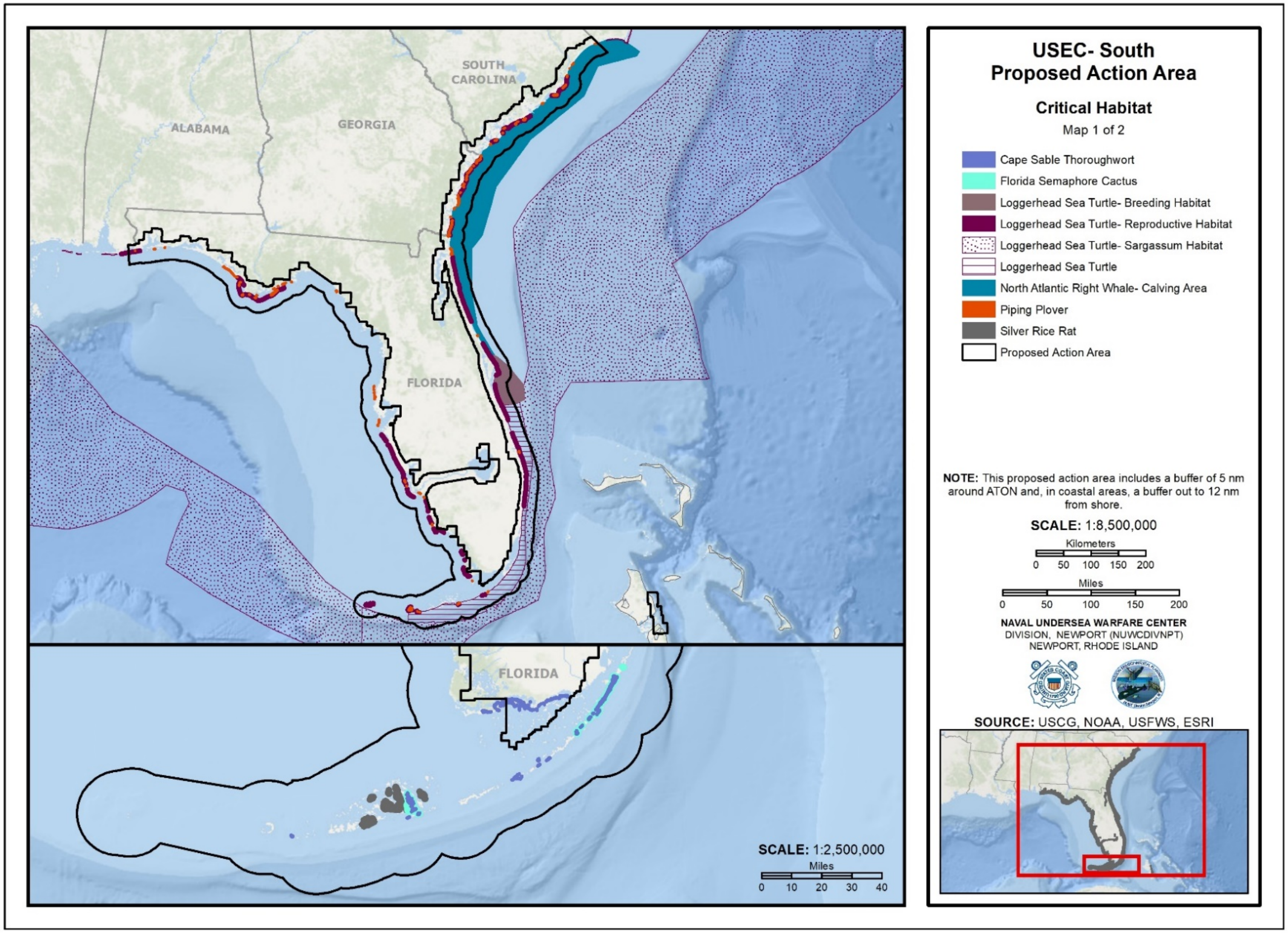


Figure 3-4. Critical Habitat in the USEC-South Proposed Action Area (Map 1 of 2)

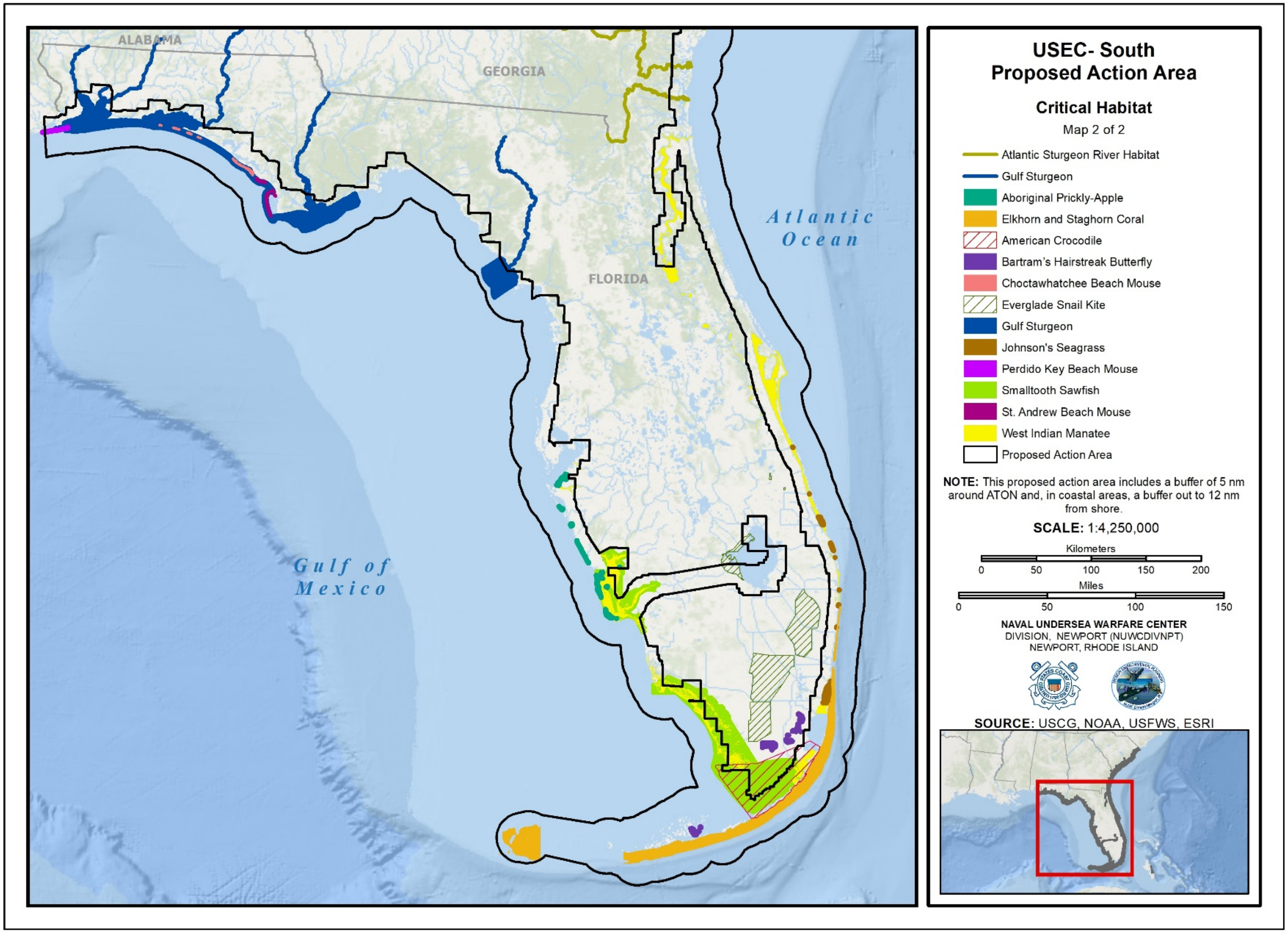


Figure 3-5. Critical Habitat in the USEC-South Proposed Action Area (Map 2 of 2)

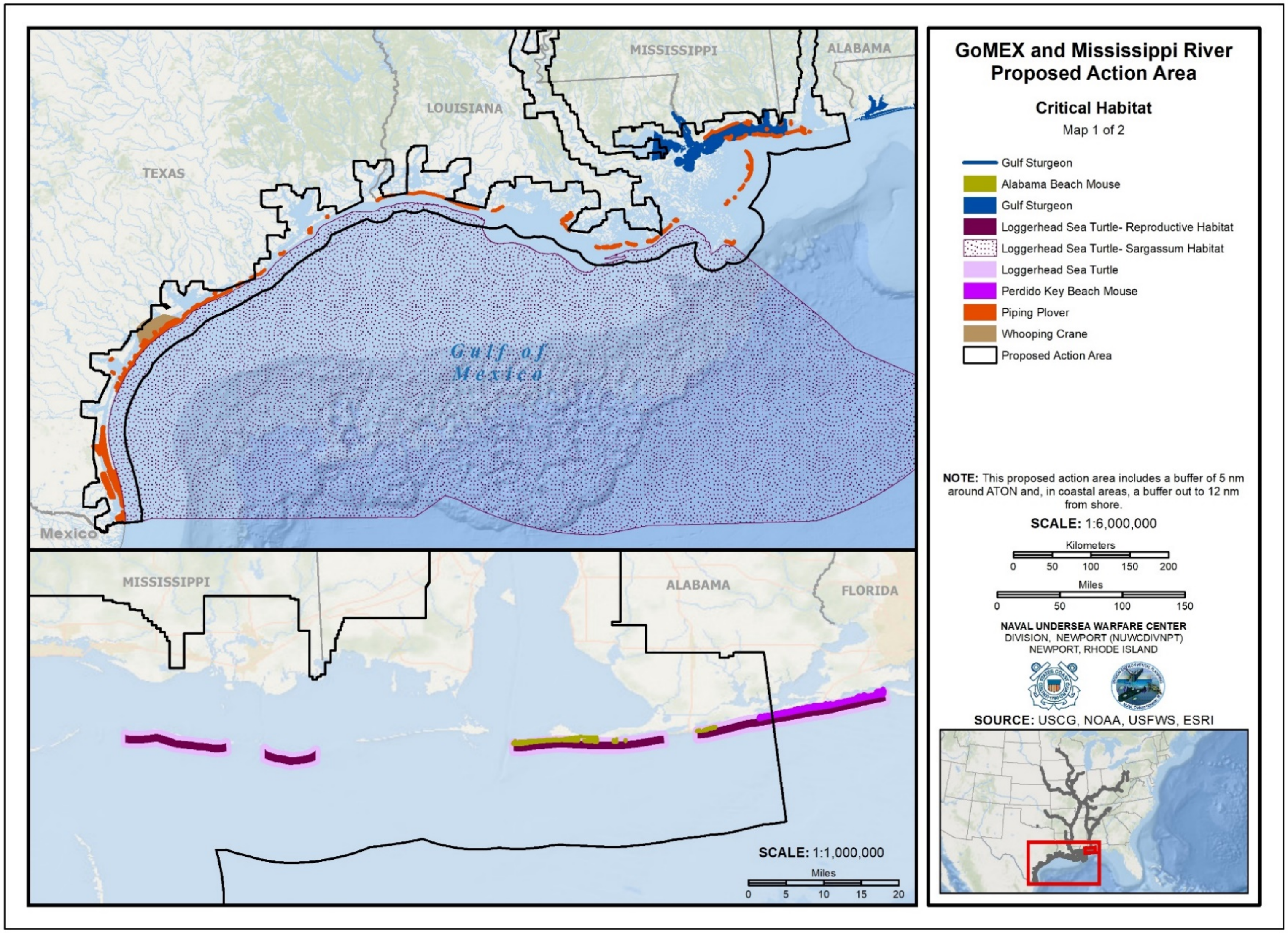


Figure 3-6. Critical Habitat in the GoMEX and Mississippi River Proposed Action Area (Map 1 of 2)

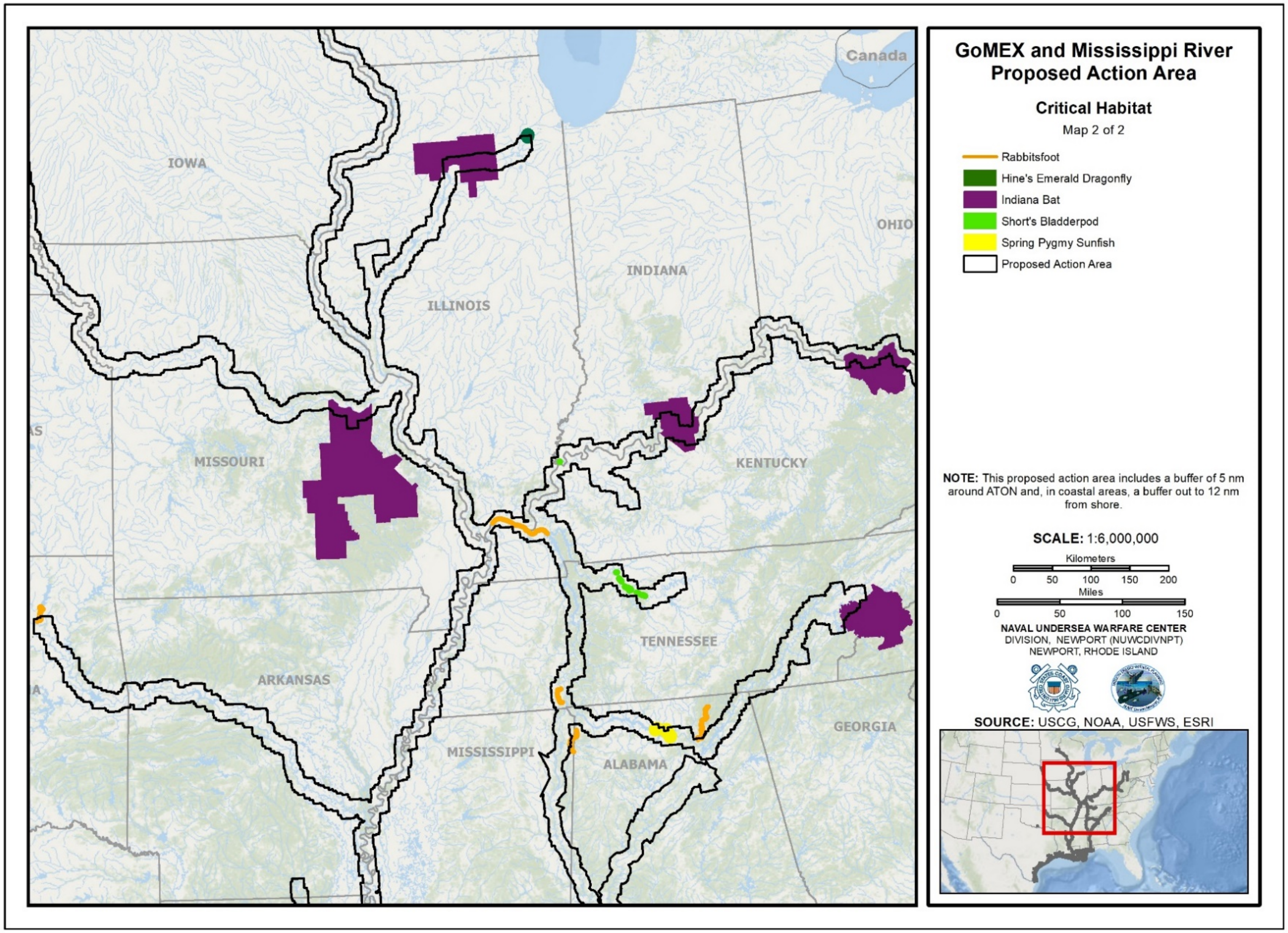


Figure 3-7. Critical Habitat in the GoMEX and Mississippi River Proposed Action Area (Map 2 of 2)

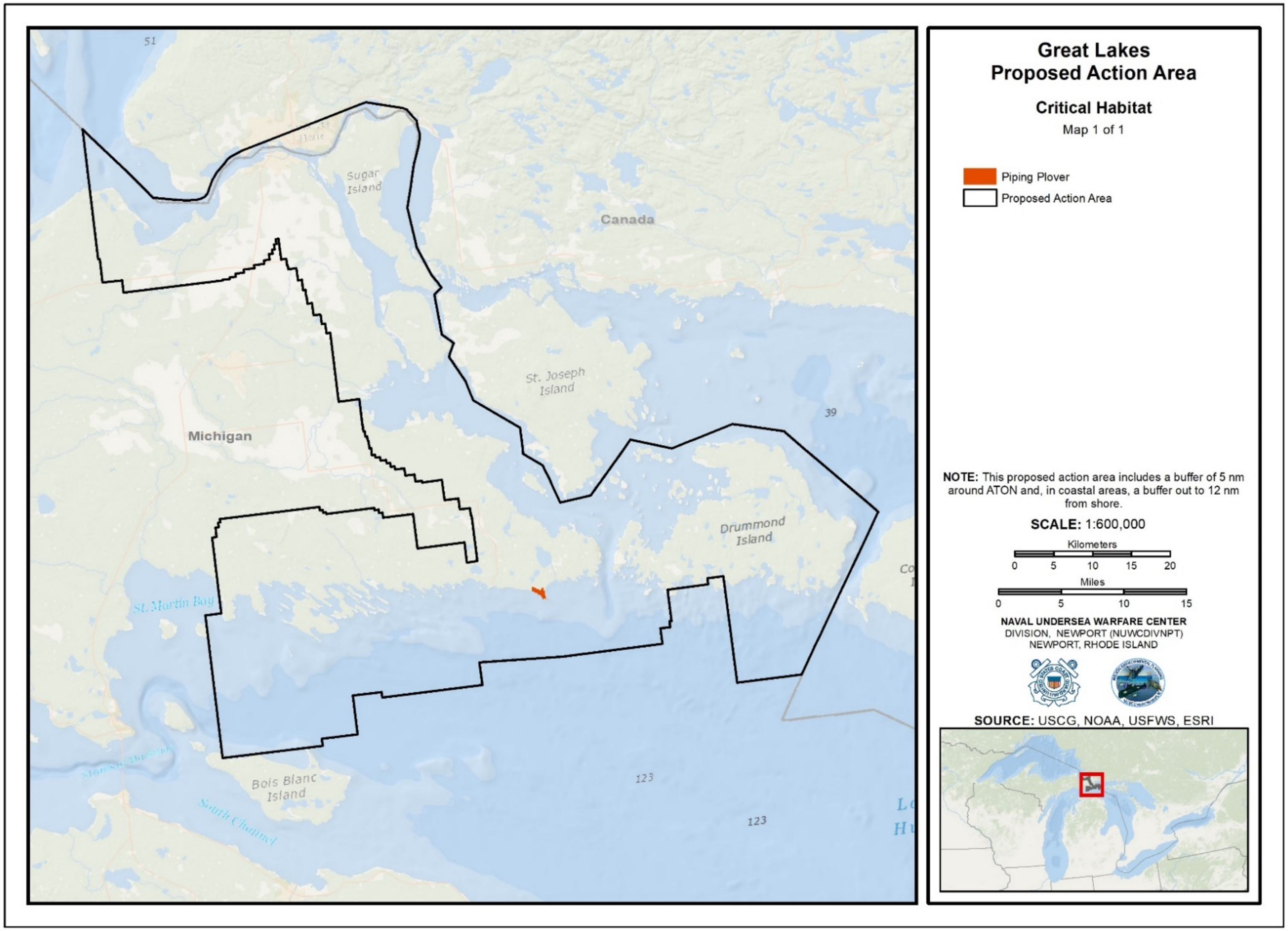


Figure 3-8. Critical Habitat in the Great Lakes Proposed Action Area

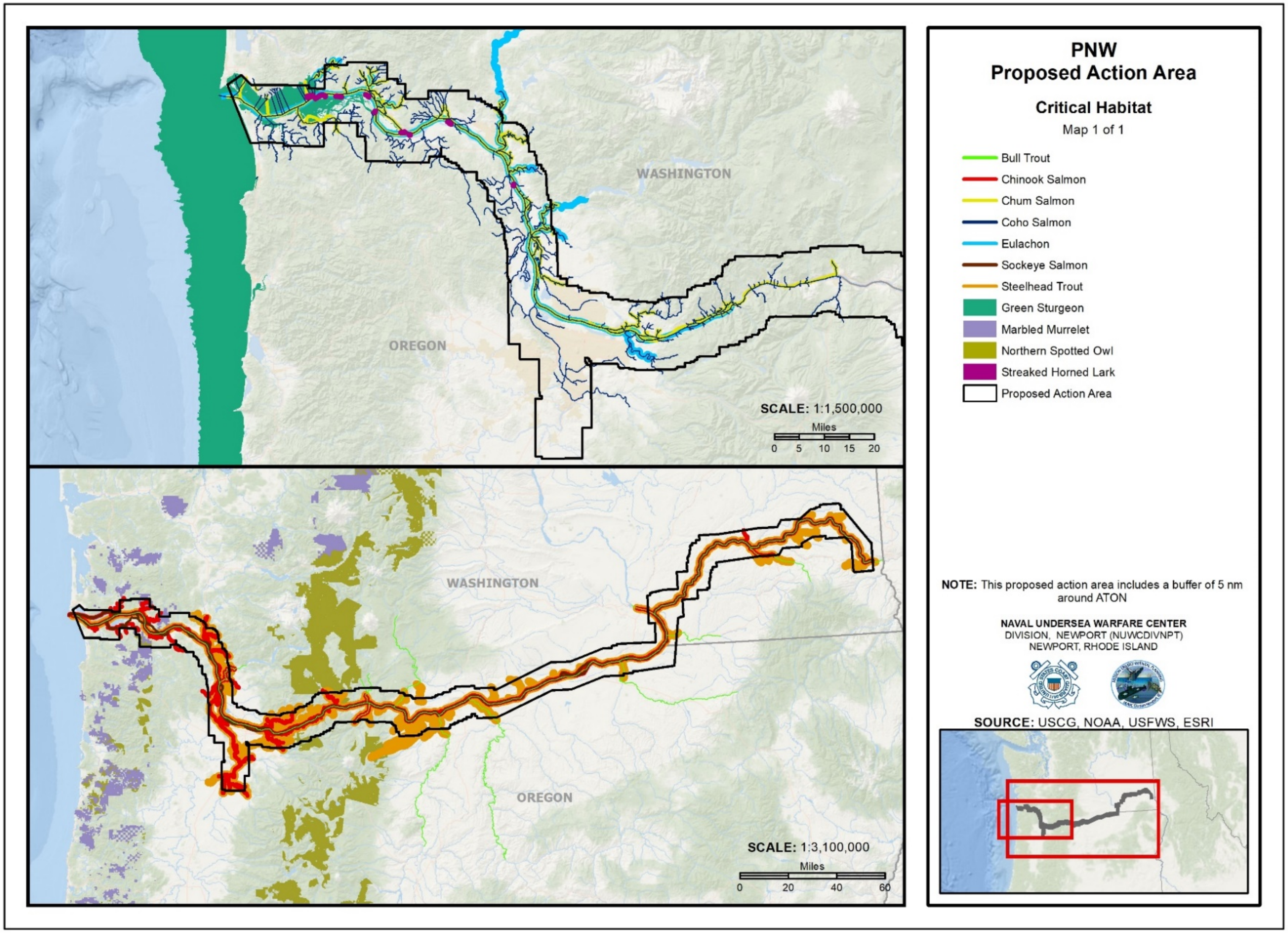


Figure 3-9. Critical Habitat in the PNW Proposed Action Area

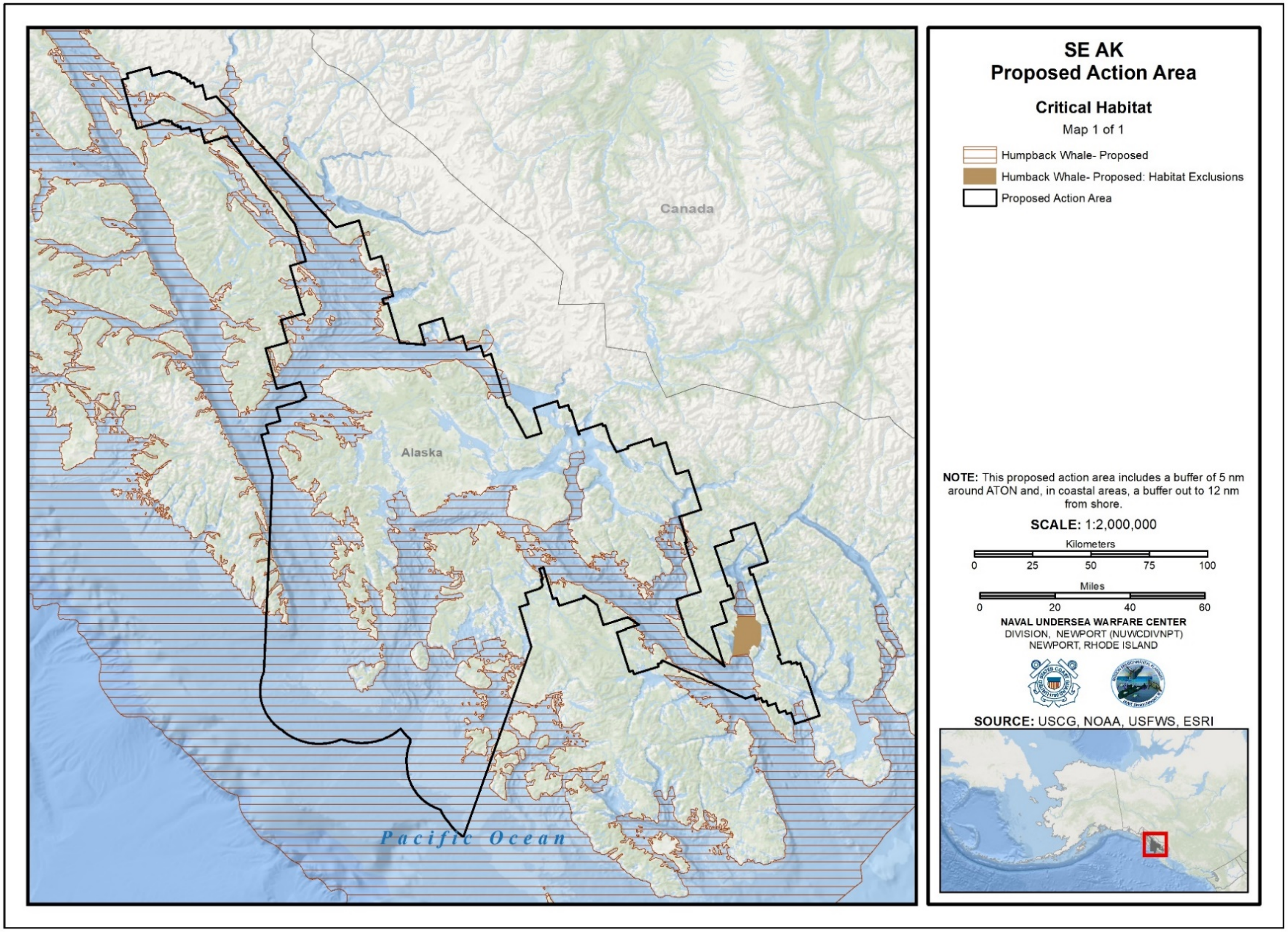


Figure 3-10. Critical Habitat in the SEAK Proposed Action Area

3.4.12.2 Environmental Consequences to Federally-Designated Critical Habitat

Impacts to critical habitat would potentially result from physical stressors of the Proposed Action, which include vessel movement, bottom devices, construction, brushing, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines associated with the Proposed Action. Acoustic stressors would not destroy or adversely modify critical habitat, therefore these stressors are not discussed further in this PEIS.

In terrestrial environments, stressors that may impact critical habitat would be limited to pile driving, construction, and brushing. In riverine and marine environments, stressors that may impact critical habitat would be limited to vessel movement, bottom devices, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines. The potential impact to any habitat from vessel movement and tow lines would be limited to disturbance on the surface of the water. Disturbance at the water's surface would not cause the destruction or adverse modification of any critical habitat within the proposed action areas. Therefore, the impacts from these stressors to critical habitat will not be discussed further in this PEIS.

3.4.12.2.1 Critical Habitat for ESA-Listed Riverine Vegetation

Potential impacts to the critical habitat for the short's bladderpod in the GoMEX and Mississippi River proposed action area would be limited to pile driving, construction, and brushing. These stressors would not impact PCEs of the critical habitat for Short's bladderpod, as they include types of rock, soils, and forest communities and do not include manmade structures (79 FR 50989; August 26, 2014). In addition, Coast Guard SOPs (Appendix B) state that ATON crews working ashore would identify ESA-listed species and avoid critical habitat areas during shoreside operations, such as brushing. The Proposed Action would not impact the PCEs or PBFs of the critical habitat of the ESA-listed short's bladderpod. Therefore, critical habitat for the short's bladderpod would not be destroyed nor adversely modified by the Proposed Action.

3.4.12.2.2 Critical Habitat for ESA-Listed Marine Vegetation

Potential impacts to the critical habitat within the USEC-South proposed action area for the aboriginal prickly apple (Figure 3-5), Cape Sable thoroughwort, and Florida semaphore cactus (Figure 3-4) would be limited to pile driving, construction, and brushing. These stressors would not impact shoreside critical habitat due to SOPs (Appendix B) that state that ATON crews working ashore would identify ESA-listed species and avoid critical habitat areas during shoreside operations, such as brushing. The Proposed Action would not impact the PBFs or PCEs of critical habitats of the ESA-listed aboriginal prickly apple, Cape Sable thoroughwort, and Florida semaphore cactus, which consist of canopy and substrate features. Therefore, critical habitat for these ESA-listed marine vegetation species would not be destroyed nor adversely modified by the Proposed Action.

Potential impacts to the critical habitat within the USEC-South proposed action area for the ESA-listed Johnson's seagrass would be from bottom devices, pile driving, unrecovered jet cone moorings, and ATON retrieval devices. All of these stressors would cause bottom disturbance to areas where the footprint of the ATON may overlap with critical habitat. While individual plants may be crushed or uprooted by these devices, the area of disturbance would be very small compared to the overall habitat available. In addition, the habitat itself would not be destroyed by typical ATON establishment or maintenance, or spudding or anchoring activities. In addition, crews that maintain these ATON would follow SOPs (Appendix B) that state that they would identify ESA-listed species and avoid critical habitat areas during their operations. There are no PBFs or PCEs for the ESA-listed Johnson's seagrass critical habitat. Therefore, critical habitat for Johnson's seagrass would not be destroyed nor adversely modified by the Proposed Action.

3.4.12.2.3 Critical Habitat for ESA-Listed Insects

Potential impacts to the critical habitat within the USEC-South and GoMEX and Mississippi River proposed action areas for Bartram's hairstreak butterfly (Figure 3-5) and Hine's emerald dragonfly (Figure 3-7) would be limited to pile driving, construction, and brushing. The presence of preferred plant and insect prey species are PCEs for these critical habitats. While individual plants and some insects may be impacted by pile driving, construction, and brushing activities, there would be no population level impacts to these resources that the Bartram's hairstreak butterfly and Hine's emerald dragonfly rely on for food. The impacts would be limited to areas directly adjacent to shoreside ATON. In addition, Coast Guard would follow SOPs (Appendix B) that state that ATON crews working ashore would identify ESA-listed species and avoid critical habitat areas during shoreside operations, such as brushing. The Proposed Action would not significantly impact the PCEs of critical habitats of ESA-listed insects. Therefore, critical habitat for the Bartram's hairstreak butterfly and Hine's emerald dragonfly would not be destroyed nor adversely modified by the Proposed Action.

3.4.12.2.4 Critical Habitat for ESA-Listed Aquatic Invertebrates

Potential impacts to the critical habitat within the USEC-South proposed action area for the Boulder star, elkhorn, lobed star, mountainous star, pillar, rough cactus, and staghorn corals (Figure 3-5) and within the GoMEX and Mississippi River proposed action area (Figure 3-7) for the rabbitsfoot would be from bottom devices, pile driving, unrecovered jet cone moorings, and ATON retrieval devices. These stressors may cause bottom disturbance in the footprint of devices being used. A PCE of Boulder star, elkhorn, lobed star, mountainous star, pillar, rough cactus, and staghorn coral critical habitat is substrate of suitable quality and availability. This would not be impacted by the shifting of sediments cause by these levels of bottom disturbance, which would not occur frequently in any given area. Likewise, a PCE of rabbitsfoot critical habitat is a range of ideal water and sediment quality conditions. While bottom disturbance by the Proposed Action would cause a temporary suspension of sediment localized to the activity, there would be no measureable change to water or sediment quality. Therefore, the Proposed Action would not significantly impact the PCEs of critical habitats of ESA-listed aquatic invertebrates. In addition, Coast Guard would follow SOPs (Appendix B) that state that they would identify ESA-listed species and avoid critical habitat areas during their operations. Therefore, critical habitat for ESA-listed aquatic invertebrates would not be destroyed nor adversely modified by the Proposed Action.

3.4.12.2.5 Critical Habitat for ESA-Listed Fish

Potential impacts to the critical habitat within within the USEC-MidATL (Figure 3-3) for the Atlantic sturgeon; within the PNW proposed action area for the bull trout, chinook salmon, chum salmon, coho salmon, eulachon, green sturgeon, sockeye salmon, and steelhead trout (Figure 3-9); within the USEC-South (Figure 3-5) for the Atlantic sturgeon, Gulf sturgeon, and smalltooth sawfish; within the GoMEX and Mississippi River proposed action area for the spring pygmy sunfish (Figure 3-7) and the Gulf sturgeon (Figure 3-6) would be from bottom devices, pile driving, unrecovered jet cone moorings, and ATON retrieval devices. These stressors may cause bottom disturbance in the footprint of devices being used. The PBFs or PCEs for the critical habitats of ESA-listed fish species within the proposed action areas include sufficient water flow, suitable sediment and water quality, and an unimpeded migratory corridor. While bottom disturbance by the Proposed Action would cause a temporary suspension of sediment localized to the activity, there would be no measureable change to water or sediment quality.

Therefore, the Proposed Action would not significantly impact the PBFs or PCEs of critical habitats of ESA-listed fish. In addition, Coast Guard would follow SOPs (Appendix B) that state that they would identify ESA-listed species and avoid critical habitat areas during their operations. Therefore, critical habitat for ESA-listed fish would not be destroyed nor adversely modified by the Proposed Action.

3.4.12.2.6 Critical Habitat for ESA-Listed Birds

Potential impacts to the critical habitat within the PNW (Figure 3-9) proposed action area for the marbled murrelet, northern spotted owl, and streak horned lark; the Great Lakes (Figure 3-8), USEC-MidATL (Figure 3-3), USEC-South (Figure 3-4), and GoMEX and Mississippi River (Figure 3-6) proposed action areas for the piping plover; the USEC-South proposed action area (Figure 3-5) for the Everglade snail kite; and the GoMEX and Mississippi River proposed action area (Figure 3-6) for the whooping crane would be limited to pile driving, construction, and brushing.

There are no PCEs or PBFs listed for the Everglade snail kite. Critical habitats for the marbled murrelet, northern spotted owl, wintering piping plover, streak horned lark, and whopping crane are terrestrial, with PBFs and PCEs that would not be impacted by the Proposed Action. A PCE of the Great Lakes piping plover is limited human disturbance. While crews may enter a critical habitat area for the piping plover (if it were to contain an ATON that required periodic maintenance), the impacts would be limited to areas directly adjacent to these shoreside ATON. In these areas, Coast Guard would follow SOPs (Appendix B) that state that ATON crews working ashore would identify ESA-listed species and avoid critical habitat areas during shoreside operations, such as brushing. Therefore, the Proposed Action would not significantly impact the PCEs of Great Lakes piping plover critical habitat. Critical habitat for the Everglade snail kite, marbled murrelet, northern spotted owl, piping plover, streaked horned lark, and whooping crane would not be destroyed nor adversely modified by the Proposed Action.

3.4.12.2.7 Critical Habitat for ESA-Listed Reptiles

Potential impacts to the loggerhead sea turtle reproductive habitat within the USEC-MidATL (Figure 3-3), USEC-South (Figure 3-4), and GoMEX and Mississippi River (Figure 3-6) proposed action areas would be limited to pile driving, construction, and brushing. In these areas, Coast Guard would follow SOPs (Appendix B) that state that ATON crews working ashore would identify ESA-listed species and avoid critical habitat areas during shoreside operations. Any impacts of pile driving, construction, and brushing would be limited to areas directly adjacent to shoreside ATON. There are no PCEs for loggerhead sea turtle critical reproductive habitat that would be impacted by the Proposed Action. Therefore, loggerhead sea turtle critical reproductive habitats would not be destroyed nor adversely modified by the Proposed Action.

Potential impacts to the critical habitat for the loggerhead sea turtle in the USEC-MidATL (Figure 3-3), USEC-South (Figure 3-4), and GoMEX and Mississippi River (Figure 3-6) proposed action areas would be from bottom devices, pile driving, unrecovered jet cone moorings, and ATON retrieval devices. These stressors may cause bottom disturbance in the footprint of devices being used. However, there are no PCEs for loggerhead sea turtle critical habitat in the nearshore, foraging, or wintering areas that would be impacted by the Proposed Action. In addition, Coast Guard would follow SOPs (Appendix B) that state that they would identify ESA-listed species and avoid critical habitat areas during their operations. Therefore, critical habitat for the loggerhead sea turtle would not be destroyed nor adversely modified by the Proposed Action.

Potential impacts to the critical habitat for the American crocodile in the USEC-South (Figure 3-4) proposed action area includes land and water, and may be impacted by any physical stressor of the

Proposed Action. However, there are no PBFs or PCEs listed for the American crocodile. Therefore, the Proposed Action would not impact the PBFs or PCEs of this critical habitat. In addition, Coast Guard would follow SOPs (Appendix B) that state that they would identify ESA-listed species and avoid critical habitat areas during their operations. Therefore, critical habitat for the American crocodile would not be destroyed nor adversely modified by the Proposed Action.

3.4.12.2.8 Critical Habitat for ESA-Listed Terrestrial Mammals

Potential impacts to the critical habitat within the USEC-South proposed action area for the silver rice rat (Figure 3-4), Choctawhatchee beach mouse, Perdido Key beach mouse, and St. Andrew beach mouse (Figure 3-5) within the GoMEX and Mississippi River proposed action area for the Alabama beach mouse, Perdido Key beach mouse (Figure 3-6), and the Indiana bat (Figure 3-7) would be limited to pile driving, construction, and brushing.

Critical habitat for the Indiana bat is designated in mines and caves and there are no PCEs or PBFs listed for the Indiana bat (41 FR 41914; September 24, 1976). The Proposed Action would not impact the critical habitat for the Indiana bat due to the location in mines and caves.

PCEs of the Alabama beach mouse, Choctawhatchee beach mouse, Perdido Key beach mouse, silver rice rat, and St. Andrew beach mouse include certain types of vegetation. Individual plants may be impacted by pile driving, construction, and brushing activities, but there would be no population level impacts to these resources that these mice and rats rely on for foraging, cover, and burrows. However, the impacts to any vegetation would be limited to areas directly adjacent to shoreside ATON. In these areas, Coast Guard would follow SOPs (Appendix B) that state that ATON crews working ashore would identify ESA-listed species and avoid critical habitat areas during shoreside operations, such as brushing. The Proposed Action would not significantly impact the PBFs or PCEs of critical habitats of ESA-listed terrestrial mammals. Therefore, critical habitat for the Alabama beach mouse, Choctawhatchee beach mouse, Indiana bat, Perdido Key beach mouse, silver rice rat, and St. Andrew beach mouse would not be destroyed nor adversely modified by the Proposed Action.

3.4.12.2.9 Critical Habitat for ESA-Listed Marine Mammals

Potential impacts to the critical habitat for the North Atlantic right whale within USEC-MidATL (Figure 3-3) and USEC-South (Figure 3-4) proposed action areas, for the West Indian manatee in the USEC-South proposed action area (Figure 3-5), and for the proposed critical habitat for the humpback whale in the SEAK proposed action area (Figure 3-10) would be from bottom devices, pile driving, unrecovered jet cone moorings, and ATON retrieval devices.

There are no PCEs or PBFs listed for the West Indian manatee. Therefore, the Proposed Action would not impact the PBFs or PCEs of this critical habitat. In addition, Coast Guard would follow SOPs (Appendix B) that state that they would identify ESA-listed species and avoid critical habitat areas during their operations. Therefore, critical habitat for the West Indian manatee would not be destroyed nor adversely modified by the Proposed Action.

PCEs of humpback whale critical habitat are the abundance of euphausiid and schooling fish prey. As discussed in Sections 3.4.4 and 3.4.6. Therefore, the Proposed Action would not significantly impact the PCEs of humpback whale critical habitat.

The PCEs of North Atlantic right whale critical habitat include general oceanographic conditions such as bathymetry, temperature, and sea state, which would not be impacted by the bottom disturbance caused by the Proposed Action. Therefore, the Proposed Action would not impact the PCEs of critical habitats of North Atlantic right whales.

Coast Guard would follow SOPs (Appendix B) that state that they would identify ESA-listed species and avoid critical habitat areas during their operations. Therefore, critical habitat for the humpback whale, North Atlantic right whale, and West Indian manatee would not be destroyed nor adversely modified by the Proposed Action.

3.4.12.2.10 Impacts Under Alternative 1 (Preferred Alternative)

Any potential impacts to critical habitat under Alternative 1 from the fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, pile driving noise, vessel movement, bottom devices, construction, brushing, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines associated with the Proposed Action would not result in significant impact to critical habitat.

Under Alternative 1, the Proposed Action may affect, but is not likely to adversely affect federally-designated critical habitat for ESA-listed species (Table 3-43). Alternative 1 would not destroy or adversely modify the critical habitat features essential for the conservation of ESA-listed species (Table 3-43).

3.4.12.2.11 Impacts Under Alternatives 2–3

Any potential impacts to critical habitat under Alternatives 2–3 from the fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, pile driving noise, vessel movement, bottom devices, construction, brushing, pile driving, unrecovered jet cone moorings, ATON retrieval devices, and tow lines associated with the Proposed Action would not result in significant impact to critical habitat.

Under Alternatives 2–3, the Proposed Action may affect, but is not likely to adversely affect federally-designated critical habitat for ESA-listed species (Table 3-43). Alternatives 2–3 would not destroy or adversely modify the critical habitat features essential for the conservation of ESA-listed species (Table 3-43).

3.4.12.2.12 Impacts Under the No Action Alternative

Under the No Action Alternative, as the existing inland tender fleet is decommissioned and not replaced, the physical and acoustic stressors associated with the Proposed Action would not be introduced into the environment. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the cessation of Coast Guard presence in the proposed action areas. Therefore, there would be no significant impact to critical habitat with implementation of the No Action Alternative.

3.4.13 Summary of Impacts to the Biological Environment

Impacts to the biological environment were analyzed for fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, pile driving noise, vessel movement, bottom devices, construction, brushing, unrecovered jet cone moorings, ATON retrieval devices, and tow lines associated with the Proposed Action. The analysis for biological resources under Alternative 1 and Alternatives 2–3 are detailed in Table 3-44. No significant impacts to the biological environment would occur with implementation of the No Action Alternative.

Table 3-44. Impacts to the Biological Environment

Biological Resource	*Impacts as a Result of Alternative 1*	*Impacts as a Result of Alternatives 2-3*	*Detailed Section*
Riverine vegetation	No significant impact	No significant impact	Section 3.4.1
Marine vegetation	No significant impact	No significant impact	Section 3.4.2
Insects	No significant impact	No significant impact	Section 3.4.3
Aquatic invertebrates	No significant impact	No significant impact	Section 3.4.4
Amphibians	No significant impact	No significant impact	Section 3.4.5
Fish	No significant impact	No significant impact	Section 3.4.6
Essential fish habitat	No significant impact	No significant impact	Section 3.4.7
Birds	No significant impact	No significant impact	Section 3.4.8
Reptiles	No significant impact	No significant impact	Section 0
Terrestrial mammals	No significant impact	No significant impact	Section 3.4.10
Marine mammals	No significant impact	No significant impact	Section 3.4.11

3.4.14 Summary of Effects to ESA-Listed Species

Effects to ESA-listed species were analyzed for the fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, pile driving noise, vessel movement, bottom devices, construction, brushing, unrecovered jet cone moorings, ATON retrieval devices, and tow lines associated with the Proposed Action. The analysis for biological resources under Alternative 1 and Alternatives 2–3 are detailed in Table 3-44. No significant impacts to the biological environment would occur with implementation of the No Action Alternative. Under the No Action Alternative, there would be no change to baseline conditions that may affect ESA-listed species. Therefore, there would be no effect to ESA-listed species with implementation of the No Action Alternative. For those ESA-listed species under NMFS' jurisdiction, NMFS issued a Biological Opinion in 2018 for the Nationwide ATON Program[26]. While the delivery system (vessels) analyzed in that Biological Opinion included, among others, the existing inland tender fleet, the process and actions conducted by the existing tender fleet analyzed in that Biological Opinion would not change with the WCCs. Thus, the "may affect" determinations in Table 3-45 and provided under the corresponding biological resource sections, are consistent with those determinations made by NMFS in their 2018 Biological Opinion. Although the Coast Guard offers a "may affect" determination (Table 3-45), this determination should be considered preliminary for those species under the USFWS' jurisdiction, since the consultation process under Section 7 of the ESA with the USFWS has not been completed.

Table 3-45. Preliminary Effects to ESA-Listed Species[1]

ESA-Listed Species	*Effect as a Result of Alternative 1*	*Effect as a Result of Alternatives 2–3*
ESA-Listed Riverine Vegetation		
Black lace cactus	NLAA	NLAA
Bradshaw's desert parsley	NLAA	NLAA
Decurrent false aster	NLAA	NLAA

[26] The Coast Guard completed an ESA Section 7 and Essential Fish Habitat consultation with NMFS on U.S. Coast Guard Federal Aids to Navigation Program, finalized on April 19, 2018. Any information provided in this PEIS includes WCC support of ATONs, only as it pertains to the Proposed Action and any determination provided herein is consistent with the findings in the NMFS Biological Opinion. Any determinations provided in this PEIS for species not included in the NMFS Biological Opinion or for those species that are under the jurisdiction of the USFWS, should be considered preliminary, until the consultation process with the Regulatory Agencies is complete..

ESA-Listed Species	Effect as a Result of Alternative 1	Effect as a Result of Alternatives 2–3
Dwarf lake iris	NLAA	NLAA
Eastern prairie fringed orchid	NLAA	NLAA
Green pitcher plant	NLAA	NLAA
Houghton's goldenrod	NLAA	NLAA
Lakeside daisy	NLAA	NLAA
Leafy prairie clover	NLAA	NLAA
MacFarlane's four o'clock	NLAA	NLAA
Michigan monkey-flower	NLAA	NLAA
Nelson's checker-mallow	NLAA	NLAA
Northern wild monkshood	NLAA	NLAA
Pitcher's thistle	NLAA	NLAA
Sand flax	NLAA	NLAA
Seabeach amaranth	NLAA	NLAA
Short's bladderpod	NLAA	NLAA
Telephus spurge	NLAA	NLAA
Tiny polygala	NLAA	NLAA
Virginia spiraea	NLAA	NLAA
Whitebluff's bladderpod	NLAA	NLAA
ESA-Listed Marine Vegetation		
Aboriginal prickly apple	NLAA	NLAA
Beach jaquemontia	NLAA	NLAA
Black lace cactus	NLAA	NLAA
Cape Sable thoroughwort	NLAA	NLAA
Carter's mustard	NLAA	NLAA
Crenulate lead-plant	NLAA	NLAA
Florida golden aster	NLAA	NLAA
Florida perforate cladonia	NLAA	NLAA
Florida prairie clover	NLAA	NLAA
Florida semaphore cactus	NLAA	NLAA
Garber's spurge	NLAA	NLAA
Godfrey's butterwort	NLAA	NLAA
Harperella	NLAA	NLAA
Johnson's seagrass	NLAA	NLAA
Knieskern's beaked rush	NLAA	NLAA
Sand flax	NLAA	NLAA
Seabeach amaranth	NLAA	NLAA
Sensitive joint-vetch	NLAA	NLAA
Telephus spurge	NLAA	NLAA
Tiny polygala	NLAA	NLAA
ESA-Listed Insects		
American burying beetle	NLAA	NLAA
Bartram's hairstreak butterfly	NLAA	NLAA
Hine's emerald dragonfly	NLAA	NLAA
Miami blue butterfly	NLAA	NLAA
Northeastern beach tiger beetle	NLAA	NLAA
Puritan tiger beetle	NLAA	NLAA
Rusty patched bumble bee	NLAA	NLAA

ESA-Listed Species	*Effect as a Result of Alternative 1*	*Effect as a Result of Alternatives 2–3*
Schaus swallowtail butterfly	NLAA	NLAA
ESA-Listed Aquatic Invertebrates		
Arkansas fatmucket	NLAA	NLAA
Atlantic pigtoe	NLAA	NLAA
Clubshell	NLAA	NLAA
Dwarf wedgemussel	NLAA	NLAA
Fanshell	NLAA	NLAA
Fat pocketbook	NLAA	NLAA
Higgins eye pearlymussel	NLAA	NLAA
Inflated heelsplitter	NLAA	NLAA
Neosho mucket	NLAA	NLAA
Northern riffleshell	NLAA	NLAA
Orange pimpleback	NLAA	NLAA
Pink mucket	NLAA	NLAA
Purple bankclimber	NLAA	NLAA
Rabbitsfoot	NLAA	NLAA
Rayed bean	NLAA	NLAA
Ring pink	NLAA	NLAA
Rough pigtoe	NLAA	NLAA
Scaleshell mussel	NLAA	NLAA
Sheepnose mussel	NLAA	NLAA
Snuffbox mussel	NLAA	NLAA
Spectaclecase mussel	NLAA	NLAA
Yellow lance	NLAA	NLAA
ESA-Listed Amphibians		
Oregon spotted frog	NLAA	NLAA
Reticulated flatwoods salamander	NLAA	NLAA
Frosted flatwoods salamander	NLAA	NLAA
ESA-Listed Fish		
Atlantic sturgeon	NLAA	NLAA
Bull trout	NLAA	NLAA
Chinook salmon	NLAA	NLAA
Chum salmon	NLAA	NLAA
Coho salmon	NLAA	NLAA
Eulachon	NLAA	NLAA
Giant manta ray	NLAA	NLAA
Green sturgeon	NLAA	NLAA
Gulf sturgeon	NLAA	NLAA
Largetooth sawfish	NLAA	NLAA
Nassau grouper	NLAA	NLAA
Oceanic whitetip shark	NLAA	NLAA
Scalloped hammerhead shark	NLAA	NLAA
Shortnose sturgeon	NLAA	NLAA
Smalltooth sawfish	NLAA	NLAA
Spring pygmy sunfish	NLAA	NLAA
Sockeye salmon	NLAA	NLAA
Steelhead trout	NLAA	NLAA

ESA-Listed Species	*Effect as a Result of Alternative 1*	*Effect as a Result of Alternatives 2–3*
ESA-Listed Birds		
Audubon's crested caracara	NLAA	NLAA
Bachman's warbler	NLAA	NLAA
Eastern black rail	NLAA	NLAA
Everglade snail kite	NLAA	NLAA
Marbled murrelet	NLAA	NLAA
Northern aplomado falcon	NLAA	NLAA
Northern spotted owl	NLAA	NLAA
Piping plover	NLAA	NLAA
Red knot	NLAA	NLAA
Roseate tern	NLAA	NLAA
Short-tailed albatross	NLAA	NLAA
Streaked horned lark	NLAA	NLAA
Whooping crane	NLAA	NLAA
Wood stork	NLAA	NLAA
ESA-Listed Reptiles		
Alabama red-bellied turtle	NLAA	NLAA
American alligator	NLAA	NLAA
American crocodile	NLAA	NLAA
Atlantic salt marsh snake	NLAA	NLAA
Bog turtle	NLAA	NLAA
Eastern massasauga rattlesnake	NLAA	NLAA
Green sea turtle	NLAA	NLAA
Hawksbill sea turtle	NLAA	NLAA
Kemp's ridley sea turtle	NLAA	NLAA
Leatherback sea turtle	NLAA	NLAA
Loggerhead sea turtle	NLAA	NLAA
Olive ridley sea turtle	NLAA	NLAA
Ringed map turtle	NLAA	NLAA
Yellow-blotched map turtle	NLAA	NLAA
ESA-Listed Terrestrial Mammals		
Alabama beach mouse	NLAA	NLAA
Anastasia Island beach mouse	NLAA	NLAA
Canada lynx	NLAA	NLAA
Choctawhatchee beach mouse	NLAA	NLAA
Columbian white-tailed deer	NLAA	NLAA
Florida bonneted bat	NLAA	NLAA
Florida panther	NLAA	NLAA
Florida salt marsh vole	NLAA	NLAA
Gray bat	NLAA	NLAA
Indian bat	NLAA	NLAA
Key deer	NLAA	NLAA
Lower Keys marsh rabbit	NLAA	NLAA
Northern long-eared bat	NLAA	NLAA
Ozark big-eared bat	NLAA	NLAA
Perdido Key beach mouse	NLAA	NLAA
Puma	NLAA	NLAA

ESA-Listed Species	*Effect as a Result of Alternative 1*	*Effect as a Result of Alternatives 2–3*
Red wolf	NLAA	NLAA
Silver rice rat	NLAA	NLAA
Southeastern beach mouse	NLAA	NLAA
St. Andrew beach mouse	NLAA	NLAA
Virginia big-eared bat	NLAA	NLAA
ESA-Listed Marine Mammals		
Blue whale	NLAA	NLAA
Bryde's whale	NLAA	NLAA
Fin whale	NLAA	NLAA
Gray whale	NLAA	NLAA
Humpback whale	NLAA	NLAA
Right whale	NLAA	NLAA
Sei whale	NLAA	NLAA
Sperm whale	NLAA	NLAA
Steller sea lion	NLAA	NLAA
West Indian manatee	NLAA	NLAA
Sea otter	NLAA	NLAA

[1] For species under NMFS' jurisdiction, the "may affect" determinations are consistent with those made by NMFS in their 2018 Biological Opinion for the Coast Guard Federal Aids to Navigation Program.

3.5 Socioeconomic Environment

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

Within the proposed action areas, these resources may be found inland (along freshwater waterways), within 3 nm of shore (nearshore), or 3–12 nm from shore. It should be noted where they are mentioned, that state waters for Texas and the Gulf Coast of Florida extend out 9 nm, farther than the standard 3 nm afforded to most states (Bureau of Ocean Energy Management 2016). The Coast Guard analyzed the patterns of existing and emerging ocean uses in the U.S. waters similar to D'Iorio et al. (2015). The horizontal zones in D'Iorio et al. (2015) include many zones (e.g., shoreline, intertidal, nearshore, coastal, and oceanic). For the purposes of the analysis in this PEIS, only inland and nearshore zones are presented as reference points for the zones in which WCCs would be expected to transit or conduct operational activities. Table 3-46 provides an overview of how each socioeconomic resource occupies these two areas.

Table 3-46. Socioeconomic Uses of the Proposed Action Areas by Distance from Shore

Socioeconomic Resource	***Frequency of Occurrence***		
	Inland	***Coastline to 3 nm***	***3–12 nm From Shore***
Commercial Fishing			
Commercial fishing	rare	sometimes	often
Coastal Marine Construction			
Marine construction	never	often	sometimes
Mineral Extraction			
Oil and Gas	never	often	often
Sand	never	often	sometimes
Recreation and Tourism			
Non-commercial fishing (benthic fixed gear)	sometimes	sometimes	often
Non-commercial fishing (benthic mobile gear)	sometimes	sometimes	often
Recreational fishing from boats (benthic species)	often	sometimes	often
Recreational fishing from boats (pelagic species)	often	sometimes	often
Recreational dive fishing	rarely	sometimes	sometimes
Kayak fishing	often	often	rarely
Recreational fishing from shore	often	always	never
Recreational intertidal harvest	rarely	always	never
Motorized boating	often	sometimes	often
Cruise travel	sometimes	sometimes	often
Paddling	often	often	sometimes
Sailing	sometimes	sometimes	often
Scuba/snorkeling	sometimes	often	sometimes
Surface board sports	often	often	rarely
Swimming	often	often	rarely
Tide pooling	rarely	always	never
Wildlife viewing at sea	sometimes	sometimes	often
Renewable Energy			
Hydroelectric	always	always	never
Wind	never	rarely	often
Transportation and Shipping			
Transportation	always	often	sometimes
Shipping	always	rarely	sometimes
Subsistence			
Fishing	rarely	often	rarely
Hunting	rarely	often	rarely

NOAA provides a range of socioeconomic information along the U.S. Coast and in coastal waters. NOAA's Economics: National Ocean Watch (ENOW) data set (National Oceanic and Atmospheric Administration 2019a) details six economic sectors that depend on the oceans and Great Lakes, providing data for about 400 U.S. coastal counties, 30 coastal states, and 8 regions. The data set produced by NOAA's Office for Coastal Management (2005 and onward) using information from the Bureau of Labor Statistics and the Bureau of Economic Analysis. Available data allow six economic sectors to be broken out within the proposed action areas. These sectors are: marine construction, living resources, offshore mineral extraction, ship and boat building, tourism and recreation, and marine transportation (National Oceanic and Atmospheric Administration 2019a). For the purposes of this analysis, these data were used to discuss the potential economic impact from the Proposed Action to marine construction, offshore mineral extraction, tourism and recreation, and marine transportation sectors in the coastal zone. In some cases, quantitative economic data were not available for a particular socioeconomic resource discussed below.

3.5.1 Commercial Fishing

3.5.1.1 Affected Environment

Commercial and recreational fisheries may exploit the same stocks, most of which are managed by NOAA and regional entities, such as the regional fishery management councils. Determining whether a catch is considered a commercial or recreational catch depends on how the catch is used—if sold for profit at the port (e.g., to a processor), the catch would be considered commercial, while if the catch is retained by fishermen (e.g., self-caught or caught on a chartered trip), the catch is considered recreational and is discussed in Section 3.5.5. Commercial fishing often targets more than one species with landings in multiple ports (depending on the season) to maximize their economic return. As a result, the port at which commercial catch is landed is not always representative of the body of water in which the fish is caught.

Commercial fishing takes place throughout much of the proposed action areas, including waters adjacent to the mainland and offshore islands, waters over offshore banks, and deep waters. In general, commercial fishing in inland freshwater is rare, but not completely absent. Many different types of fishing gear are used by commercial fishers in the proposed action areas, including gillnets, longline gear, troll gear, trawls, seines, traps or pots, harpoons, and hook and line (California Department of Fish and Wildlife 2015; National Marine Fisheries Service 2009b). Fishing activities may be seasonal and could occur at varying degrees of intensity and duration throughout the year.

Commercial fishing occurs in federally-managed waters (3–200 nm) and within state waters (out to 3 nm, or 9 nm for the Gulf Coast of Texas and Florida). Each state's natural resources or wildlife management department manages fisheries in state waters using an organizational structure similar to the structure used by federal managers. In federal waters, NMFS regulates commercial fisheries in cooperation with regional fishery management councils. The U.S. Coast Guard enforces laws applicable to the U.S. commercial fishing fleet with NOAA's Office of Law Enforcement enforceing domestic laws and international treaty requirements designed to ensure global fisheries resources are maintained at healthy levels for the future. As part of that effort, NMFS assesses the status of fisheries stocks to assist marine resources managers in maintaining sustainable fisheries as well as healthy ecosystems and productive coastal communities.

The regional management of fisheries allows participation by knowledgeable individuals with a stake in fishery management. Eight regional fishery management councils are responsible for developing fisheries management plans (FMPs) for the fisheries in their jurisdiction. Each FMP must be approved by NMFS before it may be implemented. Within each region, the FMPs focus on the status of the fishery in waters seaward of state waters. Each FMP describes a variety of management tools, including geographic and seasonal fishery closures, catch limits and quotas, size and age limits, gear restrictions, and access controls, to manage the fishery resources. Nationwide, 44 FMPs provide a framework for managing the harvest of 230 major fish stocks or stock complexes (Section 3.4.7) that make up roughly 90 percent of the commercial harvest. Highly migratory species (e.g., tunas, swordfish, sharks, and billfish) have been designated in fisheries regulations, are found throughout the Atlantic and Pacific Oceans and in the Gulf of Mexico, and migrate across council jurisdictional boundaries. Regional NMFS offices manage these species and engage stakeholders and governmental groups in the management of these species at both domestic and international levels.

The NMFS Office of Science and Technology maintains commercial landing data derived from comprehensive surveys of all coastal states' landings (National Marine Fisheries Service 2018c). The number of pounds of fish caught in the United States has been roughly steady for the last two decades. In 2005, the price per pound for all species peaked, but it declined steeply from 2007 through 2009 during the economic recession. Since then, both the total catch and total value of the catch has trended gradually upwards, while value per pound has remained roughly stable at $0.50-$0.55 per pound (National Marine Fisheries Service 2018c). Commercial fisheries landings by year are shown in Table 3-47 and are provided by weight (in pounds [lbs]) and by value (in U.S. dollars [USD]).

Table 3-47. U.S. Commercial Fisheries Landings by Year, 2008-2017

Total U.S. Commercial Landings of Fish and Shellfish		
Year	***Landings by Weight (in Millions of Lbs)***	***Landings by Value (in Millions USD)***
2008	8,325	$4,383
2009	8,031	$3,891
2010	8,231	$4,520
2011	9,858	$5,289
2012	9,634	$5,103
2013	9,870	$5,466
2014	9,486	$5,448
2015	9,718	$5,203
2016	9,572	$5,312
2017	9,916	$5,421

Table 3-48 breaks down U.S. commercial fisheries landings by proposed action area. State-based data from NMFS (National Marine Fisheries Service 2018c) were sorted by proposed action area. Data for some inland states (e.g., Kansas) were not available, but would likely be very small, and the portion of any catch recorded within the proposed action area would likely be even smaller. In some cases, states have both inland freshwater fisheries and fisheries on the Great Lakes. Even though most of the landings from states like Ohio, Illinois, and Indiana are likely landed in Great Lakes ports, which primarily are outside of the proposed action area, these states are included for reference.

Alaska is responsible for the vast majority of the total catch landed in the United States, and though only a portion of Alaska falls within the proposed action area, commercial fishing is very important throughout Southeast Alaska (National Marine Fisheries Service 2018c). The GoMEX and Mississippi River, USEC- MidATL, and PNW proposed action areas also have large commercial fisheries, though the vast majority of commercial fishing in the Pacific Northwest occurs outside of the proposed action area. However, in terms of value per pound, the USEC-South proposed action area actually leads by a long margin, and it is the only region with a value approaching $2 per pound, propelled by high value species such as spiny lobster (*Panulirus argus*), as well as high value pelagics such as billfish, tuna, and mahi (*Coryphaena hippurus*) (National Marine Fisheries Service 2018c).

Table 3-48. Total Commercial Catch by Proposed Action Area

Proposed Action Area	***2016***		***2017***		***2018***	
	Thousands of Lbs	***Thousands USD***	***Thousands of Lbs***	***Thousands USD***	***Thousands of Lbs***	***Thousands USD***
USEC-MidATL	***607,559***	***$595,341***	***658,163***	***$557,601***	***660,108***	***$504,594***
New Jersey	123,607	$193,013	198,602	$190,549	190,500	$170,261
Delaware	4,980	$10,097	4,729	$9,140	5,275	$10,535
Maryland	56,316	$94,644	48,281	$77,403	47,052	$68,410
Virginia	363,326	$203,201	343,964	$183,203	362,480	$177,039
North Carolina	59,330	$94,386	62,587	$97,306	54,801	$78,349
USEC-South	***119,764***	***$285,235***	***124,204***	***$308,504***	***122,209***	***$287,266***
South Carolina	15,833	$24,645	15,744	$25,495	8,677	$21,380
Georgia	6,357	$11,886	9,416	$16,834	7,391	$16,438
Florida	97,574	$248,704	99,044	$266,175	106,141	$249,448
Great Lakes	***6,698***	***$9,837***	***6,201***	***$8,146***	***5,493***	***$8,302***
Michigan*	6,698	$9,837	6,201	$8,146	5,493	$8,302
GoMEX and the Mississippi River	***1,655,008***	***$687,240***	***1,327,784***	***$681,673***	***1,480,409***	***$710,284***
Alabama	24,869	$50,797	31,396	$64,532	35,524	$67,732
Mississippi	304,054	$29,405	311,027	$30,425	320,265	$45,575
Louisiana	1,244,403	$407,222	890,575	$354,301	1,033,345	$377,127
Texas	73,687	$190,628	87,717	$223,973	83,906	$210,616
Illinois*	not available	not available	not available	not available	not available	not available
Minnesota*	286	$238	245	$214	210	$219
Ohio*	4,585	$4,981	4,086	$4,983	4,401	$5,729
Pennsylvania*	105	$125	68	$231	65	$215
Wisconsin*	3,019	$3,844	2,670	$3,014	2,693	$3,071
PNW	***761,346***	***$472,783***	***962,380***	***$460,805***	***899,354***	***$520,727***
Washington*	551,860	$321,072	665,895	$313,747	590,396	$346,440
Oregon*	209,486	$151,711	296,485	$147,058	308,958	$174,287

Proposed Action Area	2016		2017		2018	
	Thousands of Lbs	Thousands USD	Thousands of Lbs	Thousands USD	Thousands of Lbs	Thousands USD
SEAK*	5,585,905	$1,550,840	6,004,883	$1,764,462	5,403,751	$1,781,999
Total, United States	8,736,280	$3,601,276	9,083,615	$3,781,191	8,571,324	$3,813,172

* Data from the entire state is included, even though not all fishable waters of the state are included in the proposed action area.

Landings can be further partitioned by port. Based on the landings of the top 50 ports in each proposed action area Table 3-49, the GoMEX and Mississippi River proposed action area has the most ports, as well as the greatest landings by weight and value, followed by the USEC-MidATL and PNW proposed action areas. None of the top 50 ports are located within the Great Lakes proposed action area; however, it is important to keep in mind that just because fish are not landed at a port within the proposed action area does not mean that they are not caught there.

Table 3-49. Landings in Each Proposed Action Area (Based on the Top 50 Port Landings)

Proposed Action Area	Percentage of Ports in the Top 50 (by Weight)	Weight Total (Millions of Lbs)	Percentage of Ports in the Top 50 (by Value)	Value Total (Millions USD)
USEC-MidATL	10%	538	10%	$213
USEC-South	6%	49	4%	$104
Great Lakes	0%	0	0%	$0
GoMEX and Mississippi River	24%	1403	22%	$568
PNW	8%	408	12%	$218
SEAK	6%	119	8%	$163

The top ports within the proposed action areas for landings by volume and by monetary value are listed in Table 3-50. While the largest ports in the country (e.g., New Bedford, MA and Dutch Harbor, AK) are located outside of the proposed action area, there are still several very important ports located within the proposed action areas, headlined by Empire/Venice, LA. Although Key West, FL does not even make the top 50 in terms of landings by weight, it is the second largest port in the proposed action area by value, with $73 million in landings, again highlighting the importance of low volume high value species to the regional economies of these areas.

Table 3-50. Top U.S. Ports for Commercial Fisheries Landings by Proposed Action Area

Port	Landings by Weight (Millions of Lbs)	Port	Landings by Value (Millions USD)
USEC-MIDATL Proposed Action Area			
Reedville, Virginia (VA)	353	Cape May-Wildwood, NJ	$66
Cape May-Wildwood, New Jersey (NJ)	101	Hampton Roads Area, VA	$55

Port	*Landings by Weight (Millions of Lbs)*	*Port*	*Landings by Value (Millions USD)*
Point Pleasant, NJ	43	Reedville, VA	$36
USEC-South-Florida Proposed Action Area			
St. Augustine, Florida (FL)	18	Key West, FL	$73
GoMEX Proposed Action Area			
Empire/Venice, Louisiana (LA)	569	Empire/Venice, LA	$148
Intracoastal City, LA	328	Bayou La Batre, Alabama	$63
Pascagoula/Moss Point, Mississippi	310	Galveston, TX	$60
PNW Proposed Action Area			
Astoria, Oregon (OR)	138	Astoria, OR	$40
SEAK Proposed Action Area			
Sitka, Alaska (AK)	46	Sitka, AK	$61
Ketchikan, AK	38	Petersburg, AK	$45

Landings that depend on weight versus value produce similar rankings, but depending on the species landed in each port, they may be different. Catch can also be categorized by the species caught. Table 3-51 shows the top commercial finfish species landed in the United States. These data have not been sub-divided by proposed action area because doing so would not provide an accurate picture of where fish are caught. For example, tremendous quantities of fish are landed at ports such as Dutch Harbor, AK and New Bedford, MA, which are outside of the proposed action areas, but those landing levels cannot possibly be supported exclusively by local fish stocks, and vessels landing fish in these ports do fish within the waters of the proposed action areas (Table 3-50). Fishing vessels, particularly larger commercial vessels, often travel hundreds or even thousands of miles away from their homeports to fish. Therefore, the national level data has been retained as it was presented by NMFS (National Marine Fisheries Service 2018c).

Table 3-51. Top Ten Commercially Landed Species by Weight and Value

Ranking	*Species*	*2018 Landings by Weight (Thousands of Lbs)*	*Species*	*2018 Landings by Value (Thousands USD)*
1	Pollock (all)	3,370,679	Lobsters	$684,303
2	Menhaden	1,581,578	Crabs (all)	$644,912
3	Hakes	703,508	Salmon, Pacific	$598,067
4	Salmon, Pacific	575,972	Scallops	$540,583
5	Cod	514,893	Shrimp (all)	$496,114
6	Flatfish, Pacific	509,978	Pollock (all)	$456,510
7	Shrimp (all)	289,178	Oysters	$258,748
8	Crabs (all)	289,021	Clams (all)	$244,107
9	Rockfishes (all)	202,419	Cod	$243,869
10	Squid (all)	161,628	Menhaden	$161,088

The largest commercial landings among finfish species groups are gadoids (e.g., cod, haddock, and pollock) followed by clupeids (e.g., menhaden, alewife, and herring), Pacific salmon, and hakes, comprising roughly 45, 17, 12, and 7 percent of the total finfish caught, respectively. Apart from salmon, these species are generally low value, commanding prices between $0.1 and $0.25 per pound. The groups generating the most landings value are Pacific salmonids, followed by pollock, tuna, sablefish, and halibut. Salmon achieves its position at the top of the economic value pyramid through a combination of high landings (over one billion pounds per year) and moderate price (roughly $0.70 per pound). Pollock is the second highest revenue generator due to having the largest landings by weight (3.3 billion pounds). Tuna, sablefish, and halibut are also high value species, which, despite comparatively modest landings, are economically important because their price per pound is in excess of ten times the average price for all species. Shellfish, despite making up only about 11 percent of the total catch by volume, are responsible for more than half (53 percent) of the value. For shellfish, squid have the third largest landings by weight, but they account for only 4 percent of landings by value. These differences in species value likely result in the different ranking of port landings in Table 3-51 when ranked by weight versus value.

3.5.1.2 Environmental Consequences to Commercial Fishing

The predominant socioeconomic impact of the Proposed Action would be a potential increase in Coast Guard capabilities in the proposed action areas. Replacement of the ageing existing tender fleet would facilitate the Coast Guard's ability to support their missions in the riverine, nearshore, and offshore environments. Coast Guard missions that would benefit commercial fisheries include ATON, law enforcement, living marine resources, marine safety, and SAR. Coast Guard presence would ensure that due to ATON, marine safety, and SAR missions, mariners, including commercial fishermen, would have support should an emergency[27] arise. More readily available Coast Guard support during an emergency on the water and ensuring safe and navigable waters through the ATON mission are the principal benefits of the Proposed Action to commercial fishing.

Conversely, potential negative impacts to commercial fishing would be indirect impacts to fish from vessel noise, pile driving noise, vessel movement, bottom devices, ATON retrieval devices, and pile driving associated with the Proposed Action. As discussed in Section 3.4.6.2, there would be no significant impact to fish. Coast Guard would follow SOPs (Appendix B) to mitigate potential impacts to commercial fishing activities that may occur near WCC operations.

3.5.1.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to commercial fishing as a result of Alternative 1.

3.5.1.2.2 Impacts Under Alternatives 2–3

Under Alternatives 2–3, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to commercial fishing as a result of Alternatives 2–3.

[27] Emergencies are not a part of the Proposed Action.

3.5.1.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate the existing inland tender fleet and associated assets. As vessels are decommissioned and not replaced, Coast Guard's presence in the IW&WR could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the IW&WR could decrease. However, there would be no significant impact to commercial fishing with implementation of the No Action Alternative.

3.5.2 Coastal Marine Construction

3.5.2.1 Affected Environment

Marine construction may include nearshore projects, such as the construction of marinas, port improvements (including channel dredging and pier or seawall construction), and beach renourishment (the replacement of beach sand with sediment from other sources). Projects slightly further offshore may include the construction of oil and gas platforms, pipelines, and wind turbines, amongst others.

In this PEIS, oil and gas are discussed in Section 3.5.4. Renewable energy (e.g., wind turbines) is discussed in Section 3.5.6. The major ports for transportation and shipping are discussed in Section 3.5.7. The development of coastal areas typically relates to tourism, which is discussed in Section 3.5.5.

Table 3-52 shows the economic impact of the marine construction industry in coastal counties of states in each proposed action area. The data shown is the combined states' employment and gross domestic product for each proposed action area (National Oceanic and Atmospheric Administration 2019a). Values are compiled from averages over the 2005 through 2017 data collection period in order to provide a conservative estimate of the economic impact as it fluctuates over time. In some cases, counties or states did not have values to report; therefore, these data were excluded from the averages. There is no economic impact from marine construction in the Great Lakes proposed action area, as the Great Lakes are not marine and were therefore not part of these data.

Table 3-52. Economic Impact of Coastal Marine Construction by Proposed Action Area

Proposed Action Area	*Business Establishments **	*Employment**	*Annual Wages**	*Gross Domestic Product (GDP)**
USEC-MidATL	357	5,363	$300,379,213	$560,124,838
USEC-South	848	8,791	$448,045,645	$9,655,678,427
GoMEX	371	13,311	$807,422,877	$1,468,522,676
PNW	28	337	$23,039,888	$39,028,128
SEAK	4	7	$352,009	$560,052

* Values are averages across the states and/or counties (roughly within the proposed action areas) as reported from 2005-2017 by NOAA (National Oceanic and Atmospheric Administration 2019a).

In this sector, marine construction has the greatest economic impact in the USEC-South and GoMEX and Mississippi River proposed action areas, followed by the USEC-MidATL proposed action area.

3.5.2.2 Environmental Consequences to Coastal Marine Construction

The predominant socioeconomic impact of the Proposed Action would be similar Coast Guard capabilities in the proposed action areas. Replacement of the existing tender fleet would facilitate the Coast Guard's ability to support their missions in the riverine, nearshore, and offshore environments. Coast Guard missions that would benefit coastal marine construction include ATON, marine safety, and SAR. Coast Guard presence would ensure that due to ATON, marine safety, and SAR missions, mariners, including construction workers, would have support should an emergency[28] arise. More readily available Coast Guard support during an emergency and ensuring safe and navigable waters through the ATON mission are the principal benefits of the Proposed Action to marine construction. Coast Guard would follow SOPs (Appendix B) to mitigate any potential impacts to marine construction activities that may occur near WCC operations. As a result, there would be no significant impact to coastal marine construction as a result of the Proposed Action.

3.5.2.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to coastal marine construction as a result of Alternative 1.

3.5.2.2.2 Impacts Under Alternatives 2–3

Under Alternatives 2–3, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to coastal marine construction as a result of Alternatives 2–3.

3.5.2.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate the existing inland tender fleet and associated assets. As vessels are decommissioned and not replaced, Coast Guard's presence in the IW&WR could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the IW&WR could decrease. However, there would be no significant impact to coastal marine construction with implementation of the No Action Alternative.

3.5.3 Mineral Extraction

3.5.3.1 Affected Environment

Mineral extraction within the proposed action areas includes sand and gravel mining. Until recently, sand was extracted from terrestrial areas, primarily in land quarries and riverbeds; however, a shift to marine and coastal aggregates mining has occurred due to the decline of terrestrial resources (Peduzzi 2014). Globally, the U.S. is the top producer of sand and is also the top exporter. The U.S. also imports sand, and was amongst the top twelve importers worldwide from 2010 through 2014 (Gavriletea 2017). Most states participate in some form of sand or gravel mining. This mining may be conducted coastally or at inland locations and may produce material categorized as "construction sand and gravel" or

[28] Emergencies are not a part of the Proposed Action.

"industrial sand and gravel." Construction sand and gravel may be mixed with other materials or used as is while industrial sand and gravel is used in the production of other materials, such as in abrasives, foundry, glassmaking, and hydraulic fracturing applications. Industrial sand and gravel has a higher quartz content. In 2016, the U.S. Geological Survey (USGS) calculated that the quantity of construction sand and gravel mined in the United States was 888,000 thousand metric tons, valued at $7,460,000. The quantity of industrial sand and gravel mined in the United States was 77,700 thousand metric tons, valued at $2,630,000 (USGS 2021).

Within the proposed action areas, the USGS has found that the top states for construction sand and gravel mining are Michigan, Minnesota, and Texas. The top states for industrial sand and gravel mining are Illinois, Minnesota, Missouri, Texas, and Wisconsin. Table 3-53 details the economic impact of sand and gravel mining in all of the states within the proposed action areas, as well as totals for each proposed action area.

Table 3-53. Economic Impact of Sand and Gravel Mining in the Proposed Action Areas

State	***Type of Sand and Gravel***	***Quantity (in Thousand Metric Tons)***	***Value (in Thousands USD)***
USEC-MidATL Proposed Action Area			
Delaware	Construction	2,810	$23,500
Maryland	Construction	7,380	$92,800
New Jersey	Construction	12,500	$103,000
	Industrial	879	$35,900
North Carolina	Construction	8,120	$52,900
	Industrial	4,180	$58,900
Pennsylvania[1]	Construction	10,300	$111,000
Virginia	Construction	7,420	$84,100
Total	***All***	***53,589***	***$509,200***
USEC-South Proposed Action Area			
Florida	Construction	19,100	$204,000
	Industrial	392	$12,900
Georgia	Construction	6,360	$43,800
South Carolina	Construction	8,650	$49,600
	Industrial	495	$21,000
Total	***All***	***34,997***	***$331,300***
Great Lakes Proposed Action Area			
Michigan	Construction	41,300	$249,000
	Industrial	3,410	$54,000
Total	***All***	***44,710***	***$303,000***
GoMEX and Mississippi River Proposed Action Area			
Alabama	Construction	11,500	$77,200
	Industrial	664	$16,700
Arkansas	Construction	7,510	$66,800
	Industrial	1,330	$60,700
Illinois	Construction	20,600	$139,000
	Industrial	10,600	$350,000
Indiana	Construction	17,500	$133,000
Iowa	Construction	14,900	$117,000
	Industrial	1,340	$53,600

State	*Type of Sand and Gravel*	*Quantity (in Thousand Metric Tons)*	*Value (in Thousands USD)*
Kansas	Construction	10,100	$59,800
Kentucky	Construction	8,540	$40,300
Louisiana	Construction	17,200	$306,000
	Industrial	1,330	$44,200
Minnesota	Construction	46,700	$227,000
	Industrial	3,110	$180,000
Mississippi	Construction	10,300	$85,000
	Industrial	1,100	$6,500
Missouri	Construction	10,300	$73,500
	Industrial	8,050	$268,000
Nebraska	Construction	12,700	$94,200
Ohio	Construction	32,600	$266,000
	Industrial	1,310	$51,800
Oklahoma	Construction	10,200	$84,200
	Industrial	3,420	$72,800
Tennessee	Construction	7,450	$57,500
	Industrial	1,570	$48,500
Texas	Construction	85,800	$818,000
	Industrial	10,900	$417,000
West Virginia	Construction	556	$4,720
	Industrial	558	$32,400
Wisconsin	Construction	27,100	$183,000
	Industrial	16,800	$637,000
Total	***All***	***413,638***	***$5,071,420***
PNW Proposed Action Area			
Oregon	Construction	12,400	$111,000
Washington[2]	Construction	33,300	$271,000
Total	***Construction Only***	***45,700***	***$382,000***
SEAK Proposed Action Area			
Alaska	Construction	8,670	$74,300
Total	***Construction Only***	***8,670***	***$74,300***

[1] Pennsylvania is divided east to west. The western part of Pennsylvania is in the GoMEX and Mississippi River proposed action area while the eastern part is in the USEC-MidATL proposed action area. For the purposes of analysis, the entire state is being reported here under the USEC-MidATL proposed action area.

[2] Data for the state of Washington is from 2015. All other state data is from 2016.

Sand and gravel mining have the greatest total economic impact in Wisconsin and Texas. It should be noted that all of the top sand and gravel mining states are within the GoMEX and Mississippi River proposed action area.

Outside of river systems, the federal Outer Continental Shelf (OCS) represents a source of industrial minerals and materials (e.g., titanium, phosphate), as well as sand and gravel. The Bureau of Ocean Energy Management (BOEM) leases areas within the OCS containing sand, gravel, or shell resources (Drucker et al. 2004). These areas are depicted in Figure 3-11, Figure 3-12, and Figure 3-13. Marine aggregates (naturally occurring sediment deposits found coastally or on the OCS) are used mostly in the construction industry (Coastal Marine Construction, Section 3.5.2), but also for beach replenishment and shore protection, land reclamation, and in other fill-related uses (Garel et al. 2009).

The identification of marine aggregate resources is based on both research and offshore prospecting surveys (Garel et al. 2009), such as those conducted by BOEM on the Atlantic continental shelf in the wake of Hurricane Sandy. Garel et al. (2009) state that, in 2002, the U.S. extracted 254 million cubic ft (ft^3; 7.2 million cubic meters [m^3]) of sand from the continental shelf. According to BOEM maps of lease areas and offshore surveys, the bulk of mineral extraction areas (within all proposed action areas) are within roughly 12 nm of the coast of the United States.

The NOAA Office for Coastal Management ENOW data describes mineral extraction as the extraction of both oil and gas and sand and gravel (National Oceanic and Atmospheric Administration 2019a). Table 3-54 shows the impact of the marine mineral extraction industry. Values in the table are compiled from averages over the 2005 through 2017 data collection period in order to provide a conservative estimate of the economic impact of mineral extraction has on the marine economy as it fluctuates over time. In some cases, counties or states did not have values to report; therefore, these data were excluded from the averages. Oil and gas extraction occurs in only the Gulf of Mexico portion of the GoMEX and Mississippi River proposed action area. While oil and gas extraction occurs in Alaska, it does not occur within the SEAK proposed action area. Therefore, in the remaining areas, the economic impact can be inferred to be only from the extraction of sand and gravel, rather than a combination of sand and gravel and oil and gas. There is no sand and gravel extraction in the SEAK proposed action area.

Table 3-54. Economic Impact of Marine Mineral Extraction by Proposed Action Area

Proposed Action Area	*Business Establishments**	*Employment**	*Annual Wages**	*Gross Domestic Product (GDP)**
USEC-MidATL	167	1,404	$86,378,989	$273,711,608
USEC-South	333	1,823	$88,944,011	$337,614,107
GoMEX	3,053	117,569	$16,775,209,466	$88,759,780,699
PNW	23	306	$21,432,086	$36,003,099

* Values are averages across the states and/or counties (roughly within the proposed action areas) as reported from 2005-2017 by NOAA (National Oceanic and Atmospheric Administration 2019a).

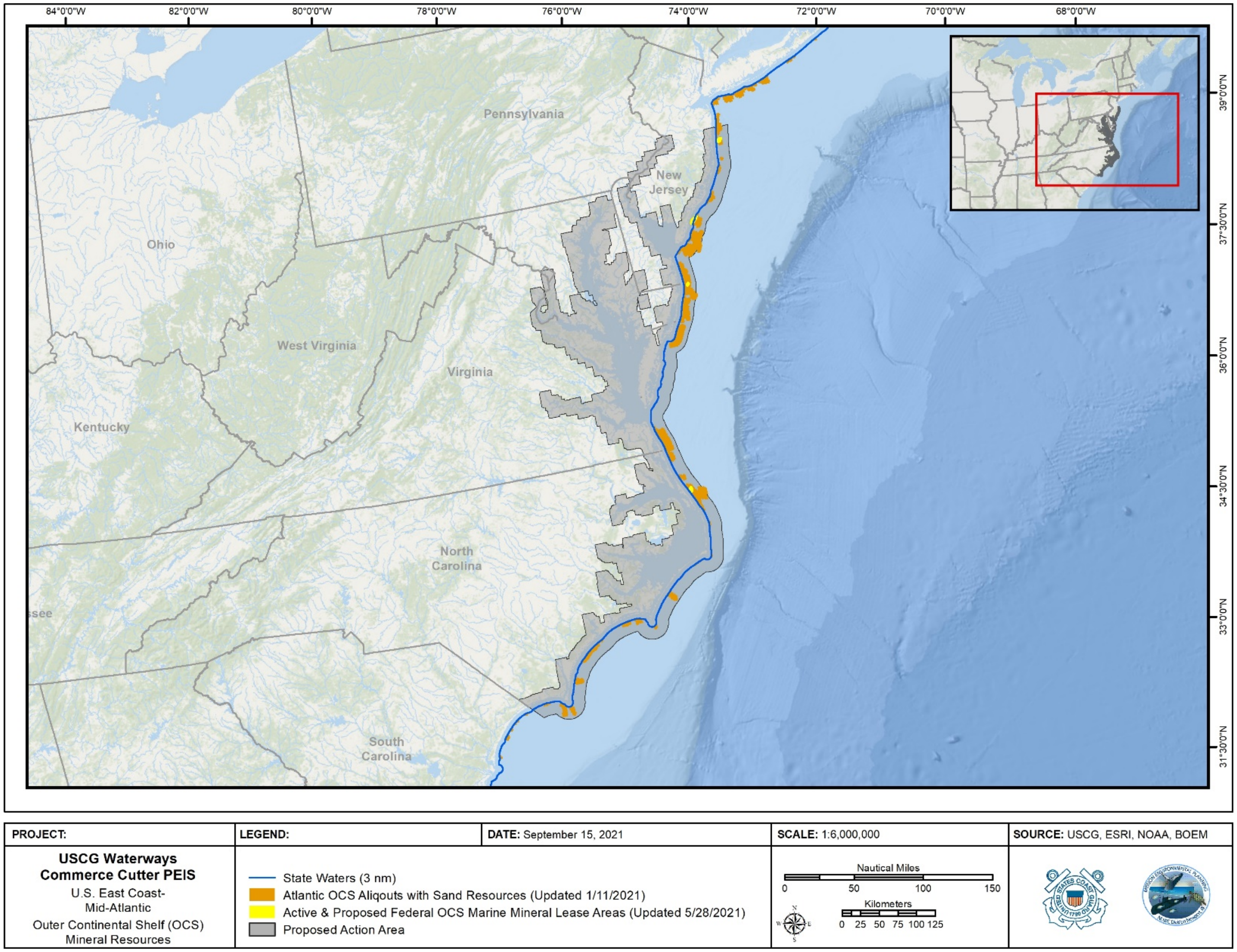


Figure 3-11. OCS Mineral Extraction Areas in the USEC-MidATL Proposed Action Area

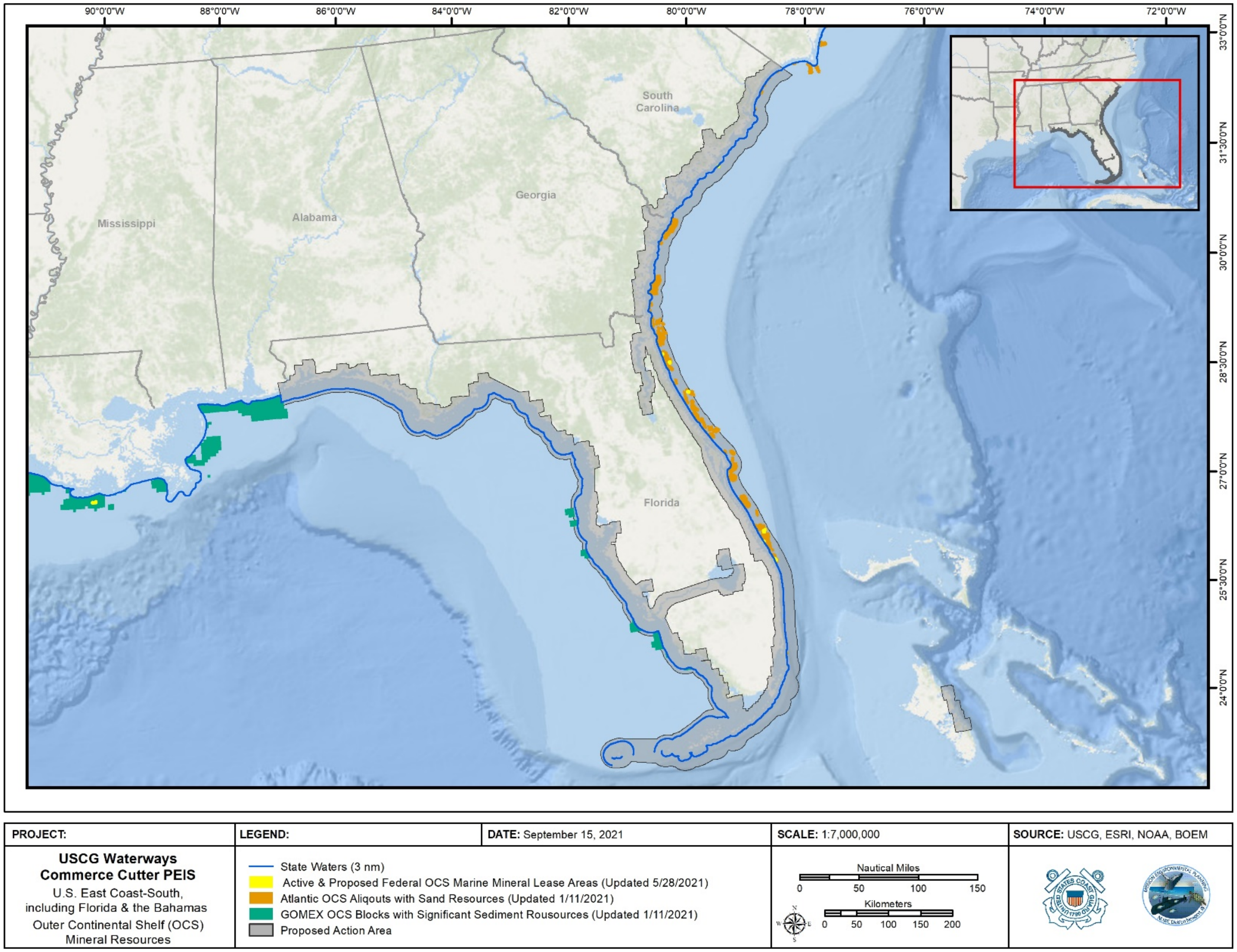
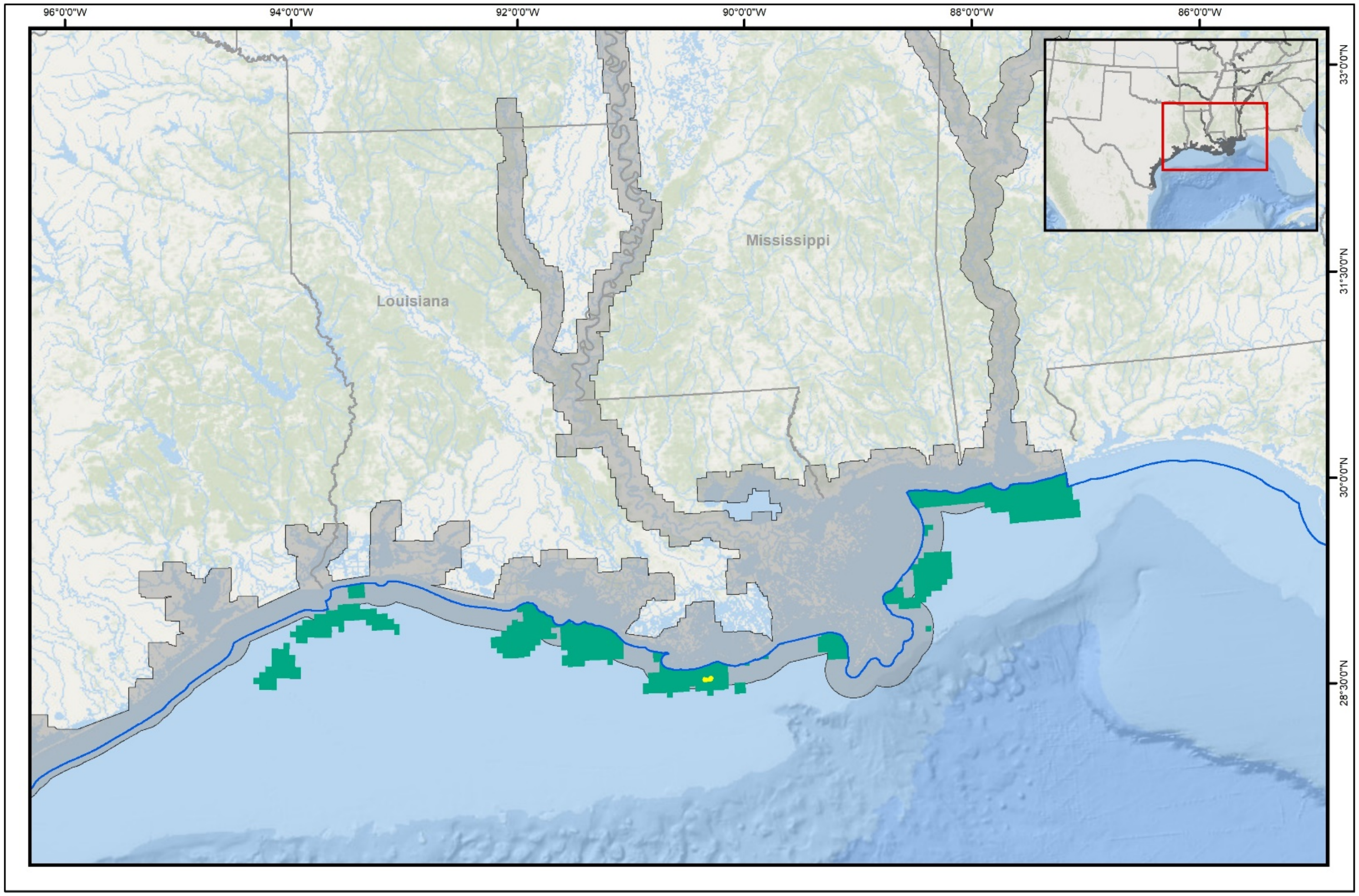


Figure 3-12. OCS Mineral Extraction Areas in the USEC-South Proposed Action Area



PROJECT:	LEGEND:	DATE: September 15, 2021	SCALE: 1:4,000,000	SOURCE: USCG, ESRI, NOAA, BOEM
USCG Waterways Commerce Cutter PEIS GoMEX and Mississippi River Outer Continental Shelf (OCS) Mineral Resources	State Waters (3 nm) Active & Proposed Federal OCS Marine Mineral Lease Areas (Updated 5/28/2021) GOMEX OCS Blocks with Significant Sediment Rousources (Updated 1/11/2021) Proposed Action Area		Nautical Miles 0 25 50 75 Kilometers 0 25 50 75 100	

Figure 3-13. OCS Mineral Extraction Areas in the GoMEX and Mississippi River Proposed Action Area

3.5.3.2 Environmental Consequences to Mineral Extraction

The predominant socioeconomic impact of the Proposed Action to mineral extraction would be similar Coast Guard capabilities in the proposed action areas. Replacement of the existing inland tender fleet would facilitate the Coast Guard's ability to support missions in the riverine, nearshore, and offshore environments. Coast Guard missions that would benefit mineral extraction include ATON, marine safety, and SAR. Coast Guard presence would ensure that due to ATON, marine safety, and SAR missions, mariners, including workers, would have support should an emergency[29] arise. More readily available Coast Guard support during an emergency and ensuring safe and navigable waters through the ATON mission are the principal benefits of the Proposed Action to mineral extraction. Coast Guard would follow SOPs (Appendix B) to mitigate any potential impacts to mineral extraction activities that may occur near WCC operations. As a result, there would be no significant impact to mineral extraction as a result of the Proposed Action.

3.5.3.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to mineral extraction as a result of Alternative 1.

3.5.3.2.2 Impacts Under Alternatives 2–3

Under Alternatives 2–3, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to mineral extraction as a result of Alternatives 2–3.

3.5.3.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate the existing inland tender fleet and associated assets. As vessels are decommissioned and not replaced, Coast Guard's presence in the IW&WR could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the IW&WR could decrease. However, there would be no significant impact to mineral extraction with implementation of the No Action Alternative.

3.5.4 Oil and Gas Extraction

3.5.4.1 Affected Environment

States control oil and gas development within their state waters, from the coast to 3 nm for most states. Beyond state waters, BOEM manages leases for oil and gas production on the OCS. While OCS oil and gas contributes only a small percentage of domestic production (16 percent of oil and 3 percent of natural gas), OCS production generated 683 million barrels of oil and 1.03 trillion cubic feet of gas in fiscal year 2019 (Bureau of Ocean Energy Management 2020c). In recent years, novel on-shore development techniques have been more cost-effective for developers, but offshore production remains an important component of the U.S. energy sector (Bureau of Ocean Energy Management 2016).

[29] Emergencies are not a part of the Proposed Action.

BOEM manages OCS leases under five-year programs and is currently operating under the 2017-2022 National OCS Oil and Gas Leasing Program (2017-2022 Program) (Bureau of Ocean Energy Management 2020b). However, based on strategies identified in EO 13795 (82 FR 20815; May 3, 2017), BOEM is currently in the process of designing a new National OCS Program for 2019-2024 that would greatly expand the area available for lease sales (Bureau of Ocean Energy Management 2020b).

Nearly all offshore oil and gas production in the U.S. EEZ occurs within the Gulf of Mexico. The region contains abundant oil and gas resources, broad industry interest, and well-established infrastructure to support exploration, development, and emergency response (Bureau of Ocean Energy Management 2016). The 2017-2022 Program makes available the entire leasable Gulf of Mexico OCS (those areas not subject to a moratorium).

The Gulf of Mexico OCS is divided into three BOEM planning areas: the Western, Central, and Eastern Gulf of Mexico Planning Areas. These planning areas cover approximately 160 million acres (Bureau of Ocean Energy Management 2018). Oil and gas production has been proceeding in the Central and Western Planning Areas (located adjacent to Alabama, Mississippi, Louisiana, and Texas state waters) for more than 60 years (Bureau of Ocean Energy Management 2018). Although the Eastern Planning Area has largely been under a production moratorium, lease sales still occur in the portions not under a moratorium, and leases exist that were sold prior to the moratorium (Bureau of Ocean Energy Management 2018). The lease sale moratorium in the Eastern Planning Area ends in 2022 (Bureau of Ocean Energy Management 2018). Since 1953, there have been more than 100 lease sales in the Gulf of Mexico Planning Areas (Bureau of Ocean Energy Management 2016). Table 3-55 provides an overview of the total existing lease blocks within the Gulf of Mexico OCS as of July 1, 2020. These totals include leases both within 12 nm (and therefore within the proposed action area) and those beyond 12 nm. Figure 3-14 depicts federal oil and gas leases within the proposed action area.

Table 3-55. Gulf of Mexico Outer Continental Shelf Oil and Gas Leases as of June 1, 2021

Planning Area	*Total Blocks*	*Total Acres*	*Number of Active Leases*[1]	*Acreage of Active Leases*	*Number of Producing Leases*[2]	*Acreage of Producing Leases*
Western	5,240	28,576,813	241	1,368,962	27	153,211
Central	12,409	66,446,351	1,914	10,099,889	509	2,603,208
Eastern	11,537	64,357,859	13	74,880	0	0
Region Subtotal	***29,186***	***159,381,023***	***2,168***	***11,543,731***	***536***	***2,756,419***

[1] An active lease is a lease that has been executed, has an effective date, and has not been relinquished, expired, or terminated.

[2] A producing lease is an active lease that has produced product (e.g. oil or gas).

Source: (Bureau of Ocean Energy Management 2020a)

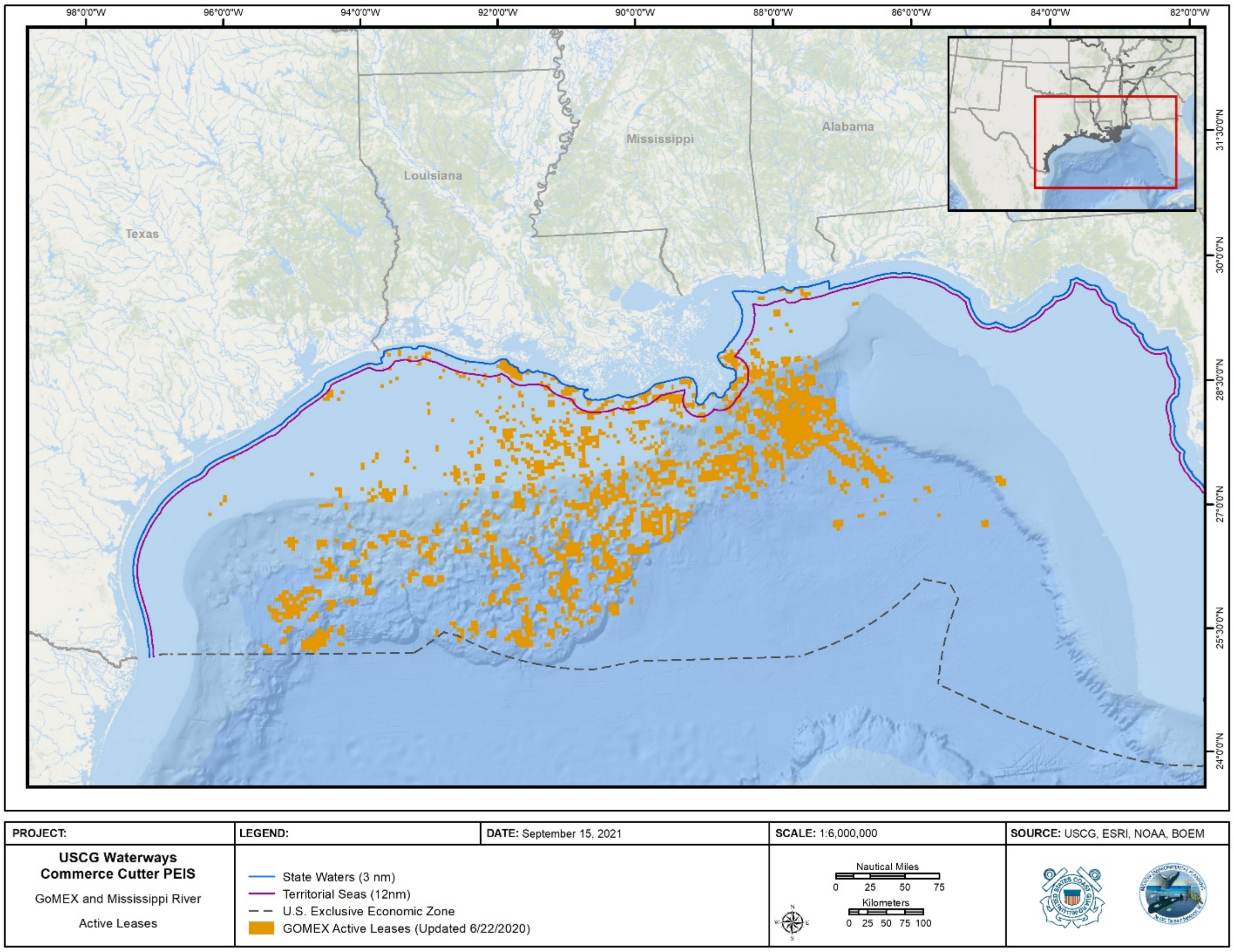


Figure 3-14. Active Federal Oil and Gas Leases in the GoMEX and Mississippi River Proposed Action Area

The 2017-2022 Program proposes 10 lease sales within the three Gulf of Mexico Planning Areas, opening all leasable areas to sales during each annual sale (Bureau of Ocean Energy Management 2016). BOEM (2016) estimated that the net economic value of the 2017-2022 Program's proposed lease sales within the Gulf of Mexico (versus sourcing the same oil and gas from other sources) would be between $2.4 and $170 billion, depending upon the market prices. The proposed 2019-2024 Program would call for 12 region-wide lease sales in the Gulf of Mexico region, including two sales for portions of the region currently under moratorium after that moratorium ends in 2022 (Bureau of Ocean Energy Management 2018).

Texas, Louisiana, and Alabama all administer oil and gas leasing programs for their state waters (Bureau of Ocean Energy Management 2018). There are no leases within Mississippi state waters (Bureau of Ocean Energy Management 2018).

3.5.4.2 Environmental Consequences to Oil and Gas Extraction

The predominant socioeconomic impact of the Proposed Action to oil and gas extraction would be similar Coast Guard capabilities in the proposed action areas. Replacement of the existing inland tender fleet would facilitate the Coast Guard's ability to support their missions in the riverine, nearshore, and offshore environments. Coast Guard missions that would benefit oil and gas extraction include ATON, marine safety, and SAR. Coast Guard presence would ensure that due to ATON, marine safety, and SAR missions, mariners, including workers, would have support should an emergency[30] arise. More readily available Coast Guard support during an at-sea emergency and ensuring safe and navigable waters through the ATON mission are the principal benefits of the Proposed Action to oil and gas extraction. Coast Guard would follow SOPs (Appendix B) to mitigate any potential impacts to oil and gas extraction activities that may occur near WCC operations. As a result, there would be no significant impact to oil and gas extraction as a result of the Proposed Action.

3.5.4.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to oil and gas extraction as a result of Alternative 1.

3.5.4.2.2 Impacts Under Alternatives 2–3

Under Alternatives 2–3, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to oil and gas extraction as a result of Alternatives 2–3.

3.5.4.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate the existing inland tender fleet and associated assets. As vessels are decommissioned and not replaced, Coast Guard's presence in the IW&WR could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the IW&WR could decrease. However, there would be no significant impact to oil and gas extraction with implementation of the No Action Alternative.

3.5.5 Recreation and Tourism

3.5.5.1 Affected Environment

Marine recreation and tourism includes the full range of tourism, leisure, and recreationally-oriented activities that take place in the proposed action areas as well as the associated development (e.g., hotels, resorts, restaurants, food industry, vacation homes, second homes, retail businesses, marinas, fishing tackle stores, dive shops, fishing piers, and recreational fishing facilities) (National Oceanic and Atmospheric Administration 1998). Major marine recreational uses include SCUBA/snorkeling, swimming, pelagic fishing, board sports, paddling, sailing, kayak fishing, motorized boating, dive fishing, wildlife viewing at sea, fishing from shore, tide pooling, gathering from shore, shore use, and commercial cruising (Wahle and Townsend 2013). Additionally, there are various cultural uses of the shore and waters.

The majority of recreational uses occur almost exclusively in the coastal areas and are short-term activities. Even charter boat tours, wildlife tours at sea, and offshore recreational fishing trips are usually

[30] Emergencies are not a part of the Proposed Action.

no more than one day in duration. In Table 3-46, temporal terms (always, often, sometimes, rarely, and never) are used to refer to the relative likelihood of the use's occurrence. For example, when in use, recreational fishing from shore "always" occupies the shoreline. The data in Table 3-46 applies broadly to all of the proposed action areas with the exception of the SEAK proposed action area, which would have fewer marine recreational uses due to seasonal inaccessibility or potential ice coverage.

With the exception of fishing, sailing, and cruises, which occasionally occur farther offshore, the majority of recreational fishing, recreational boating, sailing, and wildlife viewing will likely occur in the nearshore (coast to 3 nm) or inland. Available data show that tourism activities bring billions of dollars to communities within coastal states. Benefits from tourism include direct spending as well as indirect benefits from contributions to key business sectors such as food, lodging, arts, culture, and music. In the United States, expenditures on recreational fishing, whale watching, and diving are estimated to be roughly $30 billion per year (Cisneros-Montemayor and Sumaila 2010). According to the ENOW data set (Section 3.5), the tourism and recreation sector includes recreational fisheries, boat sales and boat rentals, charter fishing trips, eating and drinking establishments, hotels and lodging, marinas, recreational vehicle parks and campsites, scenic water tours and transportation, sporting goods rental and instruction, amusement parks, zoos, and aquaria (National Oceanic and Atmospheric Administration 2019a). In the United States, almost 2.4 million people were employed by the U.S. ocean-based tourism and recreation economy in 2016, earning about $58.7 billion in annual wages and contributing approximately $124 billion in gross domestic product (GDP) to the national economy (National Oceanic and Atmospheric Administration 2019a). From 2015 to 2016, tourism and recreation gained 73,000 jobs (6.3 percent growth)—growing significantly faster than the U.S. economy grew as a whole (1.7 percent growth) and accounting for most of the employment growth in the ocean economy (National Oceanic and Atmospheric Administration 2019a). Table 3-56 presents ENOW data by proposed action area specific to the tourism and recreation sector for 2017 (NOAA Office for Coastal Management 2020). Similar compiled data for inland waterways is not available.

Table 3-56 shows the impact of the marine tourism and recreation industry in coastal counties on states' employment and GDP. The tourism and recreation industry surrounding recreational boating is significant along the U.S. East Coast. Tourism also is important to Andros Island because tourism is the primary industry in the Commonwealth of the Bahamas, accounting for 50 percent of GDP (Official Website of the Government of The Bahamas 2020).

SCUBA diving is another popular recreational activity in several of the proposed action areas due to the occurrence of numerous reefs and shipwrecks. Dive depth limitations affect the locations and prevalence of recreational SCUBA diving within all proposed action areas. Specifically, the Professional Association of Diving Instructors suggests that certified open-water divers limit their dives to 60 ft (18 m) while more experienced divers are generally limited to 100 ft (30 m) (Professional Association of Diving Instructors 2011). Many shipwrecks and artificial reefs that are popular diving spots, particularly in the USEC-South proposed action area, are at depths ranging from 50 to 90 ft (15 to 27 m) (Associated Oceans LLC 2011). Therefore, most SCUBA diving would occur in areas where water depth is less than 100 ft (30 m).

Table 3-56. Economic Impact of Tourism and Recreation by Proposed Action Area for 2017

Proposed Action Areas	*Business Establishments*	*Employment*[1]	*Annual Wages*[2]	*Gross Domestic Product (GDP)*[3]
USEC-MidATL[4]	16,539	278,820	$5,655,415,627	$11,816,722,985
USEC-South[5]	21,954	498,036	$11,782,114,288	$24,844,354,183
Great Lakes[6]	83	745	$11,774,076	$20,809,681
GoMEX and Mississippi River[7]	6,574	136,978	$2,618,938,070	$5,724,974,778
PNW[8]	1,260	18,915	$407,384,597	$843,216,396
SEAK[9]	308	1,993	$51,310,324	$97,768,539

[1] The number of people employed by business establishments, including part-time and seasonal workers

[2] Wages paid to employees

[3] The value of goods and services that were produced in 2017

[4] ENOW data from the entire states of Delaware, Maryland, North Carolina, and Virginia were considered. Only data from eastern Pennsylvania (Bucks, Delaware, and Philadelphia Counties) and southern New Jersey (Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Ocean, and Salem Counties) were considered as portions of these two states lie outside of the proposed action area.

[5] ENOW data considered for the USEC-South proposed action area comes from Florida, Georgia, and South Carolina.

[6] Includes Chippewa County only

[7] ENOW data considered for the GoMEX and Mississippi River proposed action area considered here includes data from Alabama, Louisiana, Mississippi, and Texas.

[8] The ENOW data for the PNW proposed action area considered here includes data from Clatsop, Columbia, Multnomah, and Tillamook Counties, Oregon and Pacific and Wahkiakum Counties, Washington.

[9] The ENOW data for the SEAK proposed action area considered here includes data from Hoonah-Angoon Census Area, Juneau City and Borough, Ketchikan Gateway Borough, Petersburg Census Area, Prince of Wales-Hyder Census Area, Sitka City and Borough, and Wrangell City and Borough.

3.5.5.1.1 Whale Watching

Marine mammal watching, often referred to as “whale watching,” includes any cetacean and pinniped species such as dolphins, whales, porpoises, and seals. In the United States, approximately 4.3 million people participated in the industry in 1998, contributing nearly $357 million in sales to operators of whale watching tours across 90 communities (Hoyt 2001). According to Hoyt (2001), boat-based total expenditures (the amount whale watchers spent on the tours, as well as travel, food, hotels, and souvenirs) in 1998 in Alaska was $122.7 million, in the Eastern U.S. & Gulf of Mexico was $15.5 million, in Washington was $9.6 million, and in Oregon was $4.5 million. Even though the regions do not align with the proposed action areas, it could be inferred that the SEAK proposed action area would have the most commercial whale watching when compared to the other proposed action areas.

Most whale watch operators offer two trips per day, which limits the distance these vessels will go offshore. In the Pacific Northwest, most of the wildlife viewing trips occur within state waters, but some operators travel further offshore; however, the PNW proposed action area does not include marine waters, so whale watching would occur outside of the PNW proposed action area. In the USEC-South proposed action area, concentrations of the whale watching industry are highest in South Carolina (e.g., Hilton Head) and Florida (e.g., St. Petersburg, Panama City, Jupiter, Fort Lauderdale, and Miami). Total expenditures (the sum of direct and indirect expenditures) from whale watching in the Bahamas was

$2,970,000 in 1998 (Hoyt 2001). There are also some dolphin watching operators along the Atlantic Coast and the Gulf of Mexico.

3.5.5.1.2 Recreation and Tourism in Protected Areas

Much of the marine recreational economy depends on thriving national marine sanctuaries, parks, and marine protected areas. National marine sanctuaries are multiple-use areas committed to balancing protection and stewardship with the economic value these places hold. Across the National Marine Sanctuary Program, diverse activities like SCUBA diving/snorkeling, recreational fishing, wildlife watching, and other recreational activities help support local, coastal, and ocean-dependent economies. There are two national marine sanctuaries located in the U.S. East Coast-Mid-Atlantic proposed action area. The Mallows Bay-Potomac National Marine Sanctuary is located near Washington, DC, and central to the Chesapeake Bay region. The sanctuary protects and interprets the remnants of more than 100 World War I-era wooden steamships and other maritime and cultural heritage resources dating back nearly 12,000 years (National Marine Sanctuaries 2020). The Monitor National Marine Sanctuary, located off the North Carolina coast, protects the wreck site of the USS Monitor, which is artificial reef habitat for a variety of pelagic species. The USEC-South proposed action area includes the Florida Keys, a major tourist attraction internationally known for abundant fishing, numerous coral reefs, and historic underwater archaeological sites. The Florida Keys National Marine Sanctuary is home to the world's third-largest barrier coral reef, extensive seagrass beds, mangrove islands, and more than 6,000 species of marine life (National Marine Sanctuaries 2020). All other national marine sanctuaries are located in waters outside the boundaries of the proposed action areas.

While there are no national marine sanctuaries in Alaska, more than half of all U.S. marine protected areas are in Alaska, including natural heritage, cultural heritage, and sustainable production marine protected areas. Additionally, the Alaska Department of Fish and Game designates numerous state-managed special areas, including wildlife refuges, sanctuaries, and critical habitat.

3.5.5.1.3 Cruise Travel

The cruise travel sector in the United States consists of the cruise lines, airlines, travel agents, port service providers, and local businesses (e.g., hotels, restaurants) that are directly impacted by passenger and crew spending. For the purposes of analysis, cruise ship transit is considered along with other marine transportation (e.g., ferries, commercial shipping vessels) in Section 3.5.7. The cruise industry has been growing over the past decade, but faced significant declines due to the restrictions enacted in 2020 from the global coronavirus pandemic. From 2016 to 2018, cruise passenger embarkations from U.S. ports increased by 8.8 percent, and the direct cruise industry expenditures by cruise lines and port service providers in the United States rose by over 10 percent (Business Research and Economic Advisors 2019). The direct expenditures generated by the international cruise industry and their total economic impacts in 2018 are shown by proposed action area in Table 3-57 based on state-level data from the Business Research and Economic Advisors (2019).

Table 3-57. Economic Impact of the International Cruise Industry, 2018

Proposed Action Area	*Direct Purchase (Millions)*	*Share of U.S.*	*Total Employment*	*Share of U.S.*	*Total Income*	*Share of U.S.*
USEC-MidATL	1,872	7.8	29,754	7.1	1,751	7.5
USEC-South	9,407	39	171,823	41	8,586	37

Proposed Action Area	*Direct Purchase (Millions)*	*Share of U.S.*	*Total Employment*	*Share of U.S.*	*Total Income*	*Share of U.S.*
Great Lakes[1]	291	1.2	3,679	0.9	217	0.9
GoMEX and Mississippi River	4,673	19.7	83,087	19.9	4,709.0	20.5
PNW	1,033	4.3	24,340	5.8	1,334	5.8
SEAK	1,242	5.2	22,447	5.3	1,156	5.0

[1] Data includes stave-level data for Michigan.

Cruise ship passengers and overnight visitors participate in a variety of activities when visiting ports, many of which have a significant impact on the local economy. Going to the beach, recreational fishing, chartering yachts, shopping, snorkeling, SCUBA diving, and boating (day trips/tours and boat rentals) are all popular cruise excursion activities. Of the top ten states with the most direct expenditures generated by the international cruise industry in 2018, six (Florida, Texas, Alaska, Washington, New Jersey, and Louisiana) have significant cruise ports within the proposed action areas. The five largest cruise ports (i.e., Miami, Port Canaveral, Port Everglades, Galveston, and Long Beach) accounted for 66 percent of the passenger embarkations in the United States in 2018 (Business Research & Economic Advisors 2019). Four of these ports are within the proposed action areas. Florida remains the center of cruising in the United States, accounting for over 59 percent of all U.S. embarkations. This is largely due to its proximity to the Caribbean region, which is the number one cruise destination in the world (roughly 32 percent of all ocean-going cruises) (Business Research and Economic Advisors 2019; Cruise Lines International Association 2020).

Cruises departing from Texas and Louisiana typically make stops in the United States, Mexico, and the Caribbean, while those leaving from the U.S. East Coast often make port calls in the southern United States, Bahamas, and other Caribbean islands (Rodrigue and Notteboom 2012). Alaska benefits from the cruise industry primarily as a destination market, typically departing from the West Coast of the United States or Canada (Business Research & Economic Advisors 2019). Alaska accounts for five percent of all ocean-going cruises (Cruise Lines International Association 2020); however the vessels rarely, if ever, reach areas of Alaska north of the Aleutian Islands.

In the GoMEX and Mississippi River proposed action area, there are several cruise ports: the Port of Greater Baton Rouge in Baton Rouge, Louisiana; the Port of Metropolitan St. Louis in Saint Louis, Missouri; the Port of New Orleans in New Orleans, LA; the Port of Pittsburgh in Pittsburgh, Pennsylvania; and the Port of Cincinnati in Cincinnati, Ohio. As of 2020, there are two riverboat cruise businesses operating long-distance cruises on the Mississippi River and numerous smaller riverboat cruise businesses offering short excursions out of Minneapolis, MN; Saint Paul, MN; St. Louis, MO; Memphis, Tennessee; and Davenport, Iowa. Cruises in the upper Mississippi River sail the area between St. Louis and Saint Paul whereas cruises in the lower Mississippi River sail from Memphis to New Orleans. There is also river cruising along the Illinois (e.g., Peoria, LaSalle, and Perkins), Arkansas (e.g., Little Rock), Ohio (e.g. Louisville, Kentucky to Pittsburg, PA), and Tennessee (e.g., Chattanooga to Decatur, Alabama) Rivers. The Great Lakes proposed action area is best known for the Soo Locks boat tours in Sault Ste Marie, Michigan.

3.5.5.1.4 Recreational Boating

Recreational boating is among the many activities occurring in riverine and marine waterways across the country. There are numerous public access sites for recreational boating along the coasts, rivers, lakes, and estuaries in each proposed action area. Table 3-58 summarizes the economic contribution of recreational boating based on state-level data from the National Marine Manufacturers Association, American Sportfishing Association, and U.S. Coast Guard.

Table 3-58. Economic Impact of Recreational Boating by Proposed Action Area

Proposed Action Area	*Recreational Boating Annual Economic Impact*[1]	*Number of Recreational Boating Jobs*[1]	*Number of Recreational Boating Businesses*[1]	*Number of Jobs*[2]	*Number of Recreational Anglers*[2]	*Retail Sales*[2]	*Registered Boats*[3]
USEC-MidATL	$25,208,000,000	116,335	4,889	118,237	6,800,486	$9,923,474,528	1,257,183
USEC-South	$31,500,000,000	122,303	7,375	25,642	6,804,739	$2,542,946,279	1,834,666
Great Lakes	$7,400,000,000	31,129	1,458	9,509	2,716,156	$717,536,675	806,296
GoMEX and Mississippi River	$57,210,000,000	223,272	10,194	246,463	28,016,811	$21,896,209,829	5,472,041
PNW	$8,500,000,000	28,865	1,852	20,003	1,519,374	$1,889,023,620	407,013
SEAK	$587,000,000	2,977	318	12,689	462,024	$942,977,816	50,788

[1] State estimates are from National Marine Manufacturers Association (2018). Annual economic impact of the recreational boating industry by state includes manufacturers and suppliers, sales and services, boating activities, and business tax revenue.

[2] State estimates of the economic contributions of recreational fishing by state residents and non-residents in 2016 as provided by Southwick Associates (2019).

[3] Recreational vessel registration data by state are from U.S. Coast Guard (2020) (a) IA excludes inflatables under 7 ft (2 m) in length and canoes/kayaks under 13 ft (4 m) in length. (b) MI excludes manually propelled boats 16 ft (4.9 m) or less in length, and privately-owned non-motorized rafts, canoes, and kayaks. (c) MN excludes non-motorized boats. (d) NJ excludes non-motorized boats less than 12 ft (3.7 m) in length and canoes, kayaks, racing shells and rowing sculls. (e) PA registers non-powered craft using lakes or access areas owned by the State Fish & Boat Commission. (f) WA excludes motorboats less than 16 ft (4.9 m) with motors 10 horsepower or less used solely on state waters. Due to an invalid 2016 submission, WA's data reflects their 2015 submission.

3.5.5.1.5 Recreational Fishing

Recreational fishing (fishing for sport or pleasure, in salt or fresh water) can be contrasted with commercial fishing (selling fish for profit; discussed in Section 3.5.1) and subsistence fishing (retaining fish to meet basic nutritional needs for individuals, communities, or ceremonial purposes; discussed in Section 3.5.7). Commercial and recreational fisheries may take resources from some of the same stocks, most of which are managed by NOAA and regional entities, such as the regional fishery management councils or state governments. State fish and wildlife agencies manage inland (freshwater) and near-coastal fisheries. These agencies set and enforce fishing dates and times, fishing gear, and catch limits on fish size and number. NMFS manages marine fisheries (i.e., saltwater recreational fishing) outside the state management limits.

In 2016, nearly 9.8 million saltwater anglers took 63.3 million fishing trips generating $67.9 billion in sales impacts, $38.7 billion in value-added impacts, and $24.3 billion in income impacts. This recreational fishing effort also supported 472,000 jobs across the United States (National Marine Fisheries Service 2018b). According to a 2016 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation of both salt and freshwater fishing, 35.8 million residents 16 years and older enjoyed a variety of fishing opportunities throughout the U.S. and spent over $46.1 billion in fishing-related expenses during the year (U.S. Department of the Interior et al. 2016). Table 3-59, summarizing total anglers, fishing days, trips, and expenditures, shows that in 2016 freshwater fishing was more popular than saltwater fishing nationwide (U.S. Department of the Interior et al. 2016).

Table 3-59. Comparison of U.S. Freshwater Fishing and Saltwater Fishing

Activity	***Fresh Water (except Great Lakes)***	***Salt Water***
Anglers	29.5 million	8.3 million
Fishing Days	373 million	75 million
Fishing Trips	311 million	61 million
Trip and Equipment Expenditures	$27.5 billion	$11.2 billion

Excluding the Great Lakes, the majority (83 percent or 24.6 million) of all freshwater anglers fished in reservoirs, lakes, and ponds, and 45 percent or 13.1 million fished in rivers or streams (U.S. Department of the Interior et al. 2016), including some respondents who fished in multiple locations. These national estimates are not entirely representative of the inland proposed action areas, which generally do not include reservoirs, lakes, and ponds.

Among the 29.5 million anglers who fished freshwater, other than the Great Lakes, the most popular fish species was black bass (*Micropterus* spp.), which was targeted by 9.6 million anglers (U.S. Department of the Interior et al. 2016). The second most targeted species was panfish (sought by 8.4 million anglers), followed by catfish and bullheads (8.1 million anglers), trout (7.8 million anglers), crappie (*Pomoxis* spp.) (7.8 million anglers), and white bass (*Morone chrysops*), striped bass, and striped bass hybrid (5 million anglers) (U.S. Department of the Interior et al. 2016). Freshwater anglers also commonly fished for walleye (*Sander vitreus*), northern pike (*Esox lucius*), sauger (*Sander canadensis*), salmon, and steelhead. Participation in recreational fishing in the United States has continued its 11-year upward trajectory, adding 300,000 participants in 2018, reaching its highest number of participants since 2007 (Recreational Boating & Fishing Foundation and Outdoor Foundation 2019). The USFWS annually publishes the number of state-licensed anglers in each of the fifty states. USFWS (2019) state-level data are summarized by proposed action area in Table 3-60 based on salt and fresh water fishing licenses.

Table 3-60. Fishing Licenses by State and Proposed Action Area

Proposed Action Area	*Total Number of Fishing Licenses*	*Gross Cost of Fishing Licenses*
USEC-MidATL	4,088,658	$85,808,395
USEC-South	4,162,200	$55,994,498
Great Lakes[1]	1,154,926	$28,462,653
GoMEX and Mississippi River	19,265,123	$310,068,664
PNW	3,145,588	$58,036,765
SEAK	706,567	$20,954,670

[1] Data includes stave-level data for Michigan.
Source: USFWS (2019)

The 2018 U.S. marine recreational finfish catch, including fish kept and fish released (discarded) on the Atlantic, Gulf, and Pacific coasts (including Alaska), was estimated at 397 million fish weighing 447 million pounds, combined (National Marine Fisheries Service 2020). Marine recreational catches account for roughly 13 percent of the total weight of U.S. harvest of finfish for states covered by NMFS' Marine Recreational Information Program (MRIP). MRIP is a state-regional-federal partnership that develops, improves, and implements a network of surveys to measure total saltwater recreational fishing catch in the United States. Estimates presented in Table 3-61 and Table 3-62 were produced from data collected in 2018. MRIP collected recreational fishing data of the United States using the Coastal Household Telephone Survey, the For-Hire Survey, and the Access Point Angler Intercept Survey. Eligibility for inclusion in the survey is limited to saltwater fishing only; Great Lakes data is not included. Therefore, it is important to note not all MRIP data is representative of the proposed action areas because MRIP only monitors marine, not freshwater, recreational fishing in many states.

The MRIP works with its partners to administer surveys in Alaska, Hawaii, the Atlantic Coast (from Maine to eastern Florida), and Gulf Coast (from western Florida to Mississippi). In Louisiana, LA Creel serves as a certified alternative to the MRIP surveys. In Texas, marine recreational fishing is monitored by the Texas Parks and Wildlife Department, and in Alaska, recreational fishing data are collected through an annual mail survey administered by the Alaska Department of Fish and Game. On the Pacific Coast, marine recreational fishing is monitored by the Pacific Coast Recreational Fisheries Information Network, which administers Oregon and Washington's Ocean Sampling programs. The estimated harvests (numbers and weight of fish) for the continental United States are presented in Table 3-61. Harvest by weight is not available for Texas or Louisiana.

Table 3-61. Recreational Finfish Harvested and Released in 2018

State	*Pounds Harvested (thousands)*	*Number Harvested (thousands)*	*Number Released (thousands)*
USEC-MidATL Proposed Action Area			
Delaware	1,131	549	3,646
Maryland	11,121	7,939	20,361
New Jersey	27,820	10,195	34,959
North Carolina	20,065	16,167	62,468

State	Pounds Harvested (thousands)	Number Harvested (thousands)	Number Released (thousands)
USEC-South Proposed Action Area			
Virginia	11,671	16,558	24,771
South Carolina	8,960	7,099	29,166
Georgia	7,932	8,873	13,486
Florida	141,672	180,619	271,825
GoMEX and Mississippi River Proposed Action Area			
Alabama	23,129	16,933	29,385
Louisiana[1]		6,337	
Mississippi	11,991	12,091	16,920
Texas[2]		1,717	
PNW Proposed Action Area			
Oregon[3]	2,316	541	156
Washington[3]	2,124	400	93
SEAK Proposed Action Area			
Alaska[4]		1,406	775

[1] Louisiana only estimates harvest (no weight or release data).
[2] Texas only estimates harvest (no weight or release data) and includes only private and for-hire fisheries.
[3] Oregon and Washington estimates include only private and for-hire fisheries.
[4] Alaska estimates are from 2017.

While MRIP does not categorize recreational fishing data based on trip-specific location, recreational harvest by distance from shore is available. Nationally, the majority of recreational catch (nearly 55 percent in numbers of fish) comes from inland saltwater bodies (e.g., sounds, passes, inlets, bays, and estuaries), more than 35 percent from state territorial seas, and more than 10 percent from the EEZ (National Marine Fisheries Service 2020). In 2018, the majority of Atlantic, Gulf, and Pacific Coast trips fished primarily in inland saltwater bodies. Estimated harvests by primary fishing area, including inland saltwater bodies (e.g., sounds, inlets, bays, estuaries), state territorial seas, and the EEZ (defined as from the outer edge of the state territorial seas to 200 nm offshore), are presented in Table 3-62 for the top 10 species.

Table 3-62. Top Ten Recreational Harvest Species Categorized by Distance from Shore

Ranking by Harvested Weight	Inland Saltwater Harvest Species	State Waters Harvest Species	EEZ Harvest Species
1	Striped bass	Bluefish	Dolphinfishes
2	Scup*	Striped bass	Red snapper
3	Spotted seatrout	“Other” fishes*	Yellowfin tuna
4	Red drum	Spanish mackerel	“Other” fishes*
5	Sheepshead	Red drum	“Other” tunas/mackerels*
6	“Other” herrings	King mackerel*	King mackerel*
7	Striped mullet	“Other” mullets	Black sea bass
8	“Other” fishes*	Kingfishes	Epinephelus groupers* and Mycteroperca groupers*
9	Black drum	Little tunny/Atlantic bonito	
10	Summer flounder	Blue runner	Greater amberjack

Source: Data are from National Marine Fisheries Service (2020). *Fish included in these groups are not equivalent to those with similar names listed in the commercial fisheries data.

In general, recreational catches were the highest along the East Coast and in the Gulf of Mexico (Freire et al. 2020). Recreational catches on the West Coast have decreased considerably since the 1990s (Freire et al. 2020). Freire et al (2020) found that recreational catches in the United States were dominated by *Scombridae* (mackerels, tunas and bonitos), *Sciaenidae* (croakers), and *Pomatomidae* (bluefishes), which jointly accounted for about 40 percent of total recreational catches. In addition to these species, other key U.S. recreational species include drum, Pacific halibut, rockfishes, scorpionfishes, Pacific salmon, seatrout, sharks, striped bass, and summer flounder (National Marine Fisheries Service 2018b). Excluding Alaska, drum, specifically seatrouts (36.4 million fish) as well as Atlantic croaker and spot (19.3 million fish), were the species most frequently caught by recreational fishermen in the United States in 2016 (National Marine Fisheries Service 2018b).

NMFS reports the economic impact of recreational fishing activities in the United States in terms of employment, sales, and value-added impacts. Recreational fishing and economic performance of recreational fisheries within each proposed action area is discussed in further detail below[31].

NMFS manages and estimates U.S. marine recreational finfish harvests on the Atlantic, Gulf, and Pacific Coasts including from inland saltwater bodies; therefore, it was assumed that including inland saltwater data from state fish and wildlife agencies would be redundant for the USEC-MidATL, USEC-South, and SEAK proposed action areas, which are primarily marine. On the other hand, the GoMEX and Mississippi River and the PNW proposed action areas are largely comprised of freshwater areas. While MRIP surveys saltwater fishing along the Pacific (from California to Washington) and Gulf Coasts (from western Florida to Mississippi), additional information was gathered from the state fish and wildlife agencies as deemed necessary to supplement this information and better represent freshwater fishing in the GoMEX and Mississippi River and PNW proposed action areas.

3.5.5.1.5.1 Marine Recreational Fishing

Of all the states in the USEC-MidATL proposed action area, New Jersey generated the biggest economic impact from recreational fishing expenditures. Recreational angling in New Jersey accounted for 4.3 million trips and generated 15,400 jobs, $1.8 billion in sales, $746.2 million in income, and $1.2 billion in value-added impacts (National Marine Fisheries Service 2018b). According to the 2018 marine recreational fishing data, the Atlantic coast accounted for the majority of angler trips (67 percent) and catch (nearly 60 percent) nationally, but the majority (56 percent) of trips fished primarily in inland saltwater bodies, such as sounds, rivers, and bays (National Marine Fisheries Service 2020). The largest harvests by weight were striped bass, dolphinfish, bluefish, scup, and black sea bass, but the species most commonly caught on Northwest Atlantic trips that fished primarily in federally-managed waters were black sea bass, tomtate, red snapper, summer flounder, and dolphinfish (National Marine Fisheries Service 2020).

According to the 2018 NMFS marine recreational fishing data, recreational anglers in Florida took 22 million trips, which generated 96,300 jobs, $10.9 billion in sales, $4.1 billion in income, and $6.6 billion in value-added impacts (National Marine Fisheries Service 2018b). The information presented on marine recreational fishing data for the Atlantic Coast encompasses much of the USEC-South proposed action area as well. The top five recreational species by total harvest in Florida are blue runner, herring,

[31] "Sales" refers to the gross value of all sales by regional businesses affected by an activity, such as recreational fishing. The category includes both the direct sales made by the angler and sales made between businesses and households resulting from that original sale by the angler. "Income" includes personal income (wages and salaries) and proprietors' income (income from self-employment). "Value-added" is the contribution made to the GDP in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the purchases made by anglers (National Marine Fisheries Service 2018).

mullet, pinfish, and Atlantic thread herring (Marine Recreational Information Program 2017). Using a reconstruction approach, Smith and Zeller (2016) performed a comprehensive accounting of fisheries catches in the Bahamas from commercial and noncommercial sectors for 1950–2010 and found that recreational fishing accounted for 55 percent of reconstructed total catches.

According to the 2018 NMFS marine recreational fishing data, the Gulf Coast accounted for 29 percent of angler trips and more than 37 percent of catch nationally, but the majority of trips fished primarily in inland saltwater bodies (National Marine Fisheries Service 2020). In 2016, recreational fishing expenditures across the Gulf of Mexico region (limited to Texas, Louisiana, Mississippi, Alabama, and western Florida) totaled $11 billion. Excluding western Florida, which ranked the highest in the region, the second highest employment impacts from expenditures on saltwater recreational fishing in the Gulf of Mexico region were generated by Alabama (16,100 jobs). Texas had the second largest sales impact ($2 billion), second greatest income impact ($746 million), and the second greatest value added impact ($1.2 billion) (National Marine Fisheries Service 2018b). The largest harvests by weight were for red snapper, spotted seatrout, red drum, striped mullet, sheepshead, and Spanish mackerel, but the species most commonly caught on Gulf of Mexico trips that fished primarily in federally managed waters were red snapper, red grouper, white grunt, vermilion snapper, and sand perch (National Marine Fisheries Service 2020).

In the SEAK proposed action area, sport anglers commonly fish for salmon (chinook, coho, pink, sockeye, and chum), Pacific halibut, rockfish, lingcod, and Pacific cod (Alaska Department of Fish and Game 2020a). Of Alaska's key species and species groups, Pacific halibut (643,000 fish), rockfish species (504,000 fish), and coho salmon (305,000 fish) were most frequently caught by recreational fishermen (National Marine Fisheries Service 2018b). The most abundantly harvested of the salmons were coho and pink salmon (National Marine Fisheries Service 2020). In 2016, economic impacts from recreational fishing activities in Alaska generated 4,865 jobs, $539.4 million in sales, $195.1 million in income, and $315.5 million in value-added impacts (National Marine Fisheries Service 2018b).

3.5.5.1.5.2 Freshwater Recreational Fishing

In the Great Lakes proposed action area, resident species of interest to anglers on the St. Mary's River include northern pike, smallmouth bass (Micropterus dolomieu), walleye, yellow perch (Perca flavescens), and cisco (Coregonus artedii) (Godby et al. 2017). The St. Mary's river rapids (near Soo Locks) are a popular fishing location where the target species changes based on seasonal migration patterns. Rainbow trout (steelhead) are the most sought after species in May, June, and October, but Atlantic salmon are the preferred target in July and August (Godby et al. 2017). An open water creel survey of sport anglers in the St. Mary's River estimates 55,404 angler days of fishing effort were spent on the river in 2017, with a value of approximately $8.5 million (Godby et al. 2017).

In the PNW proposed action area, the Snake River, which flows west to the Columbia River, provides a year-round recreational trout fishery. The Columbia River offers premiere opportunities to fish for salmon, steelhead, sturgeon, shad, and a variety of warm water species. Close to a million Chinook, coho, and sockeye salmon and summer steelhead travel up the Columbia River to spawn in its tributaries (Oregon Department of Fish and Wildlife 2020a). Less well known are the river's excellent smallmouth bass and walleye fisheries. It is assumed that the Deschutes, Hood, Umatilla, and Washougal Rivers and other tributaries would have similar recreational fishing opportunities as the Columbia River. Salmon and steelhead navigate the Willamette River and its tributaries, many of which also are home to rainbow and cutthroat trout (Oregon Department of Fish and Wildlife 2020b).

In the GoMEX and Mississippi River proposed action area, Table 3-63 represents a summary of recreationally fished finfish species by waterbody (freshwater only) according to the applicable state fish and wildlife agencies best available information.

Table 3-63. Common Recreational Fishing Finfish Species in the GoMEX and Mississippi River Proposed Action Area

River	***State***	***Black bass*** [1]	***Blue sucker*** [2]	***Bowfin*** [3]	***Buffalo*** [4]	***Bullhead*** [5]	***Carp*** [6]	***Catfish*** [7]	***Crappie*** [8]	***Freshwater drum*** [9]	***Gar*** [10]	***Paddlefish*** [11]	***Pike*** [12]	***Redhorse*** [13]	***Sturgeon*** [14]	***Sunfish*** [15]	***Temperate bass*** [16]	***Trout*** [17]	***Walleye, sauger*** [18]
Arkansas River	AR-OK	x						x	x		x						x	x	x
Arkansas rivers (not specific to Ouachita River)	AR	x						x			x						x	x	x
Black River	WI-MN-LA	x						x					x					x	x
Hiwassee River	TN	x						x	x		x	x				x		x	
Illinois River	OK-IL	x				x		x	x							x	x		x
Kanawha River	West Virginia	x											x				x		x
Kaskaskia River	IL	x						x								x	x		x
Lake Pittsfield	IL	x						x	x							x	x		x
Lake Texoma	TX	x						x	x							x	x		
Louisiana rivers (not specific to Atchafalaya, Black, Quachita)	LA	x		x				x	x		x		x			x	x		
Minnesota River	MN						x	x											
Mississippi River	AR-IL-KY-LA-MO-MS-TN-IA-WI-MN	x	x		x		x	x	x	x		x	x	x	x	x	x		x

River	*State*	*Black bass [1]*	*Blue sucker [2]*	*Bowfin [3]*	*Buffalo [4]*	*Bullhead [5]*	*Carp [6]*	*Catfish [7]*	*Crappie [8]*	*Freshwater drum [9]*	*Gar [10]*	*Paddlefish [11]*	*Pike [12]*	*Redhorse [13]*	*Sturgeon [14]*	*Sunfish [15]*	*Temperate bass [16]*	*Trout [17]*	*Walleye, sauger [18]*
Missouri River	IA-KS-MO-NE-SD	x	x	x	x		x	x	x	x		x	x		x	x	x	x	x
Missouri rivers (not specific to Ohio River)	MO	x						x	x			x	x				x		
Monongahela River	PA					x		x					x			x	x	x	x
Mulberry Fork	AL	x							x							x			
Ohio River	IL-IN-KY-OH-WV-MO-PA	x					x	x	x	x		x	x			x	x		x
Saint Croix River	WI-MN	x											x						x
Tombigbee River	AL	x						x	x										
White River	AR	x						x			x						x	x	x

[1] Black bass (largemouth, redeye, smallmouth, spotted) *Micropterus*, Centrarchidae
[2] Blue sucker *Cycleptus elongates,* Catostomidae
[3] Bowfin *Amia calva,* Amiidae
[4] Buffalo (bigmouth) *Ictiobus cyprinellus,* Catostomidae
[5] Bullhead (black, brown, yellow) *Ameiurus*, Ictaluridae
[6] Carp (common, grass) *Ctenopharyngodon idella*, Cyprinidae
[7] Catfish (blue, channel, flathead) *Ictalurus, Pylodictus*, Ictaluridae
[8] Crappie (black, white) *Pomoxis*, Centrarchidae
[9] Freshwater drum *Aplodinotus grunniens*, Sciaenidae
[10] Gar (alligator, spotted) *Lepisosteus oculatus*, Lepisosteidae
[11] Paddlefish *Polyodon spathula*, Polyodontidae

River	State	Black bass [1]	Blue sucker [2]	Bowfin [3]	Buffalo [4]	Bullhead [5]	Carp [6]	Catfish [7]	Crappie [8]	Freshwater drum [9]	Gar [10]	Paddlefish [11]	Pike [12]	Redhorse [13]	Sturgeon [14]	Sunfish [15]	Temperate bass [16]	Trout [17]	Walleye, sauger [18]

[12] Pike (northern, muskellunge, chain pickerel) *Esox*, Esocidae
[13] Redhorse (shorthead) *Moxostoma macrolepidotum*, Catostomidae
[14] Sturgeon (lake, white) *Acipenser,* Acipenseridae
[15] Sunfish (bluegill, longear, orangespotted, pumpkinseed, redbreast, redear, spotted, warmouth) *Lepomis*, Centrarchidae
[16] Temperate bass (striped, yellow, white, white perch) *Morone,* Moronidae
[17] Trout (brook, brown, cutthroat, lake, rainbow) *Salvelinus*, Salmo, Oncorhynchus, Salmonidae
[18] Walleye, sauger *Sander*, Percidae

Sources: (Alabama Department of Conservation and Natural Resources 2020a, 2020c); (Arkansas Game and Fish Commission 2020); (Benike and Michalek 2001; Chapman 1998; Hunt and Westlake 2019; Illinois Department of Natural Resources 2020a, 2020b; Indiana Department of Natural Resources 2020; Iowa Department of Natural Resources 2020a, 2020b; Isaacs 2009; Kansas Department of Wildlife Park and Tourism 2020; Kentucky Department of Fish and Wildlife Resources 2020; Louisiana Department of Wildlife and Fisheries 2018; Missouri Department of Conservation 2020a; National Park Service 2012; Nebraska Game and Parks Commission 2020; Ohio Department of Natural Resources 2020; Pennsylvania Fish and Boat Commission 2013; Tennessee Department of Environment & Conservation 2020; Tennessee Wildlife Resources Agency 2020; Texas Parks and Wildlife Department 2020; West Virginia Division of Natural Resources 2020; Wisconsin Department of Natural Resources 2020; York 2019).

3.5.5.2 Environmental Consequences to Recreation and Tourism

The predominant socioeconomic impact of the Proposed Action to recreation and tourism would be similar in Coast Guard capabilities in the proposed action areas. Replacement of the existing inland tender fleet would facilitate the Coast Guard's ability to support missions in the riverine, nearshore, and offshore environments. Coast Guard missions that would benefit recreation and tourism include ATON, law enforcement, living marine resources, marine safety, and SAR. Coast Guard presence would ensure that due to ATON, marine safety, and SAR missions, mariners, including recreational boaters and fishermen and tourists on the water, would have support should an emergency[32] arise. More readily available Coast Guard support during an emergency on the water and ensuring safe and navigable waters through the ATON mission are the principal benefits of the Proposed Action to recreation and tourism.

Conversely, potential negative impacts to recreational fishing would be indirect impacts to fish from vessel noise, pile driving noise, vessel movement, bottom devices, ATON retrieval devices, and pile driving associated with the Proposed Action. However, as discussed in Section 3.4.6, there would be no significant impact to fish. Coast Guard would follow SOPs (Appendix B) to mitigate potential impacts to recreational fishing activities that may occur near WCC operations.

3.5.5.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to recreation and tourism as a result of Alternative 1.

3.5.5.2.2 Impacts Under Alternatives 2–3

Under Alternatives 2–3, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to recreation and tourism as a result of Alternatives 2–3.

3.5.5.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate the existing inland tender fleet and associated assets. As vessels are decommissioned and not replaced, Coast Guard's presence in the IW&WR could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the IW&WR could decrease. However, there would be no significant impact to recreation and tourism with implementation of the No Action Alternative.

3.5.6 Renewable Energy

3.5.6.1 Affected Environment

Renewable energy resources are resources that are constantly and naturally replenished, including wind, solar, hydroelectric, and geothermal. Renewable energy resources located in the proposed action

[32] Emergencies are not a part of the Proposed Action.

areas are riverine hydroelectric and marine, including emerging in-water technologies and offshore wind.

3.5.6.1.1 Freshwater Hydroelectric Renewable Energy Resources

Fresh water hydroelectric energy is the only type of hydroelectric resource present in the proposed action areas. There are three types of hydropower: conventional, run-of-river, and conduit/canal (National Hydropower Association 2020b). Conventional hydropower is the most common form, in which the plant is an impoundment facility that uses a dam to store water in a reservoir. Water from the reservoir flows through a turbine and activates a generator to produce electricity. Run-of-river facilities, meanwhile, channel part of a stream through a powerhouse before the water rejoins the main river. Generation depends on natural incoming flows. Conduit/canal hydropower diverts water from a reservoir, lake, or river through a pipe. The water flows through hydraulic turbines on its way to its ultimate destination, and may be used for another use, such as crop irrigation. By fitting these existing pipes with turbines, a new, efficient, innovative power source is born out of generation that is otherwise uncaptured.

The U.S. Department of Energy's Hydropower Vision Report found that hydropower can sustainably grow its current 101 gigawatts of capacity by nearly 50 gigawatts by 2050 (U.S. Department of Energy 2016). Information regarding hydroelectric power generation at the state level in the proposed action areas can be found in Table 3-64. Table 3-64 includes all hydropower facilities, even those that do not fall within any of the water bodies considered to be part of the proposed action areas due to the manner in which this data has been reported.

Table 3-64. Hydroelectric Power Generation by State

State	*Conventional Hydropower (MWh)*	*Percent Energy from Hydropower*[1]
USEC-MidATL Proposed Action Area		
Maryland	1,397,000	4
North Carolina	4,529,000	3
Virginia	1,526,000	2
USEC-South Proposed Action Area		
Florida	219,000	0
Georgia	3,082,000	2
South Carolina	2,399,000	2
Great Lakes Proposed Action Area		
Michigan	1,548,000	1
GoMEX and Mississippi River Proposed Action Area		
Alabama	7,721,000	5
Arkansas	3,418,000	6
Illinois	129,000	0
Indiana	415,000	0
Iowa	956,000	2
Kentucky	3,450,000	4
Louisiana	1,103,000	1
Minnesota	884,000	1
Missouri	1,237,000	2
Nebraska	1,725,000	5
Ohio	517,000	0

State	*Conventional Hydropower (MWh)*	*Percent Energy from Hydropower*[1]
Oklahoma	2,382,000	3
Pennsylvania	2,376,000	1
Tennessee	7,418,000	9
Texas	1,103,000	0
West Virginia	1,410,000	2
Wisconsin	2,405,000	4
PNW Proposed Action Area		
Oregon	33,700,000	57
Washington	76,843,000	68
SEAK Proposed Action Area		
Alaska	1,549,000	29

[1] Percent energy from hydropower has been rounded to the nearest integer.
Source: (National Hydropower Association 2020a)

3.5.6.1.1.1 USEC-MidATL and USEC-South Proposed Action Areas

While the states in the USEC-MidATL and USEC-South proposed action areas employ renewable energy technology for electricity generation, no hydroelectric power plants are located within either proposed action area.

3.5.6.1.1.2 GoMEX and Mississippi River Proposed Action Area

Nearly every state within the GoMEX and Mississippi River proposed action area utilizes hydroelectric power generation. Rivers with hydroelectric energy production in this proposed action area include: Arkansas River, Black Warrior River, Cumberland River, Illinois River, Kanawha River, Minnesota River, Mississippi River, Missouri River, Ohio River, Ouachita River, Tennessee River, and the White River (Johnson et al. 2020). Total capacities of hydropower plants in the proposed action area range from 3,400 MWh (megawatt hours) (A-Mill Artist Lofts Plant on the Mississippi River in Minnesota) to 2397,271 MWh (Wilson Dam on the Tennessee River in Alabama) (Johnson et al. 2020).

3.5.6.1.1.3 Great Lakes Proposed Action Area

There is only one hydroelectric facility located within the Great Lakes proposed action area: the Edison Sault Hydroelectric Power Complex. This facility lies at the northern tip of Michigan where Lake Superior, Lake Michigan, and Lake Huron meet, harnessing the hydroelectric potential of the 20 ft (6.6 m) falls at the headwaters of the Saint Mary's River (American Society of Civil Engineers 2020). The complex is the largest low-head hydroelectric facility in the U.S. with a total capacity of over 41 megawatts (MW) (Johnson et al. 2020).

3.5.6.1.1.4 PNW Proposed Action Area

All major rivers that are part of the PNW proposed action area (i.e., Willamette River, Columbia River, Snake River) contain hydroelectric power facilities. Over 50 percent of the electricity generated in both Washington and Oregon comes from hydropower (Table 3-64), and many of those hydropower plants fall within the proposed action area.

3.5.6.1.1.5 SEAK Proposed Action Area

A large portion of the electricity generated in the SEAK proposed action area comes from hydropower, and 29 percent of Alaska's electricity comes from hydropower (Table 3-64). However, these facilities are not accessible to vessels and therefore do not fall within the proposed action area.

3.5.6.1.2 Marine Renewable Energy Resources

3.5.6.1.2.1 Water Renewable Energy

Renewable energy resources in marine waters include wave energy, tidal energy, current energy, and Ocean Thermal Energy Conversion (OTEC). Wave power captures and converts the energy from waves into electricity, while tidal energy takes advantage of the ebb and flow of tides to create electricity. The U.S. Pacific Coast is estimated to support 2.64 trillion kilowatt-hours, or the equivalent of 64 percent of U.S. electricity generation in 2018 (U.S. Energy Information Administration 2019). Current energy is the creation of electricity using the water movement caused by ocean currents. OTEC is a process for producing energy by harnessing the temperature differences between ocean surface waters and deep ocean waters.

Currently there isn't any widespread technology in use for generating these marine renewable energies in the United States. Various government, research, and private entities are working to develop technology to harness this renewable energy source, including the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy. While there are institutions across the United States that are developing and testing the viability of these methods for creating renewable energy from the ocean, none are at a large enough scale to be commercially viable for energy production. These institutions are summarized in Table 3-65.

Table 3-65. Marine Renewable Energy Research Institutions in the United States

Institution	***Location***	***Proposed Action Area***	***Primary Research Objectives Relating to Marine Renewable Energy***
Southeast National Marine Renewable Energy Center	Boca Raton, FL	USEC-South	Focus on ocean currents and offshore thermal resources, including experimental ocean current turbine (under development) (Southeast National Marine Renewable Energy Center 2013).
Hawaii National Marine Renewable Energy Center	Honolulu, HI	n/a	Facilitate the development of commercial wave energy systems, including implementation of a grid-connected wave energy test site at Marine Corps Base Hawaii to allow developers to prove their devices and advance designs toward commercial readiness. Additionally establish and maintain a testing site for OTEC demonstrations and studies (Hawaii National Marine Renewable Energy Center 2020).
Pacific Marine Energy Center	Newport, OR	PNW	Works on research and development of technologies and monitoring, and tests marine renewable energy technologies in partnership with multiple universities. Research includes multiple projects under the following categories: marine energy resource characterization, wave energy conversion technology, current energy and turbine technology, marine operations, environmental effects of marine energy technologies, and the sociopolitical effects of marine energy (Pacific Marine Energy Center 2020).

Additionally, the U.S. Department of Energy's Office of Energy Efficiency & Renewable Energy funds projects relating to marine and hydrokinetic energy. These projects are broken out into four areas that represent strategic approaches to addressing challenges faced by U.S. marine and hydrokinetic energy stakeholders: data sharing and analysis ($9.30 million in 2019), foundational and crosscutting research and development ($9.14 million in 2019), reducing barriers to testing ($20.60 million in 2019), and technology-specific system design and validation ($30.95 million in 2019) (U.S. Department of Energy Water Power Technologies Office 2020).

3.5.6.1.2.2 Wind Renewable Energy

Wind energy is derived from the force of moving air that causes large wind turbine blades to rotate. The blades are connected to an electric generator that converts the mechanical energy from the wind into electricity, which is then transferred to the electrical power grid. The first commercial offshore wind farm in the United States, located in state waters off Block Island, Rhode Island, came online and reached commercial operation in December 2016. The Block Island Wind Farm was developed by Deepwater Wind, LLC (which was purchased by Orsted in 2018) and is capable of generating 30 megawatts of power using five wind turbines. Building the Block Island Wind Farm employed over 300 local workers (Orsted 2020). The Block Island Wind Farm is not within any of the proposed action areas.

In 2021, the Interior, Energy, Commerce, and Transportation Departments announced new leasing, funding, and development goals to accelerate and deploy offshore wind and energy jobs. EO 14008, *Tackling the Climate Crisis at Home and Abroad* (86 FR 7619; February 1, 2021), established a goal of doubling offshore wind by 2030 (to roughly 30 gigawatts supplied). To meet this 2030 target, BOEM plans to advance new lease sales and complete review of at least 16 Construction and Operations Plans by 2025 (Table 3-66). The EO acknowledges the many supply chain jobs that would be created in the United States to support these wind energy projects, such as steel used to create vessels that install wind turbines (White House 2021).

BOEM developed a regulatory framework to review proposed offshore wind projects in federal waters, and proposed a process for the renewable energy program that occurs in four distinct phases (Bureau of Ocean Energy Management 2017):

1. Planning and Analysis – this phase seeks to identify suitable areas for wind energy leasing consideration through collaborative, consultative, and analytical processes that engage stakeholders, tribes, and State and Federal government agencies. During this phase, BOEM conducts environmental compliance reviews and consultations with Tribes, States, and natural resource agencies.

2. Leasing – this phase results in the issuance of a commercial wind energy lease, either through a competitive or noncompetitive process. Leases grant lessees the right to use the lease area to develop plans, but does not grant the right to construct any facilities.

3. Site Assessment – this phase includes the submission of a Site Assessment Plan, which includes the lessee's detailed proposal for the construction of a meteorological tower and/or the installation of meteorological buoys on the leased area. The Site Assessment Plan must be approved by BOEM before any site assessment activities occur.

4. Construction and Operations – this phase consists of the submission of a Construction and Operations Plan, which is a detailed plan for the construction and operation of a wind energy project on

the lease. BOEM conducts environmental and technical reviews of the Construction and Operations Plan and decides whether or not to approve the Construction and Operations Plan.

Action regarding the development of offshore wind farms has only been taken in the USEC-MidATL and USEC-South proposed action areas. Offshore wind energy has not been established in any other proposed action area. Although there are efforts to determine the viability of offshore wind energy in all other proposed action areas (i.e., determination of three potential lease sites off the coast of California), there are none currently past the planning and analysis stage, but given the duration of the Proposed Action, there is potential for overlap. For example, BOEM recently funded two projects looking at the feasibility of marine renewable energy, including offshore wind energy, in the Gulf of Mexico (Musial et al. 2020; Musial et al. 2019). While these studies indicate that capacity for offshore wind in the Gulf of Mexico is large (especially in shallow waters less than 197 ft [60 m] deep), and no lease sites have been identified, nor has a lease sale been held, construction and operations would overlap with the proposed action areas.

Since 2009, BOEM's Office of Renewable Energy Programs has issued commercial wind energy leases for offshore wind farm development for projects located within or adjacent to the two proposed action areas on the U.S. East Coast (Table 3-66). The commercial wind energy lease areas are large and will not be entirely encompassed by the proposed action areas; the majority of these areas are further than 12 nm [22 km] offshore.

Table 3-66. Current BOEM Offshore Wind Leases in the Proposed Action Areas on the U.S. East Coast

Lessee	*State*	*Distance Offshore*	*Area in Acres (Hectares)*	*Lease Number, Year*	*Current Status/Next Step*
Garden State Offshore Energy I	Delaware	16 mi (26 km)	70,098 (28,368)	OCS-A 0482, 2012	SAP
Virginia Electric and Power Company	Virginia	27 mi (43 km)	112,799 (45,648)	OCS-A 0483, 2013	COP
US Wind	Maryland	13 mi (21 km)	79,707 (32,256)	OCS-A 0490, 2014	COP
Ocean Wind	New Jersey	15 mi (24 km)	160,480 (64,944)	OCS-A 0498, 2016	COP
Atlantic Shores Offshore Wind	New Jersey	10-20 mi (16-32 km)	183,353 (74,200)	OCS-A 0499, 2016	SAP
Equinor	New York	20 mi (32 km)	79,350 (32,112)	OCS-A 0512, 2017	COP
Avangrid Renewables	North Carolina	27 mi (43 km)	122,405 (49,536)	OCS-A 0508, 2017	SAP
Skipjack	Delaware	19 mi (31 km)	26,332 (10,656)	OCS-A 0519, 2018	COP

COP: Construction and Operations Plan, SAP: Site Assessment Plan
Source: (Bureau of Ocean Energy Management 2019)

BOEM grants rights-of-way allowing developers to build electricity transmission lines connecting commercial windfarms and other offshore renewable energy installations to the on-shore electrical grid. BOEM expects to receive additional unsolicited applications for right-of-way grants in the future, such as a 2018 application by PNE wind to lease an area totaling 40,920 ac. (16,560 hectares) near the New York Wind Energy Area (Bureau of Ocean Energy Management 2020d). Other offshore windfarm projects are expected in the coming years for both research and commercial development in state and federal waters.

3.5.6.2 Environmental Consequences to Renewable Energy

The predominant socioeconomic impact of the Proposed Action to renewable energy would be similar Coast Guard capabilities in the proposed action areas. Replacement of the existing inland tender fleet would facilitate the Coast Guard's ability to support missions in the riverine, nearshore, and offshore environments. Coast Guard missions that would benefit renewable energy include ATON, marine safety, and SAR. Coast Guard presence would ensure that due to ATON, marine safety, and SAR missions, mariners, including workers, would have support should an emergency[33] arise. More readily available Coast Guard support during an emergency and ensuring safe and navigable waters through the ATON mission are the principal benefits of the Proposed Action to renewable energy. Coast Guard would follow SOPs (Appendix B) to mitigate any potential impacts to renewable energy activities that may occur near WCC operations. As a result, there would be no significant impact to renewable energy as a result of the Proposed Action.

3.5.6.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to renewable energy as a result of Alternative 1.

3.5.6.2.2 Impacts Under Alternatives 2–3

Under Alternatives 2–3, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to renewable energy as a result of Alternatives 2–3.

3.5.6.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate the existing inland tender fleet and associated assets. As vessels are decommissioned and not replaced, Coast Guard's presence in the IW&WR could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the IW&WR could decrease. However, there would be no significant impact to renewable energy with implementation of the No Action Alternative.

[33] Emergencies are not a part of the Proposed Action.

3.5.7 Subsistence Fishing and Hunting

3.5.7.1 Affected Environment

In this document, the term subsistence refers to the take of animals locally for non-commercial purposes, in order to feed one's self, family, or community (Berkes 1990). It is difficult to monitor subsistence activities, as compared to commercial and recreational activities, because they tend to be diffuse, sporadic, and less dependent on established infrastructures associated with fishing and hunting practices (e.g., licenses, catch limits) (Schumann and Macinko 2007).

The adaptability of fishermen to switch gears and target species makes it difficult to differentiate between subsistence, traditional (artisanal), or advanced artisanal (semi-industrial) fishing (Salas et al. 2011). There are no particular criteria or thresholds, such as income level or frequency of fishing that define subsistence fishing. Depending on the country and regional jurisdiction, governmental bodies may manage subsistence practices (Salas et al. 2011). Survey-based studies indicate that in the United States, Native Americans, lower income urban populations, and Asian-Americans are more likely to be subsistence fishermen (Schumann and Macinko 2007). While much of the research supporting the limited policy and regulation of subsistence fishing in the United States is based on the practices of Native Alaskans, this research is not necessarily applicable to other communities (Schumann and Macinko 2007).

Fish and wildlife play a central role in the spiritual and cultural framework of Native American life. As such, treaties signed between tribes and the federal government explicitly guarantee hunting and fishing rights on land and in waters within and outside of the jurisdiction of reservations. Fishing areas that are located off-reservation are referred to as usual and accustomed fishing grounds. Small-scale, non-commercial fisheries, especially nearshore subsistence fisheries, have been recognized as fundamental for social, cultural, and food security reasons (Allison and Ellis 2001). A variety of fish are caught, mainly by hook and line from beaches, piers, and small boats that have been designed for use in nearshore waters (Pitchon and Norman 2012; Stevenson et al. 2012). It is assumed that the majority of subsistence fishing would occur in waters close to the coastline because these fishermen have limited means and opportunities to travel offshore (i.e., in waters beyond 3 nm) (Pitchon and Norman 2012; Stevenson et al. 2012). Subsistence fishing and hunting are likely to occur "often" from the coastline to 3 nm (Table 3-46), in the area where a WCC would operate within the SEAK proposed action area. Tribal usual and accustomed fishing grounds located in inshore waters (e.g., rivers and estuaries) which would not overlap with the SEAK proposed action area are not analyzed. Only tribal subsistence areas that occur in SEAK are addressed in this PEIS.

Alaskans generally place a high value on being able to hunt, fish, and live off the land. The Alaska Constitution guarantees equal access to fish, wildlife, and waters for all residents of the state. Traditionally, Alaska Natives hunted, fished, and lived off the land out of necessity. They, like other native communities, view subsistence hunting and gathering as a core value of their traditional cultures. Most subsistence activities are group activities that further core values of community, kinship, cooperation, and reciprocity. In Alaska, state and federal definitions of subsistence (and who is permitted to participate in the subsistence harvest) differ. The Alaska Department of Fish and Game (ADFG) defines subsistence fishing as "the taking of, fishing for, or possession of fish, shellfish or other fisheries resources by a resident of the State for subsistence uses [customary and traditional uses of fish]" (ADFG 2011). Current federal regulations define subsistence use as "the customary and traditional use by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools of transportation; for making and selling handicraft articles out of inedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade" (Federal Subsistence Management Program 2017). While the state definition makes subsistence harvesting available to all Alaska residents, federal land managers restrict the harvest to those whose primary residence is rural, and may restrict a particular harvest area to a specified community or group of communities. It should be noted that much of the state is defined as rural except for designated non-rural areas (Federal Subsistence Management Program 2017). Priority for subsistence harvesting in land management is expressed in the Alaska National Interest Lands Conservation Act, passed by Congress in 1980. However, since similar state legislation was struck down as violating the State Constitution, the Alaska National Interest Lands Conservation Act now only applies to federal lands. Some marine resources are subject to federal regulation. Subsistence hunting of marine mammals is governed by the MMPA, and is restricted to Alaska Natives who reside on the coast of the North Pacific Ocean or the Arctic Ocean. In addition, halibut may be harvested by residents of rural communities through the federal subsistence halibut program (Alaska Department of Fish and Game 2011).

Native communities along the Bering, Chukchi, and Beaufort Seas subsist largely on fish, land mammals, and marine mammals. The top species that are harvested as subsistence foods include marine mammals such as ringed seals, bearded seals, walruses, beluga, polar bear, and bowhead whales; fish such as Dolly Varden, Arctic char, sheefish, cod, whitefish, salmon, herring, and halibut. Statewide, most of the subsistence food is fish (about 53 percent by weight). Marine mammals comprise 14.2 percent and shellfish comprise 3.2 percent of subsistence food. In total, subsistence harvest represents 0.9 percent of the fish and game harvested annually in the state of Alaska (while 98.5 percent is taken as part of commercial fishing) (Fall 2016). According to the Alaska Department of Fish and Game (ADFG), 4 percent of Alaska's population (by area) reside in rural southeast Alaska. While only 48 percent harvest game, 80 percent harvest fish. However, if a family is not able to harvest game or fish themselves, they may still utilize the resources (harvest by someone else). As a result, 79 percent of households report using game and 95 percent of households report using fish (ADFG 2011). The residents of rural southeast Alaska 186 pounds of wild food per person per year.

The region of southeast Alaska covers the area from Yakutat Bay in the north to Dixon Entrance in the south. This area is the traditional homeland of three native groups—the Tlingit, Haida, and Tsimshian (Haynes and Wolfe 1999). Surveys compiled by Native residents state that seals and sea lions are also harvested in the SEAK proposed action area (Haynes and Wolfe 1999). For fish harvest in southeast Alaska, the Federal Subsistence Board has recognized traditional use of salmon, Dolly Varden, rainbow/steelhead trout, and eulachon (Brock and Coiley-Kenner 2009). Residents of Hoonah, Sitka, and Kake (in or near the SEAK proposed action area) report harvesting sockeye salmon, coho salmon, chinook salmon, pink salmon, and herring in many coves and inlets in the marine waters of southeast Alaska (Brock and Coiley-Kenner 2009).

3.5.7.2 Environmental Consequences to Subsistence Fishing and Hunting

The predominant socioeconomic impact of the Proposed Action to subsistence fishing and hunting would be similar Coast Guard capabilities in the proposed action areas. Replacement of the existing inland tender fleet would facilitate the Coast Guard's ability to support missions in the riverine, nearshore, and offshore environments. Coast Guard missions that would benefit subsistence fishing and hunting include ATON, law enforcement, living marine resources, marine safety, and SAR. Coast Guard presence would ensure that due to ATON, marine safety, and SAR missions, mariners, including subsistence fishermen, would have support should an emergency[34] arise. More readily available Coast Guard support during an emergency on the water and ensuring safe and navigable waters through the ATON mission are the principal benefits of the Proposed Action to subsistence fishing and hunting.

Conversely, potential negative impacts to subsistence fishing and hunting would be indirect impacts to fish and marine mammals from vessel noise, pile driving noise, vessel movement, bottom devices, ATON retrieval devices, and pile driving associated with the Proposed Action. As discussed in Section 3.4.6.2 and Section 3.4.11, there would be no significant impact to fish or marine mammals as a result of the Proposed Action. Coast Guard would follow SOPs (Appendix B) to mitigate potential impacts to subsistence fishing and hunting activities that may occur near WCC operations.

3.5.7.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to subsistence fishing and hunting as a result of Alternative 1.

3.5.7.2.2 Impacts Under Alternatives 2–3

Under Alternatives 2–3, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to subsistence fishing and hunting as a result of Alternatives 2–3.

3.5.7.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate the existing inland tender fleet associated assets. As vessels are decommissioned and not replaced, Coast Guard's presence in the IW&WR could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the IW&WR could decrease. However, there would be no significant impact to subsistence fishing and hunting with implementation of the No Action Alternative.

3.5.8 Transportation and Shipping

3.5.8.1 Affected Environment

A wide variety of vessels transit through the proposed action areas, such as container ships bringing components and finished products to markets; tankers and dry bulk vessels bringing ore, oil, gas, and more to and from their points of production; fishing vessels; passenger and tourism vessels; and research vessels. The WCCs support continued shipping and transportation by maintaining ATONs to ensure safe navigability into and between ports.

Table 3-67 provides information on the marine transportation sector within each proposed action area. Ferries transport persons and products for recreational, transit, and commercial purposes. Table 3-67 presents data on the number of registered ferry ports within each proposed action area. Additionally, the table provides ENOW data compiled by NOAA's Office for Coastal Management (2020) on the

[34] Emergencies are not a part of the Proposed Action.

economic impact of the coastal marine transportation sector (similarly compiled data for inland waterways is not available).

Table 3-67. Economic Impact of Marine Transportation by Proposed Action Area

Proposed Action Area	*Number of Registered U.S. Ferry Ports[1]*	*Number of Jobs Attributed to Marine Transportation[2]*	*Amount of GDP Attributed to Marine Transportation[2]*
USEC-MidATL	68	74,581	8,026,766,042
USEC-South	41	72,717	8,887,687,865
Great Lakes[3]	6	43,791	3,901,344,430
GoMEX and Mississippi River	64	54,924	6,635,296,991
PNW[4]	4	2,914	235,318,603
SEAK	12	41	6,136,140

[1]As compiled by the U.S. Department of Transportation (2018).

[2] Job statistics account for the number of people employed by business establishments, including part-time and seasonal workers. GDP is based on the value of goods and services that were produced in 2017 (NOAA Office for Coastal Management 2020).

[3] Due to the importance of the Soo Locke and the surrounding area for transit between Lakes Huron, Superior, and Michigan, all data bordering on these three Great Lakes is included even though the WCCs would be operating only within the vicinity of the Soo Locke and the waterways between Lake Huron and Lake Michigan. This includes data from the states of Illinois, Indiana, Michigan, and Wisconsin. Ferry data is limited to ferry ports operating within Chippewa County because some ferries operate within a single lake and would therefore not be affected by the WCCs servicing ATONs within the proposed action area.

[4] In order to focus on socioeconomic data within the area that would be attended by WCCs, ENOW data for Washington and Oregon counties outside of the PNW proposed action area were excluded. Remaining data was available only for Multnomah County, Oregon.

Table 3-68 provides information on the major commercial shipping ports located close to the existing inland tender fleet homeports. For this PEIS, major commercial shipping ports are defined as the top 25 ranked U.S. ports for each reported category (tonnage, containers, and dry bulk) in 2018 as reported by the U.S. Department of Transportation Bureau of Transportation Statistics (BTS) (2020). For inland ports, a port is considered close to an existing inland tender's homeport if it is on the same inland waterway as a homeport. For coastal ports, all major shipping ports located within the proposed action areas are included. Table 3-68 provides information on each port's involvement in commercial shipping, the cruise industry, and overall economic impact. The only commercial shipping port that is in the BTS top 25 ranked ports in Alaska is the Port of Anchorage, which is not within the SEAK proposed action area, so this proposed action area is not represented in Table 3-68.

The existing inland tender in Sault Ste Marie, Michigan services ATON in the Great Lakes. Access between Lake Superior and Lake Huron is achieved through Soo Locke in Sault Ste Marie. A total of 70,709,167 short tons of commercial cargo passed through Soo Locke into or out of Lake Superior in 2018 (Sault Area Chamber of Commerce 2019). The WCCs also would service the ATON in the waterways that provide access to Lake Michigan, so ports within Lake Michigan are included.

Table 3-68. Major Ports Close to Existing Inland Tender Homeports

Port	*Location*	*Closest WCC Homeport*	*2018 Total Tonnage Throughput (short tons)*[1]	*2018 Top 25 Ranked Port for Tonnage, Containers, or Dry Bulk?*	*Cruise Ship Port?*	*Notes on Port Economics*
USEC-MidATL Proposed Action Area						
Port of Philadelphia	Philadelphia, PA	Baltimore, MD	26,656,373	Tonnage, Containers	No	As of 2019, annual port revenue was $5.7 million, and the port directly supported over 3,000 jobs (Philadelphia Regional Port Authority 2019).
Port of Wilmington	Wilmington, DE	Baltimore, MD	6,603,444	Containers	No	As of 2020, this port annually produces $436 million in business revenue and supports 5,900 jobs (direct, indirect, induced)[2] (GT USA Wilmington 2020).
Port of Baltimore	Baltimore, MD	Baltimore, MD	44,778,259	Tonnage, Containers, Dry Bulk	Yes	In 2017, the port generated $2.6 billion in business revenues; generated $395 million in state, county, and municipal tax revenues; and supported over 37,000 jobs (direct, indirect, induced) (Martin Associates 2018a).
Port of Virginia	Portsmouth, VA	Portsmouth, VA	71,774,349	Tonnage, Containers, Dry Bulk	Yes	In 2018, the port had $92.1 billion in output sales, $39.3 billion in Virginia gross state product, and supported approximately 397,000 full- and part-time jobs (Pearson and Swan 2019).
Port of Wilmington	Wilmington, NC	Oak Island, NC	6,039,927	Containers	No	In fiscal year 2018, the port supported $12.9 million in gross revenue for North Carolina businesses and contributed to over 78,000 jobs (Head et al. 2018).
USEC-South Proposed Action Area						
Port of Charleston	Charleston, SC	Charleston, SC	24,822,636	Containers	Yes	The combined total economic impact of the ports of Charleston and Georgetown in 2018 was approximately $63.4 billion, and the two ports supported over 19,000 jobs (direct, indirect, induced) (Von Nessen 2019).

Port	*Location*	*Closest WCC Homeport*	*2018 Total Tonnage Throughput (short tons)*[1]	*2018 Top 25 Ranked Port for Tonnage, Containers, or Dry Bulk?*	*Cruise Ship Port?*	*Notes on Port Economics*
Port of Savannah	Savannah, GA	Charleston, SC	41,273,947	Tonnage, Containers	No	In fiscal year 2017, this port generated an economic output of $4.3 million and supported over 33,000 jobs (direct, indirect, induced) (Humphreys 2018).
Port of Jacksonville	Jacksonville, FL	Mayport, FL	17,999,036	Containers	Yes	In 2018, cargo activity at the port created $27 billion of total economic output, and port activities supported over 26,000 jobs (direct, indirect, induced) (Martin Associates 2019).
Port of Palm Beach	Riviera Beach, FL	Miami Beach, FL	2,094,734	Containers	Yes	In 2018, the cruise and cargo sectors of the port, combined, generated over $250 million in revenue and supported over 2,900 jobs (Port of Palm Beach 2019).
Port Everglades	Fort Lauderdale, FL	Miami Beach, FL	25,022,351	Containers	Yes	In fiscal year 2019, the port's total value of economic activity was over $32 million, and that activity supported over 219,000 jobs (direct, indirect, induced, related[3]) (Broward County Port Everglades Department 2019).
Port of Miami	Miami Beach, FL	Miami Beach, FL	8,371,129	Containers	Yes	In fiscal year 2018, the port supported over $43 billion in economic activity for the state and impacted over 334,000 jobs (direct, indirect, induced, related) (PortMiami 2018).
Port Tampa Bay	Tampa, FL	St. Petersburg, FL	31,006,487	Tonnage, Dry Bulk	Yes	In fiscal year 2015, the port's total economic activity was valued at $15.6 million and supported over 85,000 jobs (direct, indirect, induced, related) (Martin Associates 2016b).

Port	*Location*	*Closest WCC Homeport*	*2018 Total Tonnage Throughput (short tons)[1]*	*2018 Top 25 Ranked Port for Tonnage, Containers, or Dry Bulk?*	*Cruise Ship Port?*	*Notes on Port Economics*
Great Lakes Proposed Action Area						
Port of Two Harbors	Two Harbors, MN	Sault Ste Marie, MI	17,208,207	Dry Bulk	No	Commercial shipping at the port is 100% iron ore export (U.S. Department of Transportation 2020), and it is one of four ports in the Duluth area that combined generated $1.27 billion in annual revenue and supported over 6,000 jobs in 2013 (Great Lakes Seaway Public Affairs Corporation 2013).
Port of Duluth-Superior	Duluth, MN	Sault Ste Marie, MI	35,102,200	Tonnage, Dry Bulk	No	In 2017, total business generated by the port was $1.4 billion. The port generated over $180,000 in federal tax revenues, and it supported over 7,800 jobs (direct, indirect, induced) (Martin Associates 2018b).
GoMEX and Mississippi River Proposed Action Area[4]						
Port of Corpus Christi	Corpus Christi, TX	Corpus Christi, TX	93,751,006	Tonnage	No	In 2018, the port had $45.6 million in net income, supporting $150 billion in total U.S. economic activity (Port Corpus Christi 2019).
Port Houston	Houston, TX	Galveston, TX	269,003,164	Tonnage, Containers, Dry Bulk	No	In 2018, the port supported over 3.2 million jobs, $801.9 billion in economic value, and $38.1 billion in tax revenue nationally (Port Houston 2020).
Port of Texas City	Texas City, TX	Galveston, TX	42,727,582	Tonnage	No	The third largest of the top 12 port districts in Texas (World Port Source 2020), which combined generated over 5 million jobs and over $1.1 million in economic impact in 2015 (Martin Associates 2016a). Independent data on this port is not available.

Port	*Location*	*Closest WCC Homeport*	*2018 Total Tonnage Throughput (short tons)*[1]	*2018 Top 25 Ranked Port for Tonnage, Containers, or Dry Bulk?*	*Cruise Ship Port?*	*Notes on Port Economics*
Port of Port Arthur	Port Arthur, TX	Galveston, TX	39,851,706	Tonnage	No	One of the top 12 port districts in the state, which combined generated over 5 million jobs and over $1.1 million in economic impact in 2015 (Martin Associates 2016a). Independent data on this port is not available.
Port of Beaumont	Beaumont, TX	Galveston, TX	100,468,257	Tonnage	No	As of 2020, this port boasts $24.5 billion in economic impact annually and supports 67,000 jobs (direct, indirect, induced) (Port of Beaumont 2020).
Port of Lake Charles	Lake Charles, LA	Morgan City, LA	57,064,647	Tonnage	No	The port's net revenue in 2018 was $4.7 million (Lake Charles Harbor and Terminal District 2019).
Port of Gulfport	Gulfport, MS	New Orleans, LA & Mobile, AL (mid-way)	2,052,691	Containers	No	Total operating revenue for fiscal year 2019 was $28.2 million (Alexander 2019).
Port of Pascagoula	Pascagoula, MS	Mobile, AL	27,358,043	Tonnage	No	According to a 2004 study, the port is responsible for 19,370 direct jobs, $902 million in personal income, and $50 million in state tax revenue (Jackson County Port Authority 2020).
Port of Mobile	Mobile, AL	Mobile, AL	58,726,003	Tonnage, Containers, Dry Bulk	Yes	As of 2020, the port has a total economic value of $22.4 billion and supports over 134,000 jobs (direct, indirect) (Alabama State Port Authority 2020).
Port of Plaquemines	Belle Chasse, LA	New Orleans, LA	56,850,137	Tonnage, Dry Bulk	No	In 2014, the port had an annual revenue of over $5.4 million and employed 40 people (Port Plaquemines 2020).

Port	*Location*	*Closest WCC Homeport*	*2018 Total Tonnage Throughput (short tons)*[1]	*2018 Top 25 Ranked Port for Tonnage, Containers, or Dry Bulk?*	*Cruise Ship Port?*	*Notes on Port Economics*
Port of New Orleans	New Orleans, LA	New Orleans, LA	93,332,543	Tonnage, Containers, Dry Bulk	Yes	Total operating revenue for fiscal year 2018 was $78.3 million (Wendel 2019).
Port of South Louisiana	Laplace, LA	New Orleans, LA	275,557,702	Tonnage, Dry Bulk	No	In 2013, the port supported over 83,000 jobs throughout the region and generated over $310 million in tax revenue (Loren C. Scott & Associates 2015).
Port of Greater Baton Rouge	Baton Rouge, LA	New Orleans, LA	82,234,811	Tonnage, Dry Bulk	Yes	In 2018, port operating revenues were over $15 million (Hardman et al. 2019).
Port of Metropolitan St. Louis	Saint Louis, MO	Saint Louis, MO	37,426,710	Tonnage, Dry Bulk	Yes	As the third largest inland U.S. port, this port district spans 70 miles and includes both sides of the Mississippi River (Cambridge Systematics and Hanson Professional Services 2018). Specific data on the economic impact of this port is not available.
Port of Chicago	Chicago, IL	East Peoria, IL	16,866,792	Dry Bulk	Yes	The Illinois International Port District total revenue for 2018 was over $4.5 million (Baker Tilly Virchow Krause 2019).
Port of Indiana – Burns Harbor	East Chicago, IN	East Peoria, IL	11,910,541	Dry Bulk	No	In 2014, the port at Burns Harbor supported over 39,000 jobs (direct, indirect, induced, related), and total economic activity was valued at $4.8 million (Martin Associates 2015).
Ports of Cincinnati-Northern Kentucky	Multiple locations	Owensboro, KY	38,534,187	Tonnage, Dry Bulk	Yes	In 2011, cargo activity at the Port of Cincinnati supported over 6,000 jobs (direct, indirect, induced, related) and generated over $45 million in state and local taxes (Associates 2013).
Port of Huntington Tri-State	Multiple locations	Owensboro, KY	34,245,342	Tonnage, Dry Bulk	No	As the largest inland U.S. port, this port moved cargo estimated to be worth $5.3 billion in 2016 (CDM Smith 2018).

Port	*Location*	*Closest WCC Homeport*	*2018 Total Tonnage Throughput (short tons)*[1]	*2018 Top 25 Ranked Port for Tonnage, Containers, or Dry Bulk?*	*Cruise Ship Port?*	*Notes on Port Economics*
Port of Pittsburgh	Pittsburgh, PA	Sewickley, PA	21,567,015	Dry Bulk	Yes	This port is the second busiest inland U.S. port. As of 2020, the Ports of Pittsburgh, Philadelphia, and Erie, combined, have an economic benefit to Pennsylvania of nearly $50 billion per year (Pennsylvania Department of Community and Economic Development 2020).
PNW Proposed Action Area						
Port of Longview	Longview, WA	Portland, OR	13,738,906	Dry Bulk	No	In 2018, the port had $2.8 billion in total economic activity ($678 million towards the local business economy), and port-related activity was responsible for 11 percent of employment in Cowlitz County (Port of Longview 2020).
Port of Kalama	Kalama, WA	Portland, OR	15,796,458	Dry Bulk	No	In 2017, total operating revenue was $14.6 million, and port-related businesses employed 1,024 people (Port of Kalama 2020).
Port of Portland	Portland, OR	Portland, OR	23,267,941	Dry Bulk	Yes	As of 2020, this port generates $6.4 billion a year in economic value to the Portland area, including 27,000 local jobs (Port of Portland 2020).

[1] As reported by the U.S. Department of Transportation Bureau of Transportation Statistics (2020).

[2] Direct jobs are those generated by cargo and vessel activity at a port (e.g., cargo handling or truckers). Indirect jobs are those supported by the business purchases of the employers who create the direct jobs (e.g., utilities, office suppliers, or repair services). Induced jobs are those supported by the local purchases of goods and services by direct employees (e.g., sales clerks, restauranteurs, or teachers) (Martin Associates 2018a).

[3] Related jobs are those with shippers and consignees (exporters and importers) using the marine terminals for shipment and receipt of cargo (Martin Associates 2016b).

[4] Overall, the IW&WR marine transportation system within this proposed action area accounts for $5.4 trillion of economic activity annually and sustains more than 30 million jobs (U.S. Coast Guard 2019b).

3.5.8.2 Environmental Consequences to Transportation and Shipping

The predominant socioeconomic impact of the Proposed Action to transportation and shipping would be similar Coast Guard capabilities in the proposed action areas. Replacement of the existing inland tender fleet would facilitate the Coast Guard's ability to support missions in the riverine, nearshore, and offshore environments. Coast Guard missions that would benefit transportation and shipping include ATON; marine safety; ports, waterways, and coastal security; and SAR. Coast Guard presence would ensure that due to ATON, marine safety, and SAR missions, mariners, including those on shipping or passenger and cruise vessels, would have support should an emergency[35] arise. More readily available Coast Guard support during an emergency and ensuring safe and navigable waters through the ATON mission are the principal benefits of the Proposed Action to transportation and shipping. Coast Guard would follow SOPs (Appendix B) to mitigate any potential impacts to transportation and shipping activities that may occur near WCC operations. As a result, there would be no significant impact to transportation and shipping as a result of the Proposed Action.

3.5.8.2.1 Impacts Under Alternative 1 (Preferred Alternative)

Under Alternative 1, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to transportation and shipping extraction as a result of Alternative 1.

3.5.8.2.2 Impacts Under Alternatives 2–3

Under Alternatives 2–3, the socioeconomic impact of the WCCs would be considered negligible as the Coast Guard's continued presence would be beneficial, and any potential negative impacts caused by the Coast Guard's operations would be mitigated by the implementation of SOPs (Appendix B). Therefore, there would be no significant impact to transportation and shipping extraction as a result of Alternatives 2–3.

3.5.8.2.3 Impacts Under the No Action Alternative

Under the No Action Alternative, the Coast Guard would only operate the existing inland tender fleet and associated assets. As vessels are decommissioned and not replaced, Coast Guard's presence in the IW&WR could decrease. Therefore, baseline conditions of the existing environment would either remain unchanged or slightly improve due to the reduction in Coast Guard presence in the proposed action areas, but any benefits of having Coast Guard presence in the IW&WR could decrease. However, there would be no significant impact to transportation and shipping with implementation of the No Action Alternative.

3.5.9 Summary of Impacts to the Socioeconomic Environment

Impacts to the socioeconomic environment were analyzed for activities associated with the Proposed Action, primarily from a continued Coast Guard presence in the proposed action areas. The analysis for socioeconomic resources under Alternative 1 and Alternatives 2–3 are detailed in Table 3-69. No significant impacts to the socioeconomic environment would occur with implementation of the No Action Alternative.

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[35] Emergencies are not a part of the Proposed Action.

Table 3-69. Impacts to the Socioeconomic Environment

Socioeconomic Resource	***Impacts as a Result of Alternative 1***	***Impacts as a Result of Alternatives 2-3***	***Detailed Section***
Commercial Fishing	No significant impact	No significant impact	Section 3.5.1
Coastal Marine Construction	No significant impact	No significant impact	Section 3.5.2
Mineral Extraction	No significant impact	No significant impact	Section 3.5.3
Oil and Gas Extraction	No significant impact	No significant impact	Section 3.5.4
Recreation and Tourism	No significant impact	No significant impact	Section 3.5.5
Renewable Energy	No significant impact	No significant impact	Section 3.5.6
Subsistence and Hunting	No significant impact	No significant impact	Section 3.5.7
Transportation and Shipping	No significant impact	No significant impact	Section 3.5.8

CHAPTER 4 Consultation and Coordination Process

This section documents how the Coast Guard consulted with government, public, and individual interests during preparation of the PEIS. The principal emphasis of this section is a summary of the public comments that were received on the Draft PEIS and our responses to those comments. Other types of information included in this section are:

- results of any consultation with the appropriate Federal Agencies about the possible impacts of the proposal on endangered or threatened plant or animal species
- descriptions of the public participation process, including the details of scoping meetings and public hearings
- listings of the persons or groups that were provided copies of the PEIS

4.1.1 Consultation Process

The Coast Guard completed an ESA Section 7 and Essential Fish Habitat consultation with NMFS on U.S. Coast Guard Federal Aids to Navigation Program, finalized on April 19, 2018. Any information provided in this PEIS includes WCC support of ATONs, only as it pertains to the Proposed Action and any determination provided herein is consistent with the findings in the NMFS Biological Opinion. Any determinations provided in this PEIS for species not included in the NMFS Biological Opinion or for those species that are under the jurisdiction of the USFWS, should be considered preliminary, until the consultation process with the Regulatory Agencies is complete. Pursuant to Section 7 of the ESA, the Coast Guard has made “may affect” determinations consistent with the NMFS 2018 Biological Opinion for those species under NMFS’ and preliminary determinations for those species under the USFWS’ jurisdiction (Table 3-45)

Placeholder: *This section is incomplete because the Coast Guard has not completed all consultations. Consultations would be completed before issuance of the Final PEIS.*

CHAPTER 5 Conclusions

In accordance with 40 CFR § 1052.12, this chapter summarizes the major conclusions of this document. The Proposed Action supports the Coast Guard's acquisition and operation of a planned 30 WCCs with design service lives of 30 years each. This would provide the Coast Guard with a reliable and operationally available presence to accomplish assigned ATON missions and provide consistent and reliable presence in the IW&WR.

This PEIS is consistent with the requirements of NEPA (42 U.S.C. 4321), CEQ regulations for implementing NEPA (40 CFR Part 1500); DHS Directive Number 023-01, Rev 01 and DHS Instruction Manual 023-01-001-01, Rev 01; and Coast Guard Commandant Instruction 5090.1. The Coast Guard will issue a Record of Decision once the Final PEIS/POEIS has been made publicly available for at least 30 days. Scoping for preparation of the Draft PEIS and public commenting on the Draft PEIS were used to obtain input from stakeholders, including individuals, public interest organizations, governmental agencies, and tribes. This input was used to develop the alternatives and issues analyzed in this PEIS. On the basis of the analyses in this PEIS, the types of impacts that could occur during routine operations and training activities would be similar among the action alternatives. The alternatives principally differ on the basis of vessel acquisition.

CHAPTER 6 List of Preparers

Name	*Qualifications*
U.S. Navy	
Monica DeAngelis	M.S. in Biology. 27 years marine mammal research; 21 years environmental planning experience.
Erin Oliveira	B.S. in Marine Biology. 4 years environmental research experience; 10 years environmental planning experience.
McLaughlin Research Corporation	
Jessica Greene	B.S. in Environmental Science and Management. 6 years experience in Geographic Information System data and maps.
David Loiselle	M.S. in Environmental Science and Management. 2 years environmental planning experience.

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APPENDIX A APPLICABLE LAWS AND POLICIES

This appendix is a summary of the federal, tribal, state, and local statutes and regulations that are potentially applicable to the Proposed Action and Alternatives presented in this PEIS. This list includes statutes and regulations that have been followed and require no further action, as well as those for which permits or authorizations have been, or may be at a future date, requested. Given the period between document preparation and when the WCC fleet would be operational, the Coast Guard acknowledges that updates to the information provided in this PEIS may be necessary and would therefore follow appropriate processes to ensure compliance. With the exception of NEPA, which is presented first and second, respectively, the other applicable laws are presented in alphabetical order.

A.1. National Environmental Policy Act

NEPA (42 U.S.C. §§ 4321 et seq.) was enacted to provide for the consideration of environmental factors in federal agency planning and decision-making. Federal agencies implement NEPA through CEQ regulations as well as agency-specific regulations and guidance. A Notice of Intent was prepared and published on April 19, 2021 to engage the public and initiate the scoping process. Scoping is an early and open NEPA process to determine how the lead federal agency will analyze the potential impacts of a Proposed Action to the human environment, which includes the physical, biological, and socioeconomic resources. This process assisted in identifying and defining issues pertaining to a set of reasonable alternatives regarding the Proposed Action.

A.2. Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C §§ 668-668d) was enacted in 1940 and prohibits anyone, without a permit issued by the Secretary of the Interior, from “taking” bald or golden eagles, including their parts, nests, or eggs and provides criminal penalties for such acts. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." "Disturb" means: “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, 1) injury to an eagle, 2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior." In accordance with the Bald and Golden Eagle Act, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS evaluates the likelihood that the Proposed Action would cause take of bald or golden eagles.

A.3. Clean Air Act and General Conformity Rule

The purpose of the CAA (42 U.S.C. §§ 7401–7671q) is to protect public health and welfare by the control of air pollution at its source and set forth primary and secondary NAAQS to establish criteria for states to attain, or maintain, these minimum standards (Appendix F). Non-criteria air pollutants that can affect human health are categorized as hazardous air pollutants under section 112 of the CAA. The U.S. EPA identified 189 hazardous air pollutants such as benzene, perchloroethylene, and methylene chloride. Section 176(c)(1) of the CAA, commonly known as the General Conformity Rule, requires federal agencies to ensure that their actions conform to applicable SIP for achieving and maintaining the NAAQS for criteria pollutants and their precursors. In accordance with the CAA, applicable regulations, and the DHS and Coast Guard instructions and directives, this PEIS evaluates the potential for significant impact from the Proposed Action to air quality.

The criteria pollutants, which are the principal pollutants defining the air quality, include CO, SO_2, NO_2, O_3, suspended PM less than or equal to 10 microns in diameter, fine PM less than or equal to 2.5 microns in diameter, and Pb. CO, SO_2, Pb, and some particulates are emitted directly into the atmosphere from emissions sources. O_3, NO_2, and some particulates are formed through atmospheric chemical reactions that are influenced by weather, ultraviolet light, and other atmospheric processes. NAAQS are classified as primary or secondary. Primary standards protect against adverse health effects; secondary standards protect against welfare effects (e.g., damage to farm crops and vegetation and damage to buildings). Some pollutants have long- and short-term standards. Long-term standards were established to protect against chronic health effects while short-term standards are designed to protect against short-term health effects. Areas that are and have historically been in compliance with the NAAQS are designated as attainment areas. Areas that violate federal air quality standards are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment. The CAA requires states to develop a general plan to attain and maintain the NAAQS in all areas of the country and a specific plan (i.e., a SIP) to attain the standards for each area designated as nonattainment for NAAQS. These SIPs are developed by state and local air quality management agencies and submitted to the EPA for approval. If a state fails to submit a SIP or the SIP does not fully comply with the NAAQS, the state must adhere to the EPA's Federal Implementation Plan.

In 1993, the EPA developed the General Conformity Rule, which specifies how federal agencies must determine CAA conformity for sources of nonattainment pollutants in designated nonattainment and maintenance areas. The EPA General Conformity Rule is used to determine if federal actions meet the requirements of the SIP, by ensuring that air emissions related to the action do not (1) cause or contribute to violations of the NAAQS, (2) increase the frequency or severity of an existing violation of the NAAQS, or (3) delay the attainment of the NAAQS. The General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emissions thresholds that trigger requirements for a conformity analysis are called *de minimis* levels, which, in tons per year, vary by pollutant and also depend on the severity of the nonattainment status for the air quality management area in question. In other words, areas with a more severe nonattainment status will have lower thresholds for additional pollutants than areas with a less severe nonattainment status.

Through the Conformity Determination process specified in the final rule, any federal agency must analyze increases in pollutant emissions directly or indirectly attributable to a proposed action. There are two main components to the overall process: an applicability analysis to determine whether a conformity determination is required and, if it is, a conformity determination to demonstrate that the action conforms to the SIP. A conformity applicability analysis quantifies applicable direct and indirect emissions that are projected to result due to implementation of the federal action. Indirect emissions are those emissions caused by the federal action and originating in the region of interest, but which can occur later or in a different location from the action itself and are reasonably foreseeable. The federal agency can control and will maintain control over the indirect action due to a continuing program responsibility of the federal agency. Reasonably foreseeable emissions are projected future direct and indirect emissions that are identified at the time the conformity evaluation is performed. The location of such emissions is known and the emissions are quantifiable, as described and documented by the federal agency based on its own information and after reviewing any information presented to the federal agency.

The results of the applicability analysis may find that (1) the action is not subject to the General Conformity Rule, (2) the action is subject to the rule, but a conformity determination is not required, or (3) a conformity determination is required. If the results of the applicability analysis indicate that the total emissions would not exceed the *de minimis* emissions thresholds, then a conformity determination is not required and a Record of Non-Applicability must be prepared.

A.4. Clean Water Act

The Clean Water Act (CWA; 33 U.S.C §§ 1251 *et seq*.) regulates the discharge of pollutants into the surface waters of the United States, including lakes, rivers, streams, wetlands, and coastal areas. The CWA uses a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the physical, chemical, and biological integrity of the nation's waters so that they can support "the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water." These types of pollution are also discussed in MARPOL, Section A.14.

The Oil Pollution Act (OPA) of 1990 (33 U.S.C. §§ 2701-2761) amended the CWA and addressed the wide range of problems associated with preventing, responding to, and paying for oil pollution incidents in navigable waters of the U.S. It created a comprehensive prevention, response, liability, and compensation regime to deal with vessel and facility oil spills. OPA greatly increased federal oversight of maritime oil transportation, while providing greater environmental safeguards. The Oil Spill Liability Trust Fund administration was delegated to the Coast Guard by Executive Order. In accordance with the CWA, applicable regulations, and the DHS and Coast Guard instructions and directives, this PEIS evaluates the potential for significant impact from the Proposed Action to surface waters.

The Clean Water Act requires the EPA to develop criteria for surface water quality that accurately reflects the latest scientific knowledge on the impacts of pollutants on human health and the environment. These criteria, which are guidelines, are provided below:

- aquatic life criteria, which is based on how much of a chemical can be present in surface water before it is likely to harm plant or animal life, protecting freshwater and marine organisms from short-term and long term exposure;
- biological criteria, which indicates how healthy water bodies are based on how many and what kinds of organisms are present;
- human health criteria, which details how much of a specific chemical can be present in surface water before it is likely to harm human health; and
- microbial/recreational criteria, which determines when water is safe for recreational activities such as swimming.

A.5. Coastal Zone Management Act

The Coastal Zone Management Act (CZMA; 16 U.S.C §§ 1451 *et seq.*) was enacted to protect the coastal environment from demands associated with residential, recreational, and commercial uses. The CZMA provisions encourage states to develop coastal management programs for managing and balancing competing uses of the coastal zone. Each state, in order to receive federal approval, is required to define the boundaries of the coastal zone and to identify uses of the area to be regulated by the state, the mechanism for controlling such uses, and broad guidelines for priorities of uses within the coastal zone. In accordance with the CZMA, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS evaluates the potential for significant impact from the Proposed Action. A federal agency must determine the impact of the Proposed Action and provide a Coastal Consistency Determination or Negative Determination to the appropriate state agency for anticipated concurrence once the homeports are selected for the WCCs.

A.6. The Convention on International Trade in Endangered Species of Wild Fauna and Flora

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement between governments. It aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival. CITES is a voluntary international agreement. Participating countries agree to implement CITES; however, it does not take the place of national laws. Rather, it provides a framework to be respected by each country, which has to adopt its own domestic legislation to ensure implementation at the national level. In accordance with CITES, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS evaluates the potential for significant impact from the Proposed Action.

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 biological opinion that determines whether the federal agency action will jeopardize listed species or adversely modify or destroy critical habitat. An incidental take statement is also included in every biological opinion where take is anticipated. This incidental take statement allows the Proposed Action to occur without being subject to penalties under the ESA.

A.8. Executive Order 12898 (Environmental Justice)

EO 12898 (59 FR 7629 ; February 11, 1994) directs federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority populations and low-income populations, with the goal of environmental protection for all communities. Federal agencies must develop a strategy for implementing environmental justice and promote non-discrimination in federal programs that affect human health and the environment, as well as provide minority and low-income communities access to public information and public participation. In accordance with EO 12898, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS evaluates the potential for significant impact from the Proposed Action.

A.9. Executive Order 13089 (U.S. Coral Reef Ecosystem)

EO 13089 (63 FR 32701; June 16, 1998) is aimed at preserving and protection the biodiversity, health, heritage, and social and economic value of U.S. coral reef ecosystems. These coral reef ecosystems include all "species, habitats, and other natural resources associated with coral reefs in all maritime areas and zones subject to the jurisdiction or control of the United States. (e.g., federal, state, territorial, or commonwealth waters)." Federal agencies whose actions affect U.S. coral reef ecosystems (i.e., pollution and sedimentation) are required to implement measures that would reduce negative impacts. In accordance with EO 13089, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS evaluates the potential for significant impact from the Proposed Action.

A.10. Executive Order 13158 (Marine Protected Areas)

EO 13158 (65 FR 34909; May 26, 2000) was authorized in May 2000 to protect special natural and cultural resources by strengthening and expanding the nation's system of marine protected areas. The purpose of the order is to (1) strengthen the management, protection, and conservation of existing marine protected areas and establish new or expanded marine protected areas; (2) develop a scientifically-based, comprehensive national system of marine protected areas representing diverse U.S. marine ecosystems and the nation's natural and cultural resources; and (3) avoid causing harm to marine protected areas through federally conducted, approved, or funded activities. In accordance with EO 13158, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS evaluates the potential for significant impact from the Proposed Action.

A.11. Executive Order 13840 (Ocean Policy to Advance the Economic, Security, and Environmental Interests of the United States)

On June 19, 2018, President Trump signed EO 13840. The EO is intended to advance the economic, security, and environmental interests of the United States through improved public access to marine data and information, efficient federal agency coordination on ocean-related matters, and engagement with marine industries, the science and technology community, and other ocean stakeholders. The EO continues to require federal agencies to coordinate activities regarding ocean-related matters for effective management of the ocean as well as promote lawful use of the ocean by agencies, including the Armed forces. The Coast Guard continues to engage with regional and state ocean planning entities. This EO revokes and replaces EO 13547, Stewardship of the Ocean, Our Coasts, and the Great Lakes.

A.12. Executive Order 14008 (Tackling the Climate Crisis at Home and Abroad)

On January 27, 2021, President Biden signed EO 14008 (86 FR 7619; February 1, 2021). The EO is intended to put the climate crisis at the center of United States foreign policy and national security and to take a government-wide approach to the climate crisis. Methods for achieving these goals involve using the federal government's buying power and real property and asset management; securing environmental justice and spurring economic opportunity; and empowering workers—through rebuilding our infrastructure for a sustainable economy; by advancing conservation, agriculture, and reforestation; and through revitalizing energy communities.

A.13. Federal Insecticide, Fungicide, and Rodenticide Act

The Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. § 136 *et seq*.) provides for the federal regulation of pesticide distribution, sale, and use. All pesticides distributed or sold in the United States must be registered by becoming licensed by the EPA's Office of Chemical Safety and Pollution Prevention (OCSPP). Before the EPA can register a pesticide under FIFRA, the applicant must show, among other things, that using the pesticide according to specifications would "not generally cause unreasonable adverse effects on the environment." Any pesticides used in support of ATON brushing operations must be registered with the EPA. As such, Coast Guard policies limit the potential pesticides used to the products listed in the Self-Help Integrated Pest Management, Armed Forces Pest Management Board Technical Guide No. 42, which is available on the Armed Forces Pest Management Board website.

A.14. International Convention for the Prevention of Pollution from Ships

The International Convention for the Prevention of Pollution from Ships is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. The Convention, known as MARPOL 73/78, includes regulations aimed at preventing and minimizing pollution from ships—both accidental pollution and that from routine operations. MARPOL specifies standards for stowing, handling, shipping, and transferring pollutant cargoes, as well as standards for discharge of ship-generated operational wastes. Although the United States has not ratified all components of the Convention, equivalent regulations for the treatment and discharge standards of shipboard sewage exist in amendments of the CWA (Section A.4; the Federal Water Pollution Control Act implemented by 33 U.S.C. 1251 and 33 CFR 159). In accordance with MARPOL, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS evaluates the potential for significant impact from the Proposed Action.

A.15. International Maritime Organization

The International Maritime Organization (IMO) is a specialized agency of the United Nations responsible for improving the safety and security of international shipping and preventing pollution from ships. It is also involved in legal matters, including liability and compensation issues and the facilitation of international maritime traffic. The IMO concentrates on keeping legislation up to date and ensuring that it is ratified by as many countries as possible and ensuring that these conventions and other treaties are properly implemented by the countries that have accepted them. In accordance with the IMO, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS evaluates the potential for significant impact from the Proposed Action.

A.16. Magnuson-Stevens Fishery Conservation and Management Act

The MSA (16 U.S.C. Sections 1801–1882) enacted in 1976 and amended by the Sustainable Fisheries Act in 1996, mandates identification and conservation of EFH. EFH is defined as those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity (i.e., full life cycle). These waters include aquatic areas and their associated physical, chemical, and biological properties used by fish, and may include areas historically used by fish. Substrate types in areas of EFH include sediment, hard bottom, and associated biological communities. Federal agencies are required to consult with NMFS and to prepare an essential fish habitat assessment if potential adverse effects on EFH are anticipated from their activities. Any federal agency action that is authorized, funded, undertaken, or proposed to be undertaken that may affect fisheries is subject to the MSA. In addition, federal agencies shall consult with the Secretary of Commerce with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any EFH identified under the MSA. In accordance with the MSA, applicable regulations, and the DHS and Coast Guard instructions and directives, this PEIS evaluates the potential for significant impact from the Proposed Action.

A.17. Mandatory Reporting of Greenhouse Gases Rule

An increase in the atmospheric concentrations of GHGs produces a positive climate forcing, or warming effect, which contributes to climate change. The EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule on September 22, 2009. GHGs covered under the Final Mandatory Reporting of Greenhouse Gases Rule are CO_2, methane, nitrogen oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers. Each GHG is assigned a global warming potential, which is the ability of a gas or aerosol to trap heat in the atmosphere. The global warming potential rating system is standardized to CO_2, which has a value of one. The equivalent CO_2 (CO_2e) rate is calculated by multiplying the emissions of each GHG by its global warming potential and adding the results together to produce a single, combined emissions rate representing all GHGs. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of mobile sources and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions as CO_2e in metric tons are required to submit annual reports to the EPA. In general, only large industrial facilities trigger the EPA reporting requirements under the GHG Rule.

A.18. Marine Mammal Protection Act

The MMPA (16 U.S.C §§ 1361 *et seq.*) established, with limited exceptions, a moratorium on the "taking" of marine mammals in waters or on lands under U.S. jurisdiction, and on the High Seas by vessels or persons under U.S. jurisdiction. The MMPA further regulates "takes" of marine mammals in U.S. waters and by U.S. citizens on the High Seas. The term "take," as defined in Section 3 (16 U.S.C. § 1362) of the MMPA, means "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal". "Harassment" was further defined in the 1994 amendments to the MMPA as any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (i.e., Level A Harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (i.e., Level B Harassment).

The MMPA directs the Secretary of Commerce, as delegated to NMFS, and the Secretary of the Interior, as delegated to the USFWS, to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens or agencies who engage in a specified activity (other than commercial fishing) within a specified geographical region if NMFS or the USFWS finds that the taking will have a negligible impact on the species or stock(s), and will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant). The regulation must set forth the permissible methods of taking, other means of effecting the least practicable adverse impact on the species or stock and its habitat and on the availability of the species or stock for subsistence uses (where relevant), and requirements pertaining to monitoring and reporting of such taking.

A.19. Migratory Bird Treaty Act and Executive Order 13186

The MBTA of 1918 (16 U.S.C §§ 703-712 *et seq.*) was enacted to ensure the protection of shared migratory bird resources. The MBTA makes it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations.

EO 13186, titled “Responsibilities of Federal Agencies to Protect Migratory Birds” (66 FR 3853; January 17, 2001), requires all federal agencies with activities that have (or may have) negative effects on migratory birds to develop, implement, and publish a Memorandum of Understanding with the USFWS that promotes conservation of migratory birds. The DHS and Coast Guard have entered into agreements consistent with the MBTA. December 2017, a Department of Interior legal opinion (Opinion M-37050) stated that the MBTA does not prohibit incidental take. However, the Coast Guard would continue to analyze potential impacts to migratory birds and consult with the USFWS when a proposed action may result in an incidental take. In accordance with the MBTA, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS evaluates the potential for significant impact from the Proposed Action.

A.20. Mobile Source Air Toxics Rule and Engine Emission Certification Standards

HAPs emitted from mobile sources are called Mobile Source Air Toxics (MSATs), which are compounds emitted from highway vehicles and non-road equipment that are known or suspected to cause cancer or other serious health and environmental effects. In 2001, the EPA issued its first MSAT Rule, which identified 201 compounds as being HAPs that require regulation. A subset of six of the 201 MSAT compounds were identified as having the greatest influence on health and included: benzene, butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter. In February 2007, the EPA issued a second MSAT Rule, which generally supported the findings in the 2001 rule and provided additional recommendations of compounds having the greatest impact on health. The 2007 rule also identified several engine emission certification standards that must be implemented (40 CFR parts 80, 85, 86, and 96; 72 FR 8427; February 26, 2007). The primary method to control for these pollutants in mobile sources (e.g., vessels) involves reducing their content in the fuel and altering engine operating characteristics to reduce the volume of these pollutants generated during combustion. Global shipping contributes to climate change through the emissions of black carbon produced by the combustion of marine fuels.

A.21. National Historic Preservation Act

The National Historic Preservation Act of 1966 (NHPA; 54 U.S.C. §§ 300101 *et seq.*) establishes preservation as a national policy and directs the federal government to provide leadership in preserving, restoring, and maintaining the historic and cultural environment. Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. The NHPA created the National Register of Historic Places, the list of National Historic Landmarks, and the State Historic Preservation Offices to help protect each state's historical and archaeological resources. Section 110 of the NHPA requires federal agencies to assume responsibility for the preservation of historic properties owned or controlled by them and to locate, inventory, and nominate all properties that qualify for the National Register. Agencies shall exercise caution to assure that significant properties are not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate. The NHPA applies to cultural resources evaluated in this PEIS. WCCs would be decommissioned in accordance with the National Historic Preservation Act, if applicable.

A.22. National Marine Sanctuaries Act

The National Marine Sanctuaries Act (NMSA; also known as Title III of the Marine Protection, Research and Sanctuaries Act of 1972, 33 U.S.C §§ 1401 *et seq.*) authorizes the Secretary of Commerce to designate and manage areas of the marine environment with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archeological, educational, or aesthetic qualities as National Marine Sanctuaries. The primary objective of the NMSA is to protect marine resources and areas of special national significance, such as coral reefs, sunken historical vessels, or unique habitats. The NMSA also directs the Secretary to facilitate all public and private uses of those resources that are compatible with the primary objective of resource protection. Sanctuaries are managed according to site-specific Management Plans prepared by the National Oceanic and Atmospheric Administration's (NOAA) National Marine Sanctuary Program. Any federal agency internal or external to a national marine sanctuary, including private activities authorized by licenses, leases, or permits, that are likely to destroy, cause the loss of, or injure any sanctuary resource are subject to consultation with the Secretary. In accordance with the NMSA, applicable regulations, and DHS and Coast Guard instructions and directives, this PEIS evaluates the potential for significant impact from the Proposed Action.

A.23. The Rights of Federally Recognized Tribes (Native American and Alaskan Native)

Over the course of American history, the U.S. federal government's relationship with Indian tribes has been defined and modified by treaties, executive orders, court decisions, Congressional legislation, and regulations. The U.S. federal government recognizes tribal nations as "domestic dependent nations" and has established laws attempting to clarify the relationship between the federal government, state, and tribal governments. Important rights were guaranteed to tribes by treaty. Case law has established the status of Indian tribes and their relationship to the federal government. Historically, legislation passed by Congress reflects the national Indian policy at the time of enactment. Current federal Indian policy recognizes that Indian tribes are an integral part of the fabric of the United States, and the policy seeks to strengthen tribal governments through self-determination and self-governance.

The U.S. Supreme Court first recognized the existence of a Federal-Indian trust relationship in cases in the mid-1900s interpreting Indian treaties. Between 1787 and 1871, the United States entered into nearly 400 treaties with Indian tribes. In these treaties, the United States obtained land from the tribes, and in return, the United States set aside other reservation lands for those tribes, and guaranteed that the federal government would respect the sovereignty of the tribes, protect the tribes, and provide for the well-being of the tribes. The Supreme Court, in its role as the United States' highest arbiter of justice, upholds tribal rights and obligates the federal government to abide by their agreement with tribes made in the treaties. This principle, that the government has a duty to keep its word and fulfill its treaty commitments, is known as the "doctrine of trust" responsibility. The purpose behind the doctrine of trust is, and always has been, to ensure the survival and welfare of Indian tribes and people, including an obligation to provide services required to protect and enhance tribal lands, resources, and self-government. The doctrine of trust responsibility also includes economic and social programs, which are necessary to raise the standard of living and social well-being of the Indian people to a level comparable to the non-Indian society.

The federal trust responsibility extends to all federal agencies and actions, and treaty rights are not diminished by the passage of time. "Express treaty rights" include hunting, fishing, gathering, and grazing rights. "Implied rights" include rights such as the right to access the areas holding a resource of interest, such as fish or medicinal plants, which would be required to make express treaty rights meaningful. The Fifth Amendment of the U.S. Constitution provides that Congress may not deprive anyone of "private property…without just compensation." The Supreme Court has upheld that Indian treaty rights are a form of private property protected by the Just Compensation Clause. Therefore, although Congress may repeal an Indian treaty, it must adequately compensate a tribe for the value of any rights or property that are lost.

The right of hunting, fishing, gathering, and grazing at usual and accustomed grounds is secured to federally recognized tribes. A federally recognized tribe is an American Indian or Alaska Native tribal entity that is recognized as having a government-to-government relationship with the United States, with the responsibilities, powers, limitations, and obligations attached to that designation. Furthermore, federally recognized tribes are recognized as possessing certain inherent rights of self-government (i.e., tribal sovereignty) and are entitled to receive certain federal benefits, services, and protections due to their special relationship with the United States.

EO 13175 (65 FR 67249; November 6, 2000) was released in November of 2000 to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, strengthen the U.S. government-to-government relationships with Indian tribes, and reduce the imposition of unfunded mandates upon Indian tribes. The NHPA, ESA, MMPA, EO 13007 (Indian Sacred Sites; 61 FR 26771; May 29, 1996), EO 12898 (Environmental Justice; 59 FR 7629; February 16, 1994), Native American Graves Protection and Repatriation Act, American Indian Religious Freedom Act, and the Religious Freedom Restoration Act also apply to tribes and are considered under NEPA. In accordance with NEPA and DHS and Coast Guard instructions and directives, this PEIS evaluates the potential for significant impact from the Proposed Action. As part of the MMPA process (Section A.18), the Coast Guard intends to prepare a Plan of Cooperation.

APPENDIX B STANDARD OPERATING PROCEDURES

Coast Guard currently uses a variety of guidance and proactive operational measures to help minimize the environmental impacts of Coast Guard vessels and aircraft. Although SOPs are established on a vessel-by-vessel basis, SOPs for WCCs are not currently developed, since WCCs are not yet operational; however, those used on the existing inland tender fleet are provided below. While these are subject to change (given the timeframe until all WCC vessels are fully operational), the SOPs in use by the existing inland tender fleet are as follows:

General SOPs applicable to all activities addressed in this document

1. In accordance with Chapter 11 of the Vessel Environmental Manual, all Commanding Officers and Officers in Charge should plan and act to protect ESA-listed species and designated critical habitat during operations and planning, including selection of navigation and flight routes that avoid designated critical habitat and areas where ESA-listed species are known to concentrate.

2. Marine mammal and sea turtle avoidance measures are prescribed (see Vessel Operations below), including requiring that vessel crew be especially alert for activity, and proceed with caution, in areas of known migration routes or high animal density, including areas with concentrations of floating vegetation where animals may be feeding, and that vessels do not approach marine mammals or sea turtles head-on during non-emergency maneuvering, when navigationally safe to do so.

Vessel Operations

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

2. During non-emergency vessel operations, including law enforcement activities, when marine mammals or sea turtles are sighted or known to be in the immediate vicinity at the time of operations (such as if helicopters sight animals along the vessel's intended course), operators would employ all possible precautions to avoid interactions or collisions with animals when navigationally safe to do so and, in the case of law enforcement activities, when practical to do so. These precautions should include one or more of the following:

a. Reducing speed.

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

c. Avoiding sudden changes in speed and direction, or if a swimming marine mammal or sea turtle is spotted, attempting to parallel the course and speed of the animal so as to avoid crossing its path.

d. Avoiding approach of sighted animals head-on or from directly behind.

e. When whales are sighted, maintaining a distance of 200 yards (yd) (183 m) or greater between the whale and the vessel and a distance of 500 yd (457 m) or greater for right whales, provided it is safe to do so. In the Bering Sea, Gulf of Alaska, and along the East Coast of the continental United States, a whale should be treated as a right whale unless the whale is positively identified as another whale species.

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

3. Coast Guard would consider a reduction in vessel speed to 10 knots or less when a whale is sighted within 5 nm of the intended vessel track. Vessels would use navigationally prudent courses to avoid striking the whale and, if necessary, reduce speed to bare steerageway or come to a stop.

4. Unless a vessel's mission involves specifically investigating an ESA-listed species, or there is a navigational safety issue during transit, the vessel would plan its passage to avoid any known sanctuaries, feeding grounds, or other biologically important areas.

5. While conducting ATON operations, vessels should operate at minimum safe speeds while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom and would operate in marked channels whenever possible.

Vessel Observers

1. Crewmembers would be trained in marine mammal and sea turtle identification and would alert the Command of the presence of these animals and initiate the adaptive mitigation responses identified in Vessel Operations (2) above.

2. At least one properly trained crewmember would look for marine mammals and sea turtles during all vessel operations associated with the activities described in this PEIS. If a marine mammal or sea turtle is spotted, the vessel would avoid them by changing course and/or taking the measures identified in Vessel Operations (2) above, unless there is a threat to vessel safety.

3. Small vessels would also have a properly trained crew member to look for marine mammals during vessel operations associated with the activities described in this PEIS. If a marine mammal or sea turtle is spotted, the vessel would avoid them by changing course and/or taking the measures identified in Vessel Operations (2) above.

ESA-listed Documentation, Reporting, and Planning

1. The Coast Guard would document sightings of ESA-listed marine mammals and sea turtles during vessel transit whenever course changes or other measures are taken to avoid or minimize interactions with the animals in the daily Operational Summary (OPSUM). Information would include, at a minimum: date and time of the sighting that required action be taken to avoid or minimize vessel interaction with an animal, the species observed (if animals can be determined to species; if not, the type of animal [i.e., whale, sea turtle, pinniped]), number of animals sighted, approximate geographic coordinates, and action taken to avoid or minimize interactions between the vessel and the animal(s). Additional information, including photographs, would be collected as needed. Sightings listed in the OPSUMs and any supplemental information, such as photographs, would be consolidated and submitted to NMFS Office of Protected Resources Interagency Cooperation Division and the appropriate regional Fish and Wildlife Conservation Office as part of any annual reporting requirements.

2. The Coast Guard would document sightings of ESA-listed marine mammals within 200 yd (183 m) and sea turtles within 50 yd (46 m) of a vessel during vessel operations in all proposed action areas including towing and escort, pile driving, and pile removal in the daily OPSUM. Information would include, at a minimum: date and time for each sighting event; species observed, number of animals per sighting, number of animals that are adults/juveniles/calves/pups, behavior of the animals in sighting event, and geographic coordinates for the observed animals; information regarding sea state, weather conditions, visibility, and lighting conditions; and activity in which vessel(s) is (are) engaged and any actions taken to

avoid or minimize interactions with the animals. Additional information, including photographs, would be collected as needed. Sightings listed in the OPSUMs and any supplemental information, such as photographs, would be consolidated and submitted to NMFS Office of Protected Resources Interagency Cooperation Division and the appropriate regional Fish and Wildlife Conservation Office as part of any annual reporting requirements.

3. Any collision with and/or injury to a marine mammal or sea turtle would be reported immediately to the appropriate NMFS or USFWS office, depending on jurisdiction, and local authorized stranding/rescue response organizations based on where the incident occurred (see https://www.fisheries.noaa.gov/report for regional contact information for reporting).

4. Coast Guard personnel would annually report all observed bird strikes between WCCs and ESA-listed birds.

5. While underway and on station during ATON operations, all topside WCC crew members would be on lookout for species or habitats of concern such as ESA-listed whales, turtles, pinnipeds, fish, and invertebrates, as well as Johnson's seagrass and coral reefs.

6. All in-water work would be postponed or halted when ESA-listed marine mammals, sea turtles, sturgeon, sawfish, and sharks are observed within these specified distances and may be affected by ATON operations. Activities would not resume until the properly trained lookout has observed the protected species move out of the area on their own volition or, if an animal is seen above water then dives below, the Coast Guard or servicing entity will not begin in-water work until enough time has elapsed without a sighting (at least 15 minutes for pinnipeds, sea turtles, and fish, and 30 minutes for cetaceans) to assume the animal has moved beyond these specified distances. Properly trained lookouts would remain alert for protected species from 30 minutes prior to commencement of work until 30 minutes after shut-down.

7. ESA-listed marine mammals, sea turtles, sturgeon, sawfish, and sharks must not be encircled or trapped between multiple vessels or between vessels and the shore.

8. If an ESA-listed resource would be affected by the removal of a particular ATON, a separate consultation would be conducted for each instance where an ATON would be discontinued.

Pile Driving and Pile Removal

1. When possible, Coast Guard would remove creosote treated wood piles completely, rather than cutting at the sediment line or breaking off the pile. Any creosote treated wood piles that are removed would not be reused and would be disposed of properly, in accordance with Coast Guard policy. Any creosote treated piles that must be replaced would be replaced with non-creosote treated wood piles.

2. The WCC crews would adhere to seasonal work windows consistent with the Biological Opinion issued by NMFS in 2018[36], for all routine pile driving operations, including total replacement or establishment. If a unit must work outside the seasonal work window due to operational constraints (scheduling or maintenance issues, etc.), Coast Guard would consult with NMFS prior to pile driving to minimize potential impacts. This is not applicable if emergency repairs are required to remedy a navigational hazard.

[36] The Coast Guard completed an ESA Section 7 and Essential Fish Habitat consultation with NMFS on U.S. Coast Guard Federal Aids to Navigation Program, finalized on April 19, 2018. Any information provided in this PEIS includes WCC support of ATONs, only as it pertains to the Proposed Action.

3. If piles were to break or become damaged, the WCC crew or servicing entity must attempt to entirely remove the broken piles. If the entire pile cannot be removed, reasonable efforts must be made to cut the remnants without disturbing the sediment.

4. When feasible, a vibratory driver should be used instead of an impact hammer for pile driving.

5. If an impact hammer is required, pile driving must employ soft-start or ramp-up techniques (slow increase in hammering intensity), at the start of each work day or following any break of more than 30 minutes to allow any undetected ESA-listed animals to voluntarily depart the area.

6. Steel piles used would not be larger than 18 inches in diameter.

7. Structures would be replaced in-kind, whenever possible.

8. If using an impact hammer, sound attenuation devices (e.g., cushion blocks, dewatered casings, or enclosed bubble curtain around each pile) would be used, if feasible.

9. If possible, piles would be driven during low tide periods, when substrates would be exposed in intertidal areas.

10. Coast Guard would avoid beginning pile driving or pile removal after dark, to the extent practicable. If pile driving must occur during periods of darkness, Coast Guard or the servicing entity would use all available means to allow the properly trained lookout to detect marine mammals and sea turtles that may be located within the safety zone (e.g., use thermal imaging or night vision technology). The entire safety zone must be visible to the properly trained lookout in order for pile driving to commence.

11. Coast Guard or the servicing entity would minimize the suspension of sediments and disturbance of the substrate when removing piles. Measures to help accomplish this may include, but are not limited to, the following:

a. When feasible, piles would be removed with a vibratory hammer rather than a direct pull or clamshell method.

b. Piles would be removed slowly to allow sediment to slough off at or near the mudline.

c. Piles would be shaken or vibrated before pulling to break the bond between the sediment and the pile, reducing the likelihood that the pile would break and the amount of sediment that would slough.

d. If the WCC were equipped, the pile would be encircled with silt containment devices that extend from the surface of the water to the substrate.

ATON Operations

1. When operationally feasible, the Coast Guard should lower all objects (e.g., moorings) to the bottom in a controlled manner. Controlled lowering can include the use of buoyancy controls such as lift bags, or the use of cranes, winches, or other equipment that affect positive control over the rate of decent to the seafloor.

2. When lowering all objects, a properly trained lookout would ensure any mobile ESA-listed species are not observed within 50 yds of the area where the object will be dropped.

3. Each WCC vessel engaged in ATON operations would implement protective measures to prevent all excess materials, equipment, and hazardous substances from entering the surrounding environment.

a. In the event debris or other waste enters the surrounding environment, each Coast Guard vessel must attempt to capture this debris or waste. This includes the removal of hardware, pins, and bolts used to secure any equipment. Those that cannot be completely removed must be cut-off flush with the substrate when possible.

b. Any necessary large-scale painting or chemical cleaning of an ATON cannot be completed onboard the servicing unit (or over the water). If any touch-up painting by roller is required while on deck of WCC, Coast Guard would ensure there is no discharge of paint and associated solvents into the water.

c. The Coast Guard would maintain a contingency plan to control toxic materials aboard all WCC vessels. Appropriate materials and equipment would be stationed on board WCC vessels to contain and clean up any spills.

d. All project-related materials and equipment placed in the water would be free of pollutants. Vessel crew would perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations would be postponed or halted should a leak with the potential to discharge overboard be detected, and would not proceed until the leak is repaired and equipment cleaned.

4. Turbidity and siltation from ATON operations would be minimized and contained through the appropriate use of effective silt containment devices (if equipped) and the curtailment of work during adverse tidal and weather conditions.

5. When practicable, debris from destroyed aids should be recovered.

6. When feasible, Coast Guard or the servicing entity would use tools (e.g. scuba divers, bottom viewers, remote operating vehicles) when conducting operations in sensitive areas on ATON to verify bottom type and habitats; and to facilitate the removal of the existing ATON or placement of new equipment to minimize adverse effects to essential fish habitats.

7. Prior to establishment, maintenance , or discontinuance of ATON, Coast Guard would determine if Johnson's seagrass, corals, or other sensitive species are known to occur in that location or the surrounding area. Coast Guard would conduct activities consistent with the Biological Opinion issued by NMFS in 2018[37].

8. When performing ATON operations in sensitive seagrass habitats:

a. To the extent practicable, Coast Guard or the servicing entity would avoid placement of ATON in seagrass habitats.

[37] The Coast Guard completed an ESA Section 7 and Essential Fish Habitat consultation with NMFS on U.S. Coast Guard Federal Aids to Navigation Program, finalized on April 19, 2018. Any information provided in this PEIS includes WCC support of ATONs, only as it pertains to the Proposed Action.

b. If floating ATON must be placed in or near seagrass habitats, the size of the floating ATON would be minimized to only what is necessary to meet navigational requirements so that the footprint of the sinker is only as large as necessary.

c. Coast Guard would maximize the accuracy of sinker replacements on or near seagrass habitats through utilization of the ship's most accurate navigation and positioning systems and the careful lowering of sinkers.

d. To the extent possible, Coast Guard would avoid use of drag hooks for ATON recovery in areas where seagrass habitats occur.

9. When performing ATON operations in sensitive coral habitats:

a. Coast Guard would minimize spudding down and repositioning spuds when conducting ATON operations in coral habitats.

b. Drag hooks would not be used for ATON recovery (e.g., recovering anchors, chain, pilings) in areas where ESA-listed corals and Johnson's seagrass may occur.

c. Coast Guard would maximize the accuracy of sinker replacements on or near coral habitats through utilization of the ship's most accurate navigation and positioning systems and the careful lowering of sinkers.

10. The length of the ATON anchor chain used would be limited to the shortest practicable length required to hold the buoy in place.

Brushing Operations

1. The USCG is an environmental regulatory agency with responsibility to act with due regard to the preservation of the health of waterways and the surrounding environment per the Coast Guard instruction on Waterways Management (COMDTINST 16001.1 (series)). For more information, see the Waterways Management (WWM): Sector Environmental Planning (TTP), CGTTP 3-71.8 (series).

2. Personnel who conduct brushing operations would be trained by the Coast Guard as Chainsaw and Brushcutting Operators (Coast Guard CGTTP 3-71.20).

3. Personnel who apply pesticides would be enrolled in courses for pesticide applicator certification at the Navy Entomology Center of Excellence, which is run by the Department of Defense. In addition, individual states might require specific training to apply pesticides (Coast Guard CGTTP 3-71.20).

4. Coast Guard would conduct safety briefings at the beginning of each day and debriefings at the end of each day of brushing operations. Preliminarily, the brushing team would:

a. Look at pictures and notes from previous ATON operations to determine what vegetation might be encountered and the equipment and PPE needed based on the types of vegetation on site, as vegetation can vary, ranging from primarily grasses and vines to fairly heavy woody growth and timber.

b. Continue the preliminary survey by observing the ATON from the waterway, by boat, or from the buoy deck.

c. Develop a rough idea of the area to be cleared by observing the aid from the waterway as it will be seen in use.

5. The ATON brushing team would consult with the officer of the deck to determine the landing and loading site, minimizing the distance gear and equipment would need to be carried. The tide would also be considered when landing in tidal areas.

6. The ATON brushing team would conduct a detailed site survey once reaching the ATON structure, determining where visibility of the ATON is obscured by vegetation, as well as identifying hazards not visible from the water such as poisonous plants and stinging insects.

7. Crews would avoid clearing areas on bearings where the ATON cannot be observed by vessels on the waterway.

8. Crews would operate chainsaws and brushcutting equipment only under good visibility and daylight conditions. Work during foul weather or poor weather conditions (such as when the National Weather Service posts a warning) would be rescheduled.

9. As a best practice, WCC crew would be trained to be aware of endangered species, threatened species, and designated critical habitat within their area of responsibility, including ESA-listed terrestrial plants or other species/habitats that occur in the areas where brushing operations would occur.

10. If an ATON brushing action would affect threatened or endangered species or adversely modify critical habitat, the WCC brushing unit conducting the action would engage the chain of command and Coast Guard environmental staff. If there is any doubt concerning potential impacts, the unit would engage their chain of command and Coast Guard environmental staff.

11. Per the Coast Guard's Safety and Environmental Health Manual, COMDTINST M5100.47 (series), the use of pesticides in support of ATON brushing operations requires the unit create a specific integrated pest management program (IPM). The procedures to implement IPM requirements are in the IPM TTP, CGTTP 4-11.13 (series).

12. Each state may have different permitting thresholds and requirements under the National Pollutant Discharge Elimination System (NPDES). Individual states might require personnel engaged in spraying to be certified and any discharges into waterways to be permitted. Due to the variance among states, as a best practice, WCC units seeking to use pesticides understand the state requirements within their area of responsibility. State requirement resources can be accessed via the EPA's Pesticide Permitting website.

13. Per the Self-Help Integrated Pest Management, Armed Forces Pest Management Board Technical Guide No. 42, Coast Guard brushing teams would:

a. Use pesticides only to remove poisonous plants or stinging insects that put crewmembers at risk.

b. Evaluate each shoreside ATON prior to servicing to determine if poisonous plants or stinging insects are present.

c. Not use herbicides to control non-poisonous plants or to deliberately strip vegetation from surrounding areas. Complete area coverage or broadcast spraying is not authorized without written permission from the district Department of Public Works office.

d. Target only poisonous plants in the immediate vicinity of all guy wires, the tower base, and within the ATON's line of sight. Generally, do not exceed spraying beyond a 10-yard radius around targeted areas or an access path.

e. Use herbicide to thoroughly cover foliage but not to the point of runoff.

14. Coast Guard would have a contingency plan for accidental chemical spill or exposure.

15. Coast Guard would not remove mangroves.

Ballasting and Deballasting

1. In accordance with Chapter 10 of the Vessel Environmental Manual, ballasting and deballasting would be conducted in a manner to minimize the introduction of non-native species and reduce their potential impact on natural resources in areas where waters are discharged. Vessels would control all ballasting and de-ballasting evolutions as indicated below:

a. Each transfer of ballast water would be recorded in the Machinery Log noting ship's location, water depth, tanks involved, and amount of ballast taken aboard or discharged.

b. To the maximum extent practicable, taking on ballast water under the following conditions would be avoided:

i. In areas known to have infestations or populations of harmful organisms or pathogens (e.g., harmful algal blooms),

ii. In areas near sewage outfalls,

iii. In areas where tidal flushing is known to be poor at times or at times when tidal flow is known to cause more turbidity in water,

iv. In darkness where bottom-dwelling organisms may rise up in the water column,

v. In areas where propellers may stir up the sediment.

2. Ballasting and/or de-ballasting within 12 nm (14 mi) from land would be avoided.

3. In all cases, the minimum distance for de-ballasting would be 12 nm (14 mi) from land.

4. In the proposed action areas, any ballast water taken on board would likely be released (ballast tanks cycled) prior to entering any port or navigable shallow waters. If it is suspected that invasive species are in this ballast water, efforts must be made to release these species in the open ocean.

Discharging Waste

1. WCCs would not discharge any plastic waste overboard, plastic waste would either be retained onboard until return to homeport, or incinerated while at sea in accordance with MARPOL regulations and the M16455.1 (series) Vessel Environmental Manual.

2. The Coast Guard would coordinate with NMFS, the USFWS, and local sources in the proposed action areas to learn of confirmed haul out locations and communicate them to all field units in the proposed

action areas operating environment as part of the requirement not to discharge sewage black water within 3 nm (2.5 mi) of known or reported marine mammals to the extent operating constraints permit.

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 the WCC are preferred. If ports that do not have docking facilities for the WCC are used, then anchorage areas that do not contain ESA-listed species such as corals, Johnson's seagrass, or benthic habitats that support ESA-listed species' feeding, refuge, and reproduction are preferred.

2. Impacts to ESA-listed corals associated with vessel operation, including anchoring, are prohibited unless a step-down consultation has been completed to address these effects or an emergency consultation is initiated under the ESA section 7 emergency consultation procedures, depending on the specific circumstances.

3. When operationally possible, WCCs would avoid anchoring vessels on substrate supporting seagrasses, hard bottom, and other sensitive habitats. Coast Guard would not anchor vessels on coral habitat or kelp habitat.

Towing

1. All tow lines and cables used for towing a vessel would be kept taut (e.g., catenary) to the greatest extent possible and would be monitored for fraying or other signs of potential failure that could result in entanglement.

2. A trained crew member would search for marine mammals along the transit route used for towing to minimize potential collisions with animals and the WCC and/or the vessel or buoy being towed. The lookout would inform the captain immediately upon sighting a marine mammal in order for the captain to determine whether changes to vessel speed are required.

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

APPENDIX C THE PROPAGATION OF SOUND

C.1. Terminology Often Used when Describing Sound

Below are some terms that may be helpful in the discussion of active acoustics produced by the Proposed Action and in the analysis of the impacts of acoustic stressors to resources.

A-weighting - the most commonly used frequency weighting function for humans that accounts for the fact that human hearing is less sensitive to low frequencies; units dB(A) or dBA.

Absorption - The opposite of reflection. Sound absorption results from the conversion of sound energy into another form, usually heat or motion, when passing through an acoustical medium. When a sound wave encounters resistance, absorption occurs.

Ambient noise - All pervasive background noise associated with a given environment. Examples of sound sources contributing to ambient noise in the ocean include waves, wind, rain, shrimp, earthquakes, volcanoes, and distant sources, such as shipping and airguns.

Attenuate - To reduce the level (volume, loudness, energy) of an acoustical (or electrical) signal; the gradual loss of flux intensity through a medium.

Cylindrical spreading - energy spreading out from a sound source in the shape of a cylinder; no energy radiates above the top or below the bottom of the cylinder

Decibel (dB) - The measuring unit of sound pressure, and hence loudness.

dB peak - a unit of relative pressure when the pressure of the sound wave is characterized as the peak pressureDoppler effect - The apparent shift in frequency when the sound source, or the observer, is in motion.

Echosounder - an instrument that uses sound echoes to determine the water depth. The instrument emits sound waves that travel to the bottom of the ocean and are reflected back. Depth is determined by timing how long it takes the sound pulse to leave the instrument, travel to the seafloor, and return to the receiver on the ship

Frequency - The speed of vibration of a sound wave, measured in cycles per second, or Hertz. Frequency determines pitch; the faster the frequency, the higher the pitch.

Impulsive sound - a broadband signal generated by sound sources such as explosions and airguns in which the sound pressure is very large at the instant of the explosion and then decays rapidly away; the duration of the peak pressure pulse is usually only a few milliseconds.

Hearing threshold - the minimum intensity at which a sound of a specific frequency is reliably detected in absolute quiet conditions. The intensity level varies with frequency.

Impulse - A very short, transient, acoustical (or electrical) signal.

Inverse square law- Any condition in which the magnitude of a physical quantity follows an inverse relationship to the square of the distance. In pure spherical divergence of sound from a point source in free space, the sound pressure level decreases 6 dB for each doubling of the distance.

Masking - The process by which one sound is used to obscure the presence of another.

Medium - substance or material that carries or transports the wave from its source to other locations. In the open ocean, the medium through which the wave travels is the ocean water.

Octave band - A frequency spectrum which is one octave wide (i.e. all frequencies from 125 Hz to 250 Hz). In recording and audio testing, the octave itself is divided into thirds for increased accuracy.

Particle motion - the change in position of a particle with respect to time; in acoustics, particle motion is vibratory motion in which the particles move back and forth around an equilibrium point.

Peak pressure - the range in pressure between zero and the greatest pressure of the signal.

Permanent threshold shift (PTS) - a permanent increase in the threshold of hearing (minimum intensity needed to hear a sound) at a specific frequency above a previously established reference level.

Propagation - the movement of sound through a medium.

Pulse - a short duration broadband signal.

Ramp-up - gradually increasing the sound source level

Reflection - the deflection of the path of a sound wave by an object or by the boundary between two media.

Refraction - The bending of sound waves towards a region of slower sound speed.

Root-mean-square pressure - the square root of the average of the square of the pressure of the sound signal over a given duration. Root-mean-square is often abbreviated RMS.

Scattering - when the path of a sound wave is broken up by objects (volume scattering) or the sea floor or sea surface (boundary scattering). A particle in seawater or the roughness on the sea surface or seafloor can cause sound energy to be scattered.

Sound exposure level (SEL) - the decibel level of the time integral (summation) of the squared pressure over the duration of a sound event; units of dB re 1 µPa2/s

Sound Pressure Level (SPL) - The fundamental measure of sound pressure. The measurement of what sound we hear expressed in decibels in comparison to a reference level.

Spherical spreading - energy spreading out from a sound source in the shape of a sphere; the power is radiated equally in all directions from the sound source.

Temporary threshold shift (TTS) - a temporary increase in the threshold of hearing (minimum intensity needed to hear a sound) at a specific frequency that returns to its pre-exposure level over time.

Transmission loss - the decrease in acoustic intensity (due to spreading and/or attenuation) as an underwater sound wave propagates outwards from a source.

Vibration - A force which oscillates about some specified reference point. Vibration is commonly expressed in terms of frequency such as cycles per second (cps), Hertz (Hz), cycles per minute (cpm) or revolutions per minute (rpm) and strokes per minute (spm). This is the number of oscillations which occurs in that time period.

C.2. The Basics of Sound

The reference intensities used to compute sound levels in dB are different in water and air. The reference intensity for underwater sound is the intensity of a sound wave with a pressure of 1 µPa while the reference intensity for sound in air is the intensity of a sound wave with a pressure of 20 µPa, which is consistent with the minimum threshold of young human adults in their range of best hearing (1,000-3,000 Hz).

The 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. The result is that sound waves with the same intensities in water and air (when measured in watts per square meter) have relative intensities that differ by 61.5 dB. This amount must be subtracted from sound levels in water referenced to 1 µPa to obtain the sound levels of sound waves in air referenced to 20 µPa that have the same absolute intensity in watts per square meter. The difference in reference pressures causes 26 dB of the 61.5 dB difference. The differences in densities and sound speeds account for the other 35.5 dB. A 60-dB difference in relative intensity represents a million-fold difference in power.

C.3. The Spreading of Noise and Transmission Loss Under Water

Spherical spreading of sound occurs when the source is free to expand with no boundaries (e.g., the bottom or water's surface) causing refraction or reflection. The transmission loss (TL) for spherical spreading can be calculated using the formula TL = 20 log(R) where R is the range or distance from the source. Spherical spreading results in a 6 dB decrease in the intensity of the noise for each doubling of distance. Cylindrical spreading applies when noise energy spreads outwards in a cylindrical fashion because it is bounded by the bottom and the water's surface. The TL for cylindrical spreading can be calculated using the formula TL = 10 log(R). Cylindrical spreading results in a 3 dB decrease in the intensity of the noise for each doubling of distance. However, in shallow water, where most WCC activities occur, reflections from the bottom or water's surface can reduce spreading considerably. Because of the complexity of these reflections, it is difficult to define TL. Since noise energy is not perfectly contained by reflection and refraction, the true spreading is often somewhere between 3 and 6 dB per doubling of distance, sometimes referred to as practical spreading loss. This calculation can be done using the formula TL = 15Log(R1/R2) where R1 is the range or distance at which transmission loss is estimated and R2 is the range or distance of the known or measured sound level. Monitoring data from some pile driving projects indicate that the actual spreading loss is intermediate between cylindrical and spherical spreading (Reyff 2003; Thomsen et al. 2006) while other data indicates that the actual spreading loss is closer to spherical spreading (Laughlin 2010). Until a better spreading model can be developed and agreed on a practical spreading model, as described by Thomsen et al. (2006) is most appropriate.

In both water and air, acoustic waves undergo geometrical spreading and also transmission loss from other processes that attenuate sounds like absorption or scattering effects. In an under water environment, an example of a place where absorption may occur is as a sound wave reaches sediment after traveling through water. In this same environment, scattering may occur when a sound wave travels through water and reaches the water's surface where there are waves and suspended sediment particles that the sound waves may bounce off of. Due to these "barriers" (the bottom sediment and water's surface), shallow water environments would cause sound waves to undergo both absorption and scattering at any barrier.

C.4. The Propagation of Sound in Riverine Habitats

At low frequency (< 1 kHz), acoustic wave propagation should be affected by wave guide properties. The river is an acoustic wave guide where sounds are partly trapped between the water surface and the river bed (Geay et al. 2017), a problem known as the Pekeris wave guide (Geay et al. 2019). In a perfect medium without attenuation, acoustic waves with frequencies lower than the cutoff frequency would exponentially decay with horizontal distance (Jensen et al. 2011). However, noise propagation in rivers is limited by the sinuosity of a system—where a river bends, noise is unlikely to propagate. A line-of-sight rule is used to determine the extent of noise propagation in river systems. This rule means that noise may propagate into any area that is within line-of-sight of the noise source (Washington State Department of Transportation 2020). Beyond sinuosity, river bed roughness should be the best characteristic enabling the prediction of acoustic wave propagation properties in rivers. However, this parameter is not easy to measure (Geay et al. 2019).

C.5. In-Air Noise

In-air noise produced by the Proposed Action includes vessel noise, ATON signal testing noise, tool noise, and pile driving noise. ATON signal testing noise, tool noise, and pile driving noise would be created in air.

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. In pure spherical divergence of sound from a point source in free space, the SPL decreases 6 dB for each doubling of the distance.

C.6. In-Water Noise

In-water noise produced by the Proposed Action includes fathometer and Doppler speed log noise, vessel noise, and pile driving noise. ATON signal noise and tool noise are created in-air and are unlikely to be detected (depending on distance from the source) below the water's surface. While vessel noise is created under water, it can typically be detected (depending on distance from the source) in-air, above the water's surface. Fathometer and Doppler speed log noise, on the other hand, would be created under water and would not likely be detected in air due to the downward directed beam from the source (the vessel's keel).

C.7. Sound Transfer Across the Air-Sea Interface

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.

As stated above, the sound values in air and in water are not directly comparable due to the reference units used, and must be converted. Because water is much denser than air, water has higher impedance. The impedance of water is about 3600 times (10 log 3600 = 36) times that of air because sound travels faster in water than in air. Thus, sounds of equal measured pressure will be measured at 36 dB higher in water than in air. So, unlike the reference pressure correction (the 26 dB), the difference is not only between the air and water pressures, but also the impedance of water. This means it is actually 26 + 36 dB = 62 dB, which is a difference of 62 dB higher in water than in air. Therefore, sound measuring 100 dB in air would correspond to a sound measuring 162 dB in water. In consideration of the air-water interface, another 6 dB would have to be added (doubling of pressure across interface), such that 62 dB + 6 dB or 68 dB would have to be added to any in air value to estimate its corresponding in water transition value (e.g., 100 dB re: 20 µPa in air + 62 dB +6 dB = 168 dB re: 1 µPa in water).

Airborne sounds that 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 airborne noise would radiate outward, the noise in water would be transient.

C.8. Ambient Noise in Ocean and River Habitats

In the frequency band 5–500 Hz, the most common sources of sound in the ocean are seismic events, whales, ships, and wind-generated breaking waves (Curtis et al. 1999). Long term observations of ambient ocean noise show the levels at low frequencies have increased over time, primarily as the result of an increase in commercial shipping activities (Zhang et al. 2020) though the frequency distribution of shipping noise covers the entire sound spectrum (Lin et al. 2019). The sound from breaking waves ranges from 100 Hz–20 kHz, but the peak frequency ranges from 200 Hz to 2 kHz, depending on the type of breaking wave. The sound level from 200–500 Hz is primarily a function of wind speed and correlates well with the energy dissipated by breaking waves.

In a study of several freshwater sites throughout New England, average power spectral density curves of the ambient soundscape suggested differences in the frequency structure among habitat types (i.e., brook/creek, pond/lake, and river). The brook/creek habitats had the highest levels and pond/lake habitats had the lowest levels at frequencies below 500 Hz. River habitats had the highest levels at all higher frequency bands (Rountree et al. 2020). Wysocki et al. (2007) concurred with this finding, stating that the energy in the freshwater systems ranging from 200 Hz to 5 kHz was much higher in the streams and rivers than in the stagnant lakes and ponds (Wysocki et al. 2007).

C.9. The Propagation of Pile Driving Noise

Installing fixed ATON structures in shallow marine environments requires the insertion of piles, which support the structures, into the bottom. Piles may be made of wood, steel, or reinforced concrete and, once installed, extend from above the water's surface to various depths below the bottom. Installing the piles may require impact or vibratory pile driving. The duration of installation and number of strikes required to drive the pile depend on the size of the hammer, bottom properties, and the required penetration depth to support the structure.

Various mitigation measures, such as bubble curtains, screens, or cofferdams, have been developed to diminish the potential impacts of pile driving on aquatic life. Pile driving activities may also begin with a "ramp-up" or "soft start" where lower hammer energy levels are used to start the pile driving process, and then the force of pile driving is gradually increased. This method is typically meant to cause aquatic life to move from the area when disturbed at lesser than peak levels in order to decrease impacts to nearby species.

Pile driving produces high sound pressure levels in both the surrounding air and underwater environment. Sound levels vary substantially with the size of the hammer, diameter of the pile, and bottom properties influencing the source level and frequency of the noise generated. During impact pile driving, sound from the hammer striking the pile radiates into the air and a pulse propagates down the length of the pile and into the substrate, as well as the surrounding waters. During vibratory pile driving, sound or vibrations may also be transferred via the substrate and emerge at some distance from the source. The probability of impacts to species are situational and vary with pile type, impact energy, exposure type, duration, site characteristics, and species' auditory characteristics.

APPENDIX D ACOUSTICS IMPACT ANALYSIS

This appendix provides the quantifying acoustic impacts analysis including the methods and analytical approach to determining the impacts from pile driving noise. Additional information on pile driving noise can be found in Section 3.2.1.5. Resultant ranges to PTS, TTS, and behavioral reactions to marine fish, marine reptiles, and marine mammals are detailed detailed in Table 3-27, Table 3-36, and Table 3-42, respectively.

D.1. Impact Pile Driving

In monitoring reports, sound levels generated by impact driving varies considerably from pile to pile, particularly depending on material (e.g., steel, wood) and diameter of the pile, as well as distance from the pile when the sound was measured. Factors that can cause large variations in measured sound levels while impact driving include water depth, tidal conditions or currents, if sound attenuation systems are used, and geotechnical conditions that determine how difficult it is to drive the pile.

Impact pile driving produces pulse-type sounds expressed in dB re 1 µPa. For impact driving, the peak SPL is the highest instantaneous level of the measured waveform for every one of the 1-second time increments, which could be a negative or positive pressure. The RMS SPL can be computed by averaging the squared pressures over the amount of time required to reach 90 percent of the total sound energy. Alternatively, the maximum impulse level for each second of pile driving can be examined. The impulse level is an RMS SPL with a 35-millisecond time constant. The time constant is approximately the same time duration in which most acoustic energy in a pile driving acoustical pulse is contained. Use of this descriptor allows for the direct measurement of pulsed-RMS levels in the field. In addition, the unweighted SEL for each second can be measured. SEL is a common unit of sound energy used in airborne acoustics to describe short-duration events. The units for SEL are dB referenced to a pressure of 1 microPascal squared per second (dB re 1 μPa^2-second). The total sound energy in an impulse accumulates over the duration of the impulse and the maximum level accumulated is the SEL for that event. SEL is reported by the second and for an entire impact pile driving event. Table D- 1 provides the impact pile driving noise range that was used to represent the material and pile size expected to be used by the Coast Guard during ATON missions.

Table D- 1. Range of Impact Pile Driving Noise by the Material and Size of Piles

Material	*Size*	*Measurement Distance (m)*	*Peak SPL (dB re 1 µPa)*	*RMS*	*SEL (dB re 1 µPa2-second)*
Wood	Not stated, but 12–14 inch diameter seems somewhat standard	10 m away in 10.7 m of water	180	--	148
Steel pipe	12 inch diameter	10 m away in 1–2 m of water	192	177	NA
Steel pipe	14 inch diameter	10 m away in 3–15 m of water	199	--	169
Steel pipe	16 inch diameter	10 m away in less than 1 m of water	204	--	--
Steel pipe	20 inch diameter	10 m away	208	187	176

Material	*Size*	*Measurement Distance (m)*	*Peak SPL (dB re 1 µPa)*	*RMS*	*SEL (dB re 1 µPa2-second)*
		in 3–4 m of water			
Steel pipe	20 inch diameter	10 m away on land	198	183	171
Steel H	10 inch	10 m away in 2 m of water	190	175	NA
Steel H	12 inch	30 m away in 2 m of water	179	165	NA
Concrete	12 inch diameter	10 m away on land	176	--	146
Concrete	14 inch (square)	10 m away in 2–3 m of water	183	157	146

D.2. Vibratory pile driving

Sounds produced from a vibratory hammer are similar in frequency to the impact hammer, except the levels are much lower than the impact hammer and the sound is continuous while operating (University of Rhode Island 2019). Vibratory pile driving is considered a continuous type of sound, and is expressed in dB re 1 µPa measured in RMS SPL and measured in peak SPL (Table 3-7). Data is often reported in the average one-third octave band frequency spectrum over the entire pile-driving event. Non-pulse (intermittent or continuous sounds) can be tonal, broadband, or both (Southall et al. 2008). Some of these non-pulse sounds can be transient signals of short duration but without the essential properties of pulses (e.g., rapid rise time) (Southall et al. 2008). Examples of non-pulse sounds include vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems (Southall et al. 2008). The duration of such sounds, as received at a distance, can be greatly extended in highly reverberant environments (Southall et al. 2008). Soft substrates such as sand bottom would absorb or attenuate the sound more readily than hard substrates (e.g., rock), which may reflect the acoustic wave. Table D- 2 provides the impact pile driving noise range that was used to represent the material and pile size expected to be used by the Coast Guard during ATON missions.

Table D- 2. Range of Vibratory Pile Driving Noise by the Material and Size of Piles

Material	*Size*	*Measurement Distance (m)*	*Peak SPL (dB re 1 µPa)*	*RMS*	*SEL (dB re 1 µPa2-second)*
Wood	Not stated, but 12–14 inch diameter seems somewhat standard	10 m away in 12 m of water	172	162	--
Steel pipe	13 inch diameter	10 m away in 5 m of water	171	155	155
Steel pipe	14 inch diameter	10 m away in 20 m of water	171	--	154
Steel pipe	18 inch diameter	10 m away in 3 m of water	196	158	158
Steel H	10 inch	10 m away	161	147	NA

Material	*Size*	*Measurement Distance (m)*	*Peak SPL (dB re 1 µPa)*	*RMS*	*SEL (dB re 1 µPa2-second)*
		in 2 m of water			
Steel H	not stated	10 m away in varied water depths	157	142	--

D.3. Range to Effects from Pile Driving – Methodology

As discussed in Section 3.2.1.5, pile driving may be conducted by WCCs within the USEC-MidATL, USEC-South, and the GoMEX and Mississippi River proposed action areas during the construction of fixed ATON, and potentially during the discontinuation (i.e., removal) of a fixed ATON. The noise created by pile driving varies with the material and diameter of the pile, as well as the substrate where the pile is being driven. For fixed ATON, the vast majority of piles driven by the WCCs are wood piles with a diameter of 12 inches. Other fixed ATON structures may contain a combination of wood, steel, or concrete piles. Steel piles may be 12–18 inches in diameter or may be a 12 inch H pile, while concrete piles may be 10–14 inches. The vast majority of fixed structures built each year by the Coast Guard that involve pile driving (98 percent) consist of four or fewer piles. Most structures (85 percent) consist of a single pile. The noise ranges of impact pile driving and vibratory pile driving for these type and size ranges of piles are summarized in Table 3-7.

To evaluate the potential for underwater noise from pile driving, the Coast Guard considered the sound levels created during impact or vibratory pile driving, the quantitative thresholds to assess the likelihood of injury, TTS, or behavioral disturbance of fish, sea turtles, and marine mammals, animal behavior, and the SOPs (Appendix B) that will be implemented by the Coast Guard. These ranges relative to established criteria/thresholds are detailed in Table 3-27, Table 3-36, and Table 3-42, respectively. In order to calculate the potential range to effects for each species group, a variety of tools were used, which are outlined below.

D.3.1. Assumptions

Table D- 3 outlines general assumptions used regarding pile driving in order to calculate estimated ranges to effects.

Table D- 3. General Assumptions Used to Calculate Estimated Range to Effects

Assumption	*Value Used*
Strikes per Pile	Wood – 200 strikes per pile
	Steel – 500 strikes per pile
	Steel H – 500 strikes per pile
	Concrete – 1,000 strikes per pile
Piles driven per day	Assuming one pile driving evolution per day, with the potential for 1-12 piles driven in one evolution. These values are denoted by the number of piles listed in each range to effects table for each species.
Measured single strike level	The noise ranges of impact pile driving and vibratory pile driving for these type and size ranges of piles are summarized in Table 3-7.
Distance from source (m)	The noise ranges of impact pile driving and vibratory pile driving are measured at 10 m.

Assumption	Value Used
Transmission loss constant	As pile driving would be conducted in shallow water, a cylindrical model attenuation constant is used. Since this value was unknown, 15 is the advised measurement.
Weighting Factor Adjustment	Impact Pile Driving Hammers – 2kHz
	Vibratory Pile Driving Hammers – 2.5 kHz

D.3.2. Fish

Range to effects for fish were calculated using an excel spreadsheet workbook developed by the NMFS Southeast Regional Office, Protected Resources Division. This tool was developed with the intention of assessing the potential effects to ESA-listed species exposed to elevated noise levels due to pile driving activities. For impact pile driving, the tool utilizes assumed parameters such as number of strikes per pile, the number of piles driven per day, acoustic measurements as defined in Table 3-7 for each pile type, distance from the source measurement, and the transmission loss coefficient. The tool calculates single strike acoustic levels and a cumulative SEL based on the values the user inputs. The threshold values for the onset of injury, TTS for fish greater than and less than 2 grams, and a behavioral response. In fish, these threshold values are 206 dB_{peak}, 187 dB SEL_{cum}, 183 dB SEL_{cum}, and 150 dB RMS, respectively. Distance to thresholds are provided in meters and feet.

For vibratory pile driving, the tool uses similar assumed parameters such as number of seconds of vibration per pile, number of piles per day, acoustic measurements as defined in Table 3-7 for each pile type, distance from the source measurement, and the transmission loss coefficient. The tool calculates acoustic levels at the source and a cumulative SEL based on the values the user inputs. The threshold values for the onset of injury, TTS for fish greater than and less than 102 grams, and a behavioral response. In fish, these threshold values are 206 dB_{peak}, 234 dB SEL_{cum}, 191 dB SEL_{cum}, and 150 dB RMS, respectively. Distance to thresholds are provided in meters and feet.

D.3.3. Sea Turtles

Range to effects for sea turtles were calculated using the same workbook utilized for fish. In their sound exposure guidelines for pile driving, Popper et al. (2014) recommended using the sound levels for fish that do not hear well for injury and mortality thresholds for sea turtles (i.e., 210 dB SELcum and > 206 dBpeak). The Coast Guard used this threshold to evaluate pile driving activities that may injure or kill sea turtles, though the authors noted that because of their rigid anatomy, it is possible that sea turtles are highly protected from impulsive sound effects (Popper et al. 2014). Popper et al. (2014) did not provide a quantitative threshold for the onset of TTS in sea turtles, but qualitatively assessed the relative risk of a sea turtle experiencing such an effect. Lacking specific data on the sound levels that could cause TTS in sea turtles, we will use the sound levels for fish for a TTS threshold for sea turtles (i.e., 187 dB SEL_{cum}). The tool provides a behavioral threshold of 160 dB RMS.

For vibratory pile driving, the tool uses the same assumptions as fish. The threshold values for the onset of injury, TTS for sea turtles, and a behavioral response. In fish, these threshold values are 206 dB_{peak}, 234 dB SEL_{cum}, and 160 dB RMS, respectively. Distance to thresholds are provided in meters and feet.

D.3.4. Marine Mammals

In 2018, NMFS revised technical guidance for assessing the effects of anthropogenic noise on marine mammal hearing. This guidance outlined underwater thresholds for the onset of PTS and TTS in marine mammals. Accompanying this guidance is a spreadsheet tool designed to provide estimated ranges (isopleths) to PTS for low-, mid-, and high-frequency cetaceans, as well as phocid and otariid pinnipeds. While a variety of spreadsheets are made available through this tool, calculations were only conducted using the Vibratory Pile Driving and Impact Pile Driving tabs.

The tool provides two options for calculating the range to PTS from impact pile driving. One method uses the single strike SEL measurement (preferred method) while the other uses the RMS sound pressure level measurement. The RMS sound pressure level measurement method was only used to calculate range to PTS when using 10 in (25 cm) steel H-piles, as no single strike SEL values are available. The tool utilizes assumed parameters such as weighting factor adjustment, number of strikes per pile, the number of piles driven per day, acoustic measurements as defined in Table 3-7 for each pile type, distance from the source measurement, and the transmission loss coefficient. The tool calculates the distance to the PTS isopleth based on the SEL_{cum} threshold for each type of marine mammal species group for impulsive sounds. The SEL_{cum} thresholds for PTS for low-, mid-, and high-frequency cetaceans, as well as phocid and otariid pinnipeds are detailed in Table D- 4.

Ranges to PTS from vibratory pile driving follows a similar method to impact pile driving, however only one method of calculation is provided. The tool utilizes assumed parameters such as weighting factor adjustment, duration to drive a single pile, the number of piles driven per day, acoustic measurements as defined in Table 3-7 for each pile type, distance from the source measurement, and the transmission loss coefficient. The tool calculates the distance to the PTS isopleth based on the SEL_{cum} threshold for each type of marine mammal species for non-impulsive sounds. The SEL_{cum} thresholds for PTS for low-, mid-, and high-frequency cetaceans, as well as phocid and otariid pinnipeds are detailed in Table D- 4.

Ranges to TTS were calculated using the same methods as the PTS calculations. The SEL_{cum} thresholds to effects were updated based on values provided in the technical guidance. For impact and vibratory pile driving, SEL_{cum} thresholds to TTS for low-, mid-, and high-frequency cetaceans, as well as phocid and otariid pinnipeds are detailed in Table D- 4.

Ranges to behavioral reactions from marine mammals was derived from the NMFS tool for calculating the underwater Level B zone of influence for both impact and vibratory pile driving. This tool requires that the user inputs the transmission loss coefficient (15) and the measured source level in dB RMS. Inputting these two variables generated a table and chart that show the source dB contour and the distance in meters where behavioral reactions would occur. The table highlights the distance at which the 160 db (impact pile driving) or 120 db (vibratory pile driving) thresholds are reached. It should be noted that these behavioral disturbance thresholds, particularly for non-impulsive sounds, are conservative, and in most cases, animals would not be disturbed if exposed at these received levels. For example, Southall et al. (2007b) found that cetaceans were more likely to exhibit a behavioral response starting at levels of greater than or equal to 160 dB re 1 µPa, 40 dB higher than the 120 dB threshold for non-impulsive sound. The source level input was changes for each type of pile used.

Table D- 4. Acoustic Thresholds for PTS, TTS, and Behavioral Reactions to Marine Mammals

Marine Mammal Group	*Low-Frequency Cetaceans*	*Mid-Frequency Cetaceans*	*High-Frequency Cetaceans*	*Phocid Pinnipeds*	*Otariid Pinnipeds*
Impact Pile Driving					
PTS Threshold	183 dB SEL_{cum}	185 dB SEL_{cum}	155 dB SEL_{cum}	185 dB SEL_{cum}	203 dB SEL_{cum}
TTS Threshold	168 dB SEL_{cum}	170 dB SEL_{cum}	140 dB SEL_{cum}	170 dB SEL_{cum}	188 dB SEL_{cum}

Marine Mammal Group	***Low-Frequency Cetaceans***	***Mid-Frequency Cetaceans***	***High-Frequency Cetaceans***	***Phocid Pinnipeds***	***Otariid Pinnipeds***
Behavioral Reactions	160 dB SEL_{cum}	160 dB SEL_{cum}	160 dB SEL_{cum}	160 dB SEL_{cum}	160 dB SEL_{cum}
Vibratory Pile Drving					
PTS Threshold	199 dB SEL_{cum}	198 dB SEL_{cum}	173 dB SEL_{cum}	201 dB SEL_{cum}	219 dB SEL_{cum}
TTS Threshold	179 dB SEL_{cum}	178 dB SEL_{cum}	153 dB SEL_{cum}	181 dB SEL_{cum}	199 dB SEL_{cum}
Behavioral Reactions	120 dB SEL_{cum}	120 dB SEL_{cum}	120 dB SEL_{cum}	120 dB SEL_{cum}	120 dB SEL_{cum}

APPENDIX E SPECIES-SPECIFIC HEARING CAPABILITIES

The acoustic stressors associated with the Proposed Action are fathometer and Doppler speed log noise, vessel noise, ATON signal testing noise, tool noise, and pile driving noise. Species within range of these acoustic stressors may be able to detect these acoustic stressors associated with the Proposed Action either in the air or in the water, depending on the species morphology, their preferred habitat, and the medium in which the noise is created. It is assumed that the sound would need to be within the animal's hearing range, the range of frequencies that can be heard by an animal, to be detected. If an animal is unable to detect a sound or hears a faint sound because of its hearing range, it is unlikely the animal would have a behavioral response or hearing loss from the sound. The range of best hearing for each all species group, with the exception of marine mammals, is detailed in the sections below and summarized in Table E- 1. Marine mammals are in Section E.9.

Table E- 1. Range of Best Hearing for Each Species Group

Group	*Range of Best Hearing*	
	In-Air	*In-Water*
Marine Invertebrates (decapods and cephalopods only)	n/a	below 200 Hz, potentially up to 3 kHz
Flying Insects	> 100 kHz over distances greater than 100 ft (30m)	n/a
Birds	1–3 kHz	0.5–4 kHz
Bats	from 0.7 to greater than 40 kHz	n/a
Marine Fish	n/a	most species: 50 Hz – 1 kHz with best sensitivity from 100– 400 Hz specialists: over 4 kHz
Sea Snakes	below 400 Hz	80–160 Hz
Sea Turtles	50–800 Hz, with maximum sensitivity from 300–400 Hz	50 Hz – 1.6 kHz, with maximum sensitivity from 100–400 Hz

E.1. Invertebrate Hearing

Hearing capabilities of invertebrates are poorly understood (Lovell et al. 2005; Popper and Schilt 2008). Although marine invertebrates do not hear in the same way vertebrates do, it is thought they are able to sense vibrations and movements associated with sound production. While data are limited, research suggests that some of the major decapods and cephalopods may have limited hearing capabilities (Edmonds et al. 2016; Hanlon 1987; Offutt 1970), particularly of low frequency sound. In a review of crustacean sensitivity of high amplitude underwater noise by Edmonds et al. (2016), it was found that crustaceans may be able to hear the frequencies at which they produce sound, but it remains unclear which noises are incidentally produced and if there are any negative effects from masking them. Acoustic signals produced by crustaceans range from low frequency rumbles (20–60 Hz) to high frequency signals (20–55 kHz) (Henninger and Watson 2005; Patek and Caldwell 2006; Staaterman 2016). Decapod crustaceans respond primarily to sounds well below 1 kHz (Celi et al. 2014; Edmonds et al. 2016). Both behavioral and auditory brainstem response studies suggest that crustaceans may sense frequencies up to 3 kHz, but best sensitivity is likely below 200 Hz (Goodall et al. 1990; Lovell et al. 2005; Lovell et al. 2006). Most cephalopods likely sense low frequency sound below 1,000 Hz, with best sensitivities at lower frequencies (Budelmann 2010; Mooney et al. 2010; Offutt 1970). A few cephalopods may sense frequencies up to 1,500 Hz (Hu et al. 2009).

Aquatic invertebrates that can sense local water movements with ciliated cells include cnidarians, flatworms, segmented worms, urochordates (tunicates), mollusks, and arthropods (Budelmann 1992a, 1992b; Popper et al. 2001). Some aquatic invertebrates have specialized organs called statocysts for determination of equilibrium and, in some cases, linear or angular acceleration. Statocysts allow an animal to sense movement and may enable some species, such as cephalopods and crustaceans, to be sensitive to water particle movements associated with sound (Hu et al. 2009; Kaifu et al. 2008; Montgomery et al. 2006; Popper et al. 2001). Because the sensory capabilities associated with statocysts are limited to detecting water motion, and water particle motion near a sound source falls off rapidly with distance, aquatic invertebrates are most likely limited to detecting nearby sound sources rather than sound caused by pressure waves from distant sources.

Studies of sound energy effects on invertebrates are few and identify only behavioral responses and some sub-lethal non-auditory responses (Celi et al. 2014; Edmonds et al. 2016; Roberts and Breithaupt 2016). PTS, TTS, and masking studies have not been conducted for invertebrates.

E.2. Flying Insect Hearing

Generally, flying insects are sensitive to high frequency sounds (a few kHz to over 100 kHz), depending on the species. Some butterflies and moths use hearing for communication within their species, while some use it to target prey. Additionally, many flying insects use their hearing to detect and evade predators, specifically echolocating bats (Yager 2012). While the ability to sense sound vibrations is common in the Phylum Arthropoda, the reception of sound pressure waves through a tympanal “ear” is unique to insects (Stumpner and Von Helversen 2001). Pressure-sensitive tympanal ears detect high frequency sounds (> 100 kHz) over long distances (>100 ft [30m]), whereas antennal ears can detect lower frequency sounds (<1 kHz) over shorter distances (inches [centimeters]) (Albert and Kozlov 2016).

E.3. Bird Hearing

In birds, as well as amphibians and reptiles, the ears are internally coupled either through the mouth or through an interaural canal. This allows the ears to sense direction and enhances sound-localization cues (Heffner 2018). Dooling and Okanoya (1995) provided a complete summary of what is known about basic in-air hearing capabilities of a variety of bird species. Broadly, birds hear best in air at frequencies between 1 and 5 kHz, with absolute sensitivity often approaching 0 to 10 dB re 20 µPa at the most sensitive frequency, which usually is in the region of 2 to 3 kHz. A study of diving birds (ducks, gannets, and loons) showed best in-air hearing between 1 and 3 kHz (Crowell et al. 2015b). On average, the spectral limit of “auditory space” available for a bird to vocally communicate in air extends from approximately 0.5 to 6 kHz (Dooling 2002; Witherington and Hirama 2006). Dooling (2009) and Beason (2004) also noted that birds do not hear well at either high or low frequencies when compared to most mammals, and do not hear at frequencies greater than 15 kHz. While there are no studies that have directly analyzed hearing of the ESA-listed bird species located within the proposed action area, data included in this section is thought to be representative of the hearing for these species.

Diving birds may not hear well under water because of adaptations to protect their ears from pressure changes during diving (Dooling and Therrien 2012). Currently, there are few studies on underwater bird hearing or auditory threshold data (Hansen et al. 2017a; Melvin et al. 1999; Therrien 2014). The long-tailed duck (*Clangula hyemalis*) was recorded responding to underwater sound stimuli with frequencies between 0.5 and 2.86 kHz at underwater stimuli greater than 117 dB re 1 µPa at 1 m (Therrien 2014). The most recent study on the underwater hearing range of a diving bird was on great cormorants (*Phalacrocorax carbo*). Hansen et al. (2017b) found that great cormorants can hear between 1 and 4 kHz underwater. Common murres (*Uria aalge*) avoided gill nets with acoustic deterrent devices emitting a 1.5 kHz tone at 120 dB re 1µPa at 1 m (Melvin et al. 1999). For the purposes of analysis, the assumed range of underwater hearing in birds is 0.5–4 kHz, which encompasses all of these studies. Water birds spend a limited amount of time underwater, and Dooling and Therrien (2012) speculate that birds may not depend on underwater hearing to locate prey or avoid predators while diving underwater (although research in this area is lacking).

E.4. Bat Hearing

Although hearing ranges for bats are not well documented, bats generally have poor hearing at low frequencies, which is supported by examination of call frequencies. Bat call frequencies are typically categorized as low- (less than 25 kHz), mid- (from 25–35 kHz), or high frequency (greater than 40 kHz). Bats are able to adjust their frequencies used in echolocation to be either higher or lower than the range of best hearing for their prey (Faure et al. 1993). Bat calls can range from 9 to 200 kHz (Maryland Department of Natural Resources 2019). Some bats have the capacity to hear lower frequencies, particularly insectivorous bats that orient towards low frequency sounds produced by their prey. *Eptesiscus fuscus* has the ability to hear low frequency sounds from 0.7–1.3 kHz (Poussin and Simmons 1982).

E.5. Fish Hearing

All fish have two sensory systems to detect sound in the water: the inner ear, which functions very much like the inner ear in other vertebrates, and the lateral line, which consists of a series of receptors along the fish's body (Popper 2008). Although hearing capability data only exist for fewer than 100 of the 32,000 fish species, current data suggest that most species of fish detect sounds from 50 Hz to 1 kHz. It is believed that most fish have their best hearing sensitivity from 100 to 400 Hz (Popper 2003), including ESA-listed salmon and sturgeon species. While all fish are sensitive to the particle motion component of sound, some fish species possess anatomical specializations in the form of connections between swim bladders and the inner ear that may enhance their sensitivity to the pressure component of sound (Popper 2014). These adaptations allow some fish species such as clupeiformes (herrings, shads, sardines, anchovies) the ability to sense higher frequencies and lower intensities, hearing sounds above 4 kHz (Popper 2008; Popper and Fay 2010).

Unlike other fish, sharks do not have a swim bladder. As such, sharks are incapable of detecting sound pressure and are limited to detection of particle motion only (Casper and Popper 2010). The data on hearing in species tested in the elasmobranch group (e.g., nurse shark, little skate, and Atlantic sharpnose shark) show that they do not hear particularly well, and that their best hearing is at low frequencies (below 100 Hz) (Casper et al. 2003; Casper and Mann 2006, 2009). The hearing range of tested elasmobranchs is from roughly 20 Hz up to 1 kHz, with similar thresholds in all species above 100 Hz (Casper and Mann 2009). Some research suggests that larger piscivorous (fish-eating) sharks, like the scalloped hammerhead shark, may be responsive to frequencies below 40 Hz, but the hearing range of smaller sharks is approximately 40 Hz to 1.5 kHz (Casper and Mann 2006; Myrberg 2001), with reduced sensitivity above 100 Hz and very little sensitivity above 800 Hz (Casper and Mann 2006; Myrberg 2001).

E.6. Amphibian Hearing

In amphibians, as well as reptiles and birds, the ears are internally coupled either through the mouth or through an interaural canal. This allows the ears to sense direction and enhances sound-localization cues (Heffner and Heffner 2018). Amphibian hearing varies depending on if they are in water or on land. While amphibians are well adapted to hearing airborne sounds (Heffner and Heffner 2007), they are also able to hear efficiently underwater and underground (Smotherman and Narins 2004). Hearing studies on amphibians are sparse, though experimental studies exist. Most frog hearing studies are of in-air hearing, though many amphibian species can hear more effectively underwater (Encyclopædia Britannica 2019). Salamanders lack a tympanic middle ear, which limits long-range acoustic communication in terrestrial environments (Crovo et al. 2016). The inner ear of amphibians includes different auditory organs such as the basilar papilla and the amphibian papilla. The amphibian papilla is an auditory organ unique to amphibians that possesses its own membrane and hair cells and covers the mid-frequency portion of an amphibians' auditory range (Van Dijk et al. 2011). Some amphibians have continuous hair cell production, meaning they can recover from hearing damage.

In the Order Anura, hearing ranges are between 450 and 1,350 Hz in true frogs and between 650 and 1,680 Hz in tree frogs (Van Dijk et al. 2011). The hearing range for the green tree frog (*Hyla cinerea*) is between 900 and 3,000 Hz, which is the dominant frequency range for a male tree frog's mating call (Moss and Simmons 1986). Bullfrogs have a 60 dB hearing range of 100 Hz to 3.5 kHz with maximum hearing sensitivity ranging from 1,200 to 1,500 Hz (Encyclopædia Britannica 2019; Feng et al. 1975; Heffner and Heffner 2007). Additionally, bullfrogs are sensitive to low-frequency tones below approximately 500 Hz (Capranica and Moffat 1975). In-water SPL thresholds are similar throughout their hearing range. Hearing sensitivity underwater falls off at about 16 dB/octave with an average loss of about 30 dB above 0.4 kHz (Lombard et al. 1981).

Sound production is present in some species of Caudata including the lesser siren, suggesting intraspecific communication, orientation behavior, and defense (Crovo et al. 2016). Dominant frequencies of acoustic signals used to communicate over short distances are between 2.7 and 11.7 kHz (Crovo et al. 2016). It is believed that Caudata hear within the sound ranges they produce. Salamanders have enhanced underwater hearing capabilities. Most species are sensitive to frequencies above 120 Hz, and these species are most sensitive to frequencies from 1 to 10 kHz (Crovo et al. 2016). Axolotls (*Ambystoma mexicanum*), for example, have a hearing frequency range of 100 to 6,000 Hz (Fehrenbach 2015), though they are not present in the proposed action areas.

E.7. Reptile Hearing

Reptiles have a diverse auditory anatomy that relates to both form and function. In reptiles, as well as amphibians and birds, the ears are internally coupled either through the mouth or through an interaural canal. This allows the ears to sense direction and enhances sound-localization cues (Heffner 2018). Depending on the species, the reptile may detect noise better in water or in air. Table E- 2 presents the general hearing ranges of hearing among groups of reptiles that may be present in the proposed action areas.

Table E- 2. Range of Best Hearing for Each Reptile Group

Reptile Group	*Hearing Range in Air*	*Hearing Range in Water*
Crocodilia: alligators	Range: 300 Hz – 2 kHz[4] Peak sensitivity: 1-1.5 kHz[5]	Range: 300 Hz – 2 kHz[4] Peak sensitivity: 800 Hz
Squamata: snakes	Range: 50 Hz – 1 kHz Peak sensitivity: 200-300 Hz	N/A
Squamata: lizards	Range: 500 Hz – 4 kHz Peak sensitivity: 700 Hz	N/A
Testudines: turtles, tortoises, terrapins (based on red-eared slider ABR tests)	Peak sensitivity: 300-500 Hz[1]	Peak sensitivity: 500-600 Hz[1] Thresholds: 20-30 dB lower than in air thresholds
Testudines: sea turtles	N/A	Range: 30 Hz – 2 kHz Peak sensitivity: 100-800 Hz[2] Juvenile Range: 100-500 Hz Peak: 200-400 Hz[3]

N/A = Not Applicable
[1] (Christensen-Dalsgaard et al. 2012b)
[2] (Bartol and Ketten 2006; Bartol et al. 1999; Lenhardt 2002; Lenhardt 1994; Ridgway et al. 1969)
[3] (Bartol and Ketten 2006; Bartol et al. 1999; Yudhana et al. 2010)
[4] (Bierman and Carr 2015)
[5] (Higgs et al. 2002; Wever 1971)
[6] (Christensen-Dalsgaard and Manley 2005; Mader 2005)

E.7.1. Crocodiles

It has been shown that American alligators can detect both in-air and underwater sound signals (Dinets 2011). Auditory brainstem response (ABR) audiograms showed that the hearing range for alligators is best between 300 Hz and 2 kHz (Bierman and Carr 2015). In water, best sensitivity was observed at 800 Hz, and no responses were observed to exposures at 4 kHz. Crocodilian hearing is most sensitive at low frequencies. Best hearing range in-air was found between 1 and 1.5 kHz, with poor sensitivity above 2 kHz (Higgs et al. 2002; Wever 1971). Hearing range was observed to extend to higher frequencies in-air than in water (Higgs et al. 2002).

E.7.2. Snakes

Snakes are able to detect sound from vibrations in the air and from the ground. In air, they hear at frequencies between 50 and 1,000 Hz, with their peak sensitivity between 200–300 Hz (Carson 1998). In general, research on the hearing range of snakes is deficient both in-air and underwater. Although sea snakes are not found within the proposed action areas, there is some relevant research on sea snake motion detection which is assumed to have an importance in sensory function (water snakes are assumed to use the same sensory function). Unlike terrestrial snakes, marine organisms sense water movement using specialized receptors. Comparable to tactile mechanoreceptors such as whiskers of pinnipeds and papillae of crocodilians, sea snakes have scale sensilla (small tactile mechanosensory organs on their head scales) (Dehnhardt et al. 1998; Dehnhardt et al. 2001; Denny 1993; Povel and Van Der Kooij 1996; Soares 2002; Thewissen and Nummela 2008). Scale sensillas, which are common to many Squamata reptiles (including snakes and lizards), sense the displacement of water (Crowe-Riddell et al. 2016). Most lizards hear in the same range as the green iguana, from 500 to 4,000 Hz, with a sensitivity peak at 700 Hz, equal to about 24 dB (Christensen-Dalsgaard and Manley 2005; Mader 2005).

E.7.3. Turtles and Sea Turtles

Hearing sensitivity in the Testudines species group is best underwater due to the structure of their large middle ear. Hearing of a red-eared slider (*Trachemys scripta elegans*) was measured underwater and showed peak vibrations from 500 to 600 Hz (Christensen-Dalsgaard et al. 2012b). In air, ABR tests showed best sensitivity from 300 to 500 Hz. Underwater thresholds are 20 to 30 dB lower than in-air thresholds (Christensen-Dalsgaard et al. 2012b).

The role of underwater hearing in sea turtles is unclear and few sea turtles have been studied to determine auditory thresholds. Sea turtles are typically out of water only during nesting activities, which do not occur within the proposed action areas; therefore, only underwater hearing is discussed. Research suggests that sea turtles are low-frequency hearing specialists, typically hearing frequencies from 30 to 2,000 Hz, with a range of maximum sensitivity between 100 and 800 Hz (Bartol and Ketten 2006; Bartol et al. 1999; Lenhardt 2002; Lenhardt 1994; Ridgway et al. 1969). Juvenile and subadult sea turtles of a range of species detect sounds from 100 to 500 Hz underwater, with maximum sensitivity at 200 and 400 Hz (Bartol and Ketten 2006; Bartol et al. 1999; Yudhana et al. 2010). ABR testing also was used to detect thresholds for juvenile green turtles (lowest threshold 93 dB re 1 µPa at 600 Hz) and juvenile Kemp's ridley turtles (thresholds above 110 dB re 1 µPa across hearing range) (Bartol and Ketten 2006). Functional hearing of all species of sea turtles, for the purposes of this analysis, is assumed to be 10 Hz to 2 kHz.

E.8. Terrestrial Mammal Hearing

In the evolution of mammals, the two ears are isolated, having lost the directionality of coupled ears found in birds, amphibians, and reptiles. Mammals have evolved both the ability to hear sounds well above 10 kHz (high frequency hearing) and external ears, or pinnae. This allowed them to use two high frequency cues for localizing: the difference in the intensity of a sound at the two ears, and the directionality induced by the pinnae. Because the magnitude of high frequency cues depends on the size of the head and pinnae relative to the wavelength of the sound, smaller mammals hear higher frequencies than larger mammals. Localization acuity, however, is related to the accuracy needed to direct the eyes to a sound source. The result is that mammals with relatively narrow fields of best vision (e.g., humans and cats) require more accurate localization acuity to direct their gaze than animals with broad fields of best vision (e.g., gerbils and cattle). Subterranean mammals (specifically the pocket gopher, naked mole rat, and blind mole rat), are not able to hear frequencies as high as their head size would predict and can also not localize sounds. They are not only unable to distinguish left sounds from right sounds, but they also lack pinnae and are therefore not under selective pressure to hear high frequencies to make front to back distinctions (Heffner and Heffner 2008).

The range of variation in mammalian low frequency hearing is known to be greater than that for high frequency hearing. There are many species from different orders, including rodents and carnivores, that are sensitive to both high and low frequencies, with audiograms in some cases spanning over 13 octaves (Heffner and Heffner 2015). Table E- 3 presents the general hearing ranges of hearing among groups of terrestrial mammals that may be present in the proposed action areas.

Table E- 3. Range of Best Hearing for Each Terrestrial Mammal Group

Representative Terrestrial Mammal	***Hearing Range***	***Highest Frequency and Sensitivity***
Chipmunk	At a level of 60 dB SPL, the chipmunks have a broad hearing range extending from 39 Hz to 52 kHz (10.4 octaves) with an average best sensitivity of 16.7 dB at 1 kHz.	56 kHz is the highest frequency to which they responded; only 500 Hz and 1 kHz are audible at levels below 20 dB SPL
Groundhogs	At a level of 60 dB SPL, the groundhogs have a broad hearing range extending from 40 Hz to 27.5 kHz (9.4 octaves) with an average best sensitivity of 21.5 dB at 4 kHz. Best hearing occurs at 4 and 8 kHz	32 kHz was the highest frequency to which they responded; they do not hear appreciably below 20 dB SPL
Hamsters	At a level of 60dB SPL, the hamsters show a broad hearing range ex-tending from 96 Hz to 46.5 kHz (8.9 octaves) with an average best sensitivity of 1 dB at 10 kHz	50 kHz was the highest frequency to which they responded; below 20 dB SPL their range of best hearing is from 4 to 12.5 kHz
Darwin’s leaf-eared mice	At a level of 60 dB SPL, their hearing range extends from 1.55 kHz to 73.5 kHz (5.5 octaves) with an average best sensitivity of 33.5 dB at 11 kHz.	80 kHz was the highest frequency to which one animal responded; ability to hear below 20 dB SPL is limited to a narrow range around 8–11 kHz
Spiny mice	At a level of 60 dB SPL, their hearing range extends from 2.3 kHz to 71 kHz(4.9 octaves) with an average best sensitivity of 14 dB at 8 kHz.	80 kHz was the highest frequency to which they responded; able to hear below 20 dB SPL at two frequencies, 8 and 16 kHz
Domestic cat	At 70 dB SPL, domestic cats’ hearing range spanned from 48 Hz to 85 kHz. The audiogram showed a very broad range of good hearing from 500 Hz to 32 kHz.	In cats, Huang et al. (2000) suggest that the data generally support the idea that in larger felids, the middle ear response is shifted to lower frequencies.
Red fox	At 60 dB SPL, red foxes perceive pure tones between 51 Hz and 48 kHz, spanning 9.84 octaves with a single peak sensitivity of −15 dB at 4 kHz.	
White-tailed deer	At a level of 60 dB SPL, their hearing range extends from 115 Hz to 54 kHz with a best sensitivity of −3 dB at 8 kHz; increasing the intensity of the sound extends their hearing range from 32Hz (at 96.5 dB) to 64kHz (at 93 dB).	

Source: Heffner et al. 2001; Malkemper et al. 2015; Heffner and Heffner 2010

E.8.1. Rodents

There are roughly 20 species of rodents for which audiograms have been produced, and these species have a median upper frequency detection limit of 52 kHz (Heffner et al. 2001). Rodents show more variation in high-frequency hearing than any other order of mammals. Rodent high-frequency hearing limits extend from 5.9 kHz for the blind mole rat (the poorest high-frequency limit of any mammal) to 92 kHz for the wild house mouse, a range of 3.96 octaves (Heffner and Heffner 1998). Only echolocating bats and cetaceans are known to hear higher frequencies than rodents (Bitter et al. 2001).

E.8.2. Deer

Using auditory brainstem response testing, it was determined that white-tailed deer hear between 0.25–30 kHz, with best sensitivity from 4–8 kHz. While the upper limit of human hearing lies at about 20 kHz, white-tailed deer detected frequencies to at least 30 kHz (D'Angelo et al. 2007). The better high frequency hearing of deer is explained by the observation that mammals rely on high-frequency cues to localize sound, high frequencies being particularly important for localization in the vertical plane and for preventing front-back confusions (Heffner and Heffner 2008). As has been demonstrated in reindeer, the pinnae of deer are directional for high frequencies and sensitivity may be reduced by 20 dB or more when the pinnae are pointed away from the sound source (Flydal et al. 2001). Compared with humans, white-tailed deer have better high frequency but poorer low frequency hearing (Heffner and Heffner 2008).

E.8.3. Cats

The hearing range of cats is believed to be between 5 and 32 kHz, though there are discrepancies with the limits. According to the literature, cats can hear ultrasonic frequencies, but to what extent is unclear. The lower limit of hearing is recorded as 125 Hz. While the upper limit is not well defined, it is typically below 60 kHz (Kruger et al. 2021), except for in one study by Heffner and Heffner (1985).

E.9. Marine Mammal Hearing

Marine mammals use sound for communication, feeding, and navigation. Measurements of marine mammal sound production and hearing capabilities provide some basis for assessment of whether exposure to a particular sound source may affect a marine mammal behaviorally or physiologically. Hearing has been directly measured in some odontocete and pinniped species [in air and underwater] (Erbe et al. 2016; Finneran 2016; Southall et al. 2007b). To better reflect marine mammal hearing, Southall et al. (2007b) recommended that marine mammals be divided into hearing groups and in 2016 and revised in 2018, NMFS made modifications as part of their technical guidance (National Marine Fisheries Service 2018a). Table E- 4 presents the general hearing ranges for marine mammals, modified from the NMFS technical guidance (National Marine Fisheries Service 2018a) that may be present in the proposed action areas.

Table E- 4. Generalized Hearing Range for Each Marine Mammal Group

Hearing Group	***Generalized Hearing Range***
LF cetaceans (baleen whales)	7 Hz to 35 kHz
MF cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
HF cetaceans (true porpoises, *Kogia*, river dolphins, cephalorhynchid, *Lagenorhynchus cruciger*, *L. australis*)	275 Hz to 160 kHz
SI: manatees and dugongs	*
PW underwater (true seals)	50 Hz to 86 kHz
OW underwater (sea lions, fur seals, sea otter, and polar bears)**	60 Hz to 39 kHz

HF: high-frequency marine mammal hearing group; LF: low-frequency marine mammal hearing group MF: mid-frequency marine mammal hearing group; OW: otariid and non-phocid marine carnivore hearing group; PW: phocid marine mammal hearing group; *SI: manatees and dugongs; NMFS (2018a) included all available datasets from in-water groups, including sirenian datasets (Gerstein et al. 1999; Mann et al. 2009a); Behavioral and Auditory Evoked Potential threshold measurements for manatees have revealed lower upper cutoff frequencies and sensitivities compared to the mid-frequency cetaceans (National Marine Fisheries Service 2016b, 2018a); see Section 3.2.1.6; **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.

E.9.1. Mysticetes

Direct measurements of mysticete hearing are lacking. Thus, hearing predictions for mysticetes are based on other methods including: anatomical studies and modeling (Cranford and Krysl 2015; Houser et al. 2001b; Parks et al. 2007; Tubelli et al. 2012); vocalizations (see reviews in (Au and Hastings 2008; Richardson et al. 1995; Wartzok and Ketten 1999)); taxonomy; and behavioral responses to sound ((Dahlheim and Ljungblad 1990); see review in (Reichmuth et al. 2007)). It is generally assumed that most animals hear well in the frequency ranges similar to those used for their vocalizations (songs or calls), which are mainly below 1 kHz in baleen whales (Richardson et al. 1995). Although auditory frequency range and vocalization frequencies do not always perfectly align, caution should be taken when considering vocalization frequencies along in predicting hearing capabilities of species for which no data exists, like mysticetes. Estimation of hearing ability based on inner ear morphology was completed for two baleen whale species: humpback whales (700 Hz to 10 kHz; (Houser et al. 2001a) and North Atlantic right whales (10 Hz to 22 kHz; (Parks et al. 2007)). Further, preliminary anatomical data indicate minke whales may be able to hear slightly above 22 kHz (Ketten and Mountain 2009). The anatomy of the baleen whale inner ear seems to be well adapted for detection of low-frequency sounds (Ketten 1992a, 1992b, 1994). Thus, the auditory system of baleen whales is almost certainly more sensitive to low-frequency sounds than that of the small- or moderate-sized toothed whales. However, auditory sensitivity in at least some large whale species extends up to higher frequencies than the maximum frequency of the calls, and relative auditory sensitivity at different low-moderate frequencies is unknown.

E.9.2. Odontocetes

Odontocetes use high-frequency biosonar signals to sense their environment. They have a broad hearing range extending to 200 kHz, but the frequency of best hearing range from 150 Hz to 160 kHz (Mooney et al. 2012; Tougaard et al. 2014). Auditory response curves for odontocetes show maximum auditory sensitivity near the frequencies where toothed whale signals have peak power (Mooney et al. 2012; Tougaard et al. 2014) at about 1,000 to 20,000 Hz for social sounds and 10,000 to 100,000 Hz or higher for echolocation. Like mysticetes, it is assumed that most animals hear well in the frequency ranges similar to those used for their vocalizations (songs or calls); although auditory frequency range and vocalization frequencies do not always perfectly align. Odontocetes use underwater communicative signals that, while not as low in frequency as those of many mysticetes, likely serve similar functions. These include tonal whistles, clicks, and pulsed calls in some odontocetes. Odontocetes generate short-duration (500–200 microseconds), specialized clicks used in biosonar with peak frequencies between 10 and 200 kHz to detect, localize, and characterize underwater objects such as prey (Au 1993; Wartzok and Ketten 1999). These clicks are often more intense than other communicative signals, with reported source levels as high as 229 dB re 1 µPa peak-to-peak (Au et al. 1974). The echolocation clicks of high-frequency cetaceans (e.g., porpoises) are narrower in bandwidth (i.e., the difference between the upper and lower frequencies in a sound) and higher in frequency than those of mid-frequency cetaceans.

E.9.3. Pinnipeds and Carnivores

Unlike cetaceans who spend their entire lives in the water, pinnipeds and carnivores are adapted to live part of their lives in water and part on land and therefore would be expected to adapt to hearing in water and in air. Underwater hearing in otariid seals is adapted to low frequency sound and less auditory bandwidth than phocid seals. Hearing in otariid seals has been tested in California sea lion (Kastak and Schusterman 1998) and northern fur seal (Babushina et al. 1991; Moore and Schusterman 1987), whose ranges overlap with the proposed action areas. Kastelein et al. (2005) provided underwater audiograms of a male and female Steller sea lion, whose range also overlaps with the proposed action area. The audiogram of the male had a maximum hearing sensitivity at 77 dB at 1 kHz, with a best hearing range, between 1 and 16 kHz. The female Steller sea lion had a maximum sensitivity at 73 dB at 25 kHz. Kastelein et al. (2005) concluded that low frequency sounds are audible to Steller sea lions. Based on these studies, otariid seals would be expected to hear sounds within the ranges of 50 Hz to 75 kHz in air and 50 Hz to 50 kHz in water.

Phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemila et al. 2006; Kastelein 2009; Reichmuth et al. 2013). Phocid ears are anatomically distinct from otariid ears in that phocids have larger, more dense middle ear ossicles, inflated auditory bulla, and larger sections of the inner ear (i.e., tympanic membrane, oval window, and round window), which make them more adapted for underwater hearing (Hemila et al. 2006; Kastak and Schusterman 1998; Mulsow et al. 2011; Reichmuth et al. 2013; Schusterman and Moore 1978; Terhune and Ronald 1975).

Hearing in odobenids (walrus) and polar bears are both very similar to that of otariids. The walrus is the only extant odobenid pinniped and may be found within the Arctic proposed action area. The walrus is adapted to low-frequency sound with a range of best hearing in water from 1 to 12 kHz and maximum hearing sensitivity around 12 kHz; its hearing ability falls off sharply at frequencies above 14 kHz (Kastelein et al. 2002; Kastelein et al. 1996). The walrus hearing sensitivity is most similar to otariids, and therefore the walrus is assigned the same functional hearing range as for otariids for this analysis. Functional hearing limits are conservatively estimated to be 50 Hz–35 kHz in air and 50 Hz–50 kHz in water (Southall et al. 2007b).

Traditional behavioral audiometry is difficult to perform for polar bears. Therefore, obtaining data on the hearing capabilities of polar bears presents a challenge. There have been a number of recent measurements of large mammal hearing using auditory evoked potential audiometry (Nachtigall et al.

2005; Supin et al. 2001; Yuen et al. 2005). Using this technique, the in-air range of best sensitivity for polar bears has been measured from 11.2–22.5 kHz by Nachtigall et al. (2007). Southall et al. (2007b) determined that the polar bear has a range of best hearing from 50 Hz–50 kHz in water and 50 Hz–35 kHz in air.

Ghoul and Reichmuth (2014) studied a male sea otter and determined that the aerial audiogram of the sea otter resembled that of sea lions and showed a reduction in low-frequency sensitivity relative to terrestrial mustelids. Best sensitivity was 1 dB re 20 µPa at 8 kHz. Under water, hearing sensitivity was significantly reduced when compared to sea lions and other pinniped species, demonstrating that sea otter hearing is primarily adapted to receive airborne sounds. Critical ratios were more than 10 dB higher than those measured for pinnipeds, suggesting that sea otters are less efficient than other marine carnivores at extracting acoustic signals from background noise, especially at frequencies below 2 kHz.

E.9.4. Sirenians

Behavioral data on manatees indicate they have an underwater hearing range of approximately 400 Hz to 76 kHz (Gerstein et al. 2008; Gerstein et al. 1999; Mann et al. 2009b). Gerstein et al. (1999) obtained behavioral audiograms for two West Indian manatees and found an underwater hearing range of approximately 400 Hz to 76 kHz, with best sensitivity around 16 to 18 kHz. Mann et al. (2009b) obtained masked behavioral audiograms from two manatees; sensitivity was shown to range from 250 Hz to 90 kHz, although the detection level at 90 kHz was 80 dB above the manatee's frequency of lowest sensitivity (16 kHz). Behavioral and audio evoked potential threshold measurements for manatees have revealed lower and upper cutoff frequencies and sensitivities compared to the mid-frequency cetaceans (National Marine Fisheries Service 2016b, 2018a). Sirenians communicate by sound and this communication is best developed between a mother and calf. Cows and calves use vocalizations to keep track of one another—it is believed that these animals can identify and distinguish one another based on their chirps and barks.

APPENDIX F THE NATIONAL AMBIENT AIR QUALITY STANDARDS

The criteria pollutants, which are the principal pollutants defining the air quality, include CO, SO_2, NO_2, O_3, suspended PM less than or equal to 10 microns in diameter, fine PM less than or equal to 2.5 microns in diameter, and lead. CO, SO_2, lead, and some particulates are emitted directly into the atmosphere from emissions sources. O_3, NO_2, and some particulates are formed through atmospheric chemical reactions that are influenced by weather, ultraviolet light, and other atmospheric processes. The NAAQS are classified as primary or secondary and provide details about these pollutants. Primary standards protect against adverse health effects; secondary standards protect against welfare effects (e.g., damage to farm crops and vegetation and damage to buildings). Some pollutants have long- and short-term standards. Long-term standards were established to protect against chronic health effects while short-term standards are designed to protect against acute, or short-term, health effects. Areas that are and have historically been in compliance with the NAAQS are designated as attainment areas. Areas that violate a federal air quality standard are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment. Table F- 1 presents NAAQS.

Table F- 1. National Ambient Air Quality Standards

Pollutant		*Primary or Secondary*	*Averaging Time*	*Level*	*Form*
Carbon Monoxide (CO)		Primary	8 Hours	9 ppm (10 mg/m3)	Not to be exceeded more than once per year
			1 Hour	35 ppm (40 mg/m3)	
Lead		Primary and Secondary	Rolling 3-month period	0.15 µg/m3 (1)	Not to be exceeded
Nitrogen Dioxide (NO2)		Primary	1 Hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Primary and Secondary	1 Year	53 ppb (2)	Annual mean
Ozone (O3)		Primary and Secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (particulate matter)	PM2.5	Primary	1 year	12.0 µg/m3	Annual mean, averaged over 3 years
		Secondary	1 year	15.0 µg/m3	Annual mean, averaged over 3 years
		Primary and Secondary	24 hours	35 µg/m3	98th percentile, averaged over 3 years
	PM10	Primary and Secondary	24 hours	150 µg/m3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO2)		Primary	1 Hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3 Hours	0.5 ppm	Not to be exceeded more than once per year

In areas designated nonattainment for the lead standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standard (1.5 µg/m^3 as a calendar quarter average) also remain in effect.

Pollutant	***Primary or Secondary***	***Averaging Time***	***Level***	***Form***

The level of the annual nitrogen dioxide standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4)The previous sulfur dioxide standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous sulfur dioxide standards or is not meeting the requirements of a State Implementation Plan call under the previous sulfur dioxide standards (40 CFR 50.4(3)).

Source: U.S. Environmental Protection Agency 2016. Last updated December 20, 2016.

Notes: $\mu g/m^3$= micrograms per cubic meter; ppb= parts per billion; ppm=parts per million; $PM_{2.5}$= fine particulate matter less than or equal to 2.5 microns in diameter; PM_{10}= fine particulate matter less than or equal to 10 microns in diameter.

APPENDIX G RESPONSES TO PUBLIC COMMENTS

This Draft PEIS assessed how operations and training activities associated with the WCC program acquisition strategy could potentially impact human and natural resources. Following publication of the Notice of Availability (NOA) to prepare a Programmatic EIS in the Federal Register, the Coast Guard has prepared this Draft PEIS in accordance with NEPA, as implemented by the CEQ Regulations (40 CFR §§ 1500 *et seq.*); DHS Directive Number 023-01, Rev. 01 and Instruction 023-01-001, Rev. 01; and Coast Guard Commandant Instruction 5090.1.

Following a 45-day public comment period on the Draft PEIS, the Coast Guard will review and respond to comments in writing and, if appropriate, incorporate changes in the Final PEIS. The Final PEIS will be circulated for a 30-day wait period. Following the 30-day wait period, the Coast Guard will prepare a Record of Decision that will formally document the selected alternative for the project and mitigation to be implemented by the Coast Guard, and address substantive new comments received on the Final PEIS.

Placeholder: *This section is incomplete because the Coast Guard intends to conduct a 45-day public comment period on the Draft PEIS and will update this section before the Final PEIS is completed.*

APPENDIX H ADDITIONAL INFORMATION BY SPECIES GROUP

H.1. Amphibians

H.1.1. Oregon Spotted Frog

The Oregon spotted frog was listed as threated under the ESA on August 28, 2014 (79 FR 51657; August 29, 2014). Critical habitat has been designated (81 FR 29336; May 11, 2016), but is outside of the proposed action areas.

The Oregon spotted frog is distributed as geographically-isolated, small populations in Oregon, Washington, California, and British Columbia. They are associated with freshwater marshes and lakes where they breed in early spring in warm emergent vegetated shallows. The Oregon spotted frog is highly aquatic and reliant on connected seasonal habitats for breeding, summer foraging, and overwintering (U.S. Geological Service n.d.). Oregon spotted frogs would be expected in rivers that are tributaries to the Columbia River, such as Klickitat and White Salmon Rivers (79 FR 51658; August 29, 2014). Due to the discrete area in which this species is found, overlap with the Proposed Action would be minimal. Oregon spotted frogs are opportunistic predators that prey on primarily insects. They also eat other frogs including adult Pacific tree frogs (*Pseudacris regilla*) and western toad (*Anaxyrus boreas*) juveniles (Licht 1986; Pearl et al. 2005; Pearl and Hayes 2002).The Oregon spotted frog may be present in the PNW proposed action area.

H.1.2. Reticulated and Frosted Flatwoods Salamanders

The reticulated flatwoods salamander was listed as endangered under the ESA in 2009 (74 FR 6700; February 10, 2009). Critical habitat has been designated (74 FR 6700; February 10, 2009), inland near Mobile Bay, but outside of waterways; therefore critical habitat for this species is not within the proposed action areas. The reticulated flatwoods salamander is restricted to the northern coastal plain of the Gulf of Mexico, and its historical range included parts of southern Alabama, north Florida, and Georgia (Center for Biological Diversity n.d.).

The frosted flatwoods salamander was listed as threatened under the ESA in 1999 (64 FR 1569; April 1, 1999). Critical habitat has been designated (74 FR 6700; February 10, 2009), but is located outside of waterways; therefore critical habitat for this species is not within the proposed action areas. The frosted flatwoods salamander has a very narrow geographic distribution, occurring only in the southeastern coastal plain of the United States. They can be found east of the Apalachicola River in northern Florida, as well as in southern South Carolina and Georgia (Center for Biological Diversity n.d.; Pauly et al. 2007).

Both of these salamander species inhabit longleaf pine-wiregrass flatwoods and savannas in the southeastern coastal plain. They spend most of their lives underground, in crayfish burrows, and root channels. They emerge in the early winter rains to breed in small seasonal wetlands (Center for Biological Diversity n.d.). As larvae they feed on invertebrates and as adults they primarily eat earthworms and arthropods. Overlap with the waterways of the proposed action areas would be minimal. The reticulated and frosted flatwoods salamanders may be present in portions of the GoMEX and Mississippi River and USEC-South proposed action areas.

H.2. Fish

Table H- 1. Fish Species Not Expected in the Proposed Action Areas

Taxonomic Order	***Representative Species or Groups***	***Water Column Location***
Chimaeriformes	Rabbitfish, ratfish, chimeras	Demersal, bathydemersal
Lampriformes	opahs, oarfish	Mesopelagic and bathypelagic
Myctophiformes	lanternfishes	Mesopelagic and bathypelagic
Notacanthiformes	Gilbert's halosaurid fish, snubnosed spiny eel	Bathypelagic, bathydemersal
Osmeriformes	argentines, deep-sea smelts	Mesopelagic and bathypelagic
Percopsiiformes	Cave fish, pirate perch	Freshwater caves and crevasses
Pristiformes	sawfishes	Demersal, coastal
Stomiiformes	Dana viperfish, ribbon sawtail fish	Mesopelagic and bathypelagic
Zeiformes	dories, boarfishes	Mesopelagic and bathypelagic

Table H- 2. ESA-Listed Fish Species Not Impacted by the Proposed Action

Common Name	***Scientific Name***	***Habitat***	***Reason For Exclusion***
Spotfin chub	*Cyprinella monacha*	Clear, large creeks or medium-sized rivers of moderate gradient, in upland and montane areas	Habitat restricted to non-navigable tributaries
Okaloosa darter	*Etheostoma okaloosae*	Florida streams and bayous located almost entirely on Eglin Air Force Base	Habitat does not overlap
Niangua darter	*Etheostoma nianguae*	Rocky pools and rins of clear creeks and small North-flowing tributaries of the Osage River Basin.	Habitat restricted to non-navigable tributaries
Slackwater darter	*Etheostoma boschungi*	This darter typically inhabits gravel-bottomed pools in sluggish areas of creeks and small rivers that generally are not more than 12 meters wide and 2 meters deep	Habitat restricted to non-navigable tributaries

Common Name	*Scientific Name*	*Habitat*	*Reason For Exclusion*
Slender chub	*Erimystax cahni*	Isolated portions of Clinch and Powell river systems. Gravel bars and shoals in moderate to swift currents; depths primarily 25-100cm	Exceptionally rare and restricted to depths generally too shallow for navigation
Trispot darter	*Etheostoma trisella*	Stream edges, quiet backwaters, or pools in the Coosa River System	Habitat restricted to non-navigable tributaries
Bayou darter	*Etheostoma rubrum*	Within Bayou Pierre and tributaries, occupies fast rocky riffles of shallow, meandering creeks and small to medium rivers. Most common near heads of gravel riffles in water less than 15 to 30 cm deep.	Habitat restricted to depths too shallow for navigation
Yellowfin madtom	*Noturus flavipinnis*	Generally under cover (undercut banks, trees, roots) in slow pools and occasionally small backwaters off runs and riffles, within the upper Tennessee River drainage[1].	Habitat does not overlap with navigable portions of waterways
Chucky madtom	*Noturus crypticus*	restricted to two riffle areas in Little Chucky Creek, a third order tributary of the Nolichucky River	Habitat restricted to non-navigable tributaries
Smoky madtom	*Noturus baileyi*	Clear, cool, rocky riffles, runs, and flowing pools of Citico creek, a Little Tennessee River tributary	Habitat restricted to non-navigable tributaries
Arkansas river shiner	*Notropis girardi*	Remnant populations may persist in the Cimarron and Beaver Rivers as well as two restricted segments of the Canadian River.	Historical range overlaps proposed action area, but present documented range restricted to outside proposed action area.
Topeka shiner	*Notropis topeka*	Quiet, open, permanent pools of small, clear, high-quality headwaters and creeks, including tiny spring-fed pools in headwater streams.	Habitat restricted to non-navigable tributaries

Common Name	***Scientific Name***	***Habitat***	***Reason For Exclusion***
Alabama cavefish	*Speoplatyrhinus poulsoni*	Endemic to Key Cave in Lauderdale County, Alabama	Habitat geographically overlaps proposed action area, but is exclusively subterranean
Snail darter	*Percina tanasi*	Inhabits sand and gravel shoals of moderately flowing, vegetated, large creeks and rivers in the upper Tennesee River system.	Habitat does not overlap with navigable portions of waterways
Alabama sturgeon	*Scaphirhynchus suttkusi*	Restricted to inland freshwater wetlands of the Alabama River system.	Habitats which overlap with navigable waterways are outside of proposed action area

H.3. Marine Mammals

Table H- 3. Mysticete Species, MMPA Stock, and DPS Presence in the Proposed Action Areas

Common Name (Scientific Name)	***MMPA Stock, DPS and ESA-Listing Status[1]***	***Distribution of the Stock/DPS***	***Proposed Action Area(s)***	***Critical Habitat within Proposed Action Area(s)***
Blue whale (*Balaenoptera musculus*)	Western North Atlantic; Endangered	Western North Atlantic from Arctic to mid-latitude waters; Rare occurrences in Florida and Gulf of Mexico waters	USEC-MidATL; USEC-South; GoMEX and Mississippi River	None
	Eastern North Pacific; **Endangered**	Migrate between waters Gulf of California, Mexico and Costa Rica and the California Coast.	SEAK	None
Bryde's whale (*Balaenoptera edeni*)	Northern Gulf of Mexico, Gulf of Mexico DPS; Endangered	Northeastern Gulf of Mexico in the De Soto canyon, along continental shelf break between 100 m and 400 m depth.	GoMEX and Mississippi River	None
Fin whale (*Balaenoptera physalus*)	Western North Atlantic; Endangered	Offshore waters of Cape Hatteras north to Nova Scotia.	USEC-MidATL; USEC-South	None
	Northeast Pacific; **Endangered**	Alaskan waters, including the Bering Sea and Gulf of Alaska (Central Alaskan Coast, Aleutian Islands).	SEAK	None
Gray whale (*Eschrichtius robustus*)	Eastern North Pacific	Migrate between Chukchi, Beaufort and northwestern Bering Seas (summer) to lagoons of Baja California, Mexico (winter).	SEAK	None
	Western North Pacific DPS; Endangered	Okhotsk Sea, Russia and Bering Sea (summer) and eastern Asia (winter).	SEAK	None
Humpback whale[2] (*Megaptera novaeangliae*)	Gulf of Maine stock (formerly Western North Atlantic); West Indies DPS	Migrate from feeding grounds in Gulf of Maine and to the Caribbean (majority off of Dominican Republic).	USEC-MidATL; USEC-South	None
	Western North Pacific stock (Hawaii DPS;	Migrate between feeding grounds in Alaska (Gulf of Alaska, Bering Sea,	SEAK	Proposed Rule: 84 FR 54354, October 9, 2019

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status*[1]	*Distribution of the Stock/DPS*	*Proposed Action Area(s)*	*Critical Habitat within Proposed Action Area(s)*
	Western North Pacific DPS- **Endangered)**	west along the Aleutian Islands to the Kamchatka Peninsula) and wintering grounds in Hawaii and Asia.		
	Central North Pacific stock (Hawaii DPS; Mexico DPS- **Threatened;** Central American DPS- **Endangered**)	Feeding areas of this stock overlap with Western North Pacific stock in British Columbia to Bering Sea. Dispersed between Alaskan and Hawaiian waters.	SEAK	Proposed Rule: 84 FR 54354, October 9, 2019
Minke whale (*Balaenoptera acutorostrata*)	Canadian Eastern Coastal	Coastal and offshore waters of Canada and New England to the Caribbean and Gulf of Mexico.	USEC-MidATL; USEC-South; GoMEX and Mississippi River	None
	Alaska	Waters of the Chukchi and Bering Seas and inshore waters of Gulf of Alaska.	SEAK	None
North Atlantic right whale (*Eubalaena glacialis*)	Western Stock; Endangered	Coastal waters of southeastern U.S. to New England waters and the Canadian Bay of Fundy, Scotian Shelf and Gulf of St. Lawrence.	USEC-MidATL; USEC-South	81 FR 4837, January 27, 2016
North Pacific right whale (*Eubalaena japonica*)	Eastern North Pacific; **Endangered**	Gulf of Alaska and Bering Sea, along the California coast to Baja California, Mexico.	SEAK	73 FR 19000, April 08, 2008
Sei whale (*Balaenoptera borealis*)	Nova Scotia; Endangered	Continental shelf waters of the northeastern U.S. and extends northwestward to south of Newfoundland, Canada.	USEC-MidATL; USEC-South	None

[1] All marine mammals in the United States are offered protection under the Marine Mammal Protection Act. Some species are offered further protection under the Endangered Species Act.

[2] NOAA identified 14 DPS worldwide and revised ESA listings (81 FR 62259, September 8, 2016). The DPS that occur in waters under U.S jurisdiction do not necessarily equate to exiting MMPA stocks. No changes to current stock structures are proposed at the time of the drafting of this document.

Table H- 4. Odontocete Species, MMPA Stock, and DPS Presence in the Proposed Action Areas

Common Name (Scientific Name)	***MMPA Stock, DPS and ESA-Listing Status[1]***	***Distribution of the Stock/DPS***	***Proposed Action Area(s) with Overlap***	***Critical Habitat within Proposed Action Area(s)***
Atlantic spotted dolphin (*Stenella frontalis*)	Northern Gulf of Mexico	U.S. EEZ of the Gulf of Mexico from continental shelf waters 10-200m to slope waters <500 m deep.	GoMEX and Mississippi River	None
	Western North Atlantic	U.S. EEZ waters from southern Florida to Canada in continental slope waters.	USEC-MidATL; USEC-South	None
Atlantic white-sided dolphin (*Lagenorhynchus albirostris*)	Western North Atlantic	Northwest Atlantic from North Carolina to Maine primarily in the Gulf of Maine.	USEC-MidATL	None
Common bottlenose dolphin – Atlantic (*Tursiops truncatus*)	Biscayne Bay	Within Biscayne Bay from Haulover Inlet south to Card Sound Bridge.	USEC-South	None
	Charleston Estuarine System	Centered near Charleston, South Carolina and bounded in the north by Prince Inlet and the south to the North Edisto River.	USEC-MidATL	None
	Florida Bay	Florida Bay between mainland Florida and the Florida Keys.	USEC-South	None
	Indian River Lagoon Estuarine System (Florida)	Bounded in the north by the Ponce de Leon inlet and the south by the Jupiter inlet and estuarine waters in between including but not limited to the Intracoastal Waterway, Mosquito Lagoon, Indian River, Banana River and the St. Lucie Estuary.	USEC-South	None
	Jacksonville Estuarine System	Bounded in the north by the Florida/Georgia border at Cumberland Sound and extends south to Jacksonville Beach, Florida.	USEC-South	None
	Northern Georgia/Southern South Carolina Estuarine System	The southern extent of the North Edisto River southwestward to the northern extent of Ossabaw Sound, including St. Helena, Port Royal, Calibogue and Wassaw Sounds.	USEC-South	None

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status*[1]	*Distribution of the Stock/DPS*	*Proposed Action Area(s) with Overlap*	*Critical Habitat within Proposed Action Area(s)*
		Includes estuarine waters of the rivers and creeks as well as 1 km of nearshore coastal waters.		
	Northern North Carolina Estuarine System	Primarily waters of the Pamlico Sound estuarine system, including the Core, Roanoke, and Albemarle sounds, and the Neuse River. Also found in coastal waters, within 1 km from shore, from Beaufort, NC to Virginia Beach, VA, including the lower Chesapeake Bay.	USEC-MidATL	None
	Northern South Carolina Estuarine System	Estuarine waters from Murrells Inlet, South Carolina, southwest to Price Inlet, South Carolina and including coastal waters out to 1 km.	USEC-MidATL	None
	Southern Georgia Estuarine System	South to the Georgia/Florida border at the Cumberland River/Sound north to the Altamaha River/Sound, encompasses all estuarine waters in between, including but not limited to the Intracoastal Waterway, Hampton River, St. Andrew and Jekyll Sounds and their tributaries, St. Simons Sound and tributaries, and the Turtle/Brunswick River estuary.	USEC-MidATL	None
	Central Georgia Estuarine System	North to Ossabaw Sound, and south to the Altamaha River, including nearshore coastal waters out to 1 km.	USEC-MidATL	None
	Southern North Carolina Estuarine System	South to the Little River Inlet estuary extending north to the southern Pamlico Sound including estuarine and nearshore coastal waters (≤3 km from shore).	USEC-MidATL	None
	Western North Atlantic, Central Florida Coastal	Coastal waters to the 200 m isobath from 29.4°N south to the western end of Vaca Key.	USEC-South	None

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status[1]*	*Distribution of the Stock/DPS*	*Proposed Action Area(s) with Overlap*	*Critical Habitat within Proposed Action Area(s)*
	Western North Atlantic, Northern Florida Coastal	Coastal waters the 200 m isobath from the Georgia/Florida border south to 29.4°N.	USEC-South	None
	Western North Atlantic, Northern Migratory Coastal	Coastal waters to approximately the 200 m north to Long Island, NY and south to Cape Lookout, NC.	USEC-MidATL	None
	Western North Atlantic, South Carolina-Georgia Coastal	Coastal waters to approximately the 200 m isobath from the Little River Inlet, SC, south to the Georgia/Florida border.	USEC-MidATL	None
	Western North Atlantic, Southern Migratory Coastal	Coastal waters to 200 m depth from Cape Lookout, NC, and coastal waters 0–20 m in depth Assateague, VA, including the Chesapeake Bay.	USEC-MidATL	None
	Western North Atlantic, Offshore	Primarily distributed along the outer continental shelf and continental slope in the Northwest Atlantic Ocean from Georges Bank to the Florida Keys.	USEC-MidATL; USEC-South	None
	Western North Atlantic, Coastal	Distributed along the Atlantic coast south of Long Island, NY around the Florida peninsula and along the Gulf of Mexico coast.	USEC-MidATL; USEC-South; GoMEX and Mississippi River	None
Common bottlenose dolphin – Gulf of Mexico (*Tursiops truncatus*)	Northern Gulf of Mexico Bay, Sound, and Estuary*	Gulf of Mexico bays, sounds and estuaries from the Florida Keys to the Texas/Mexico border.	USEC-South; GoMEX and Mississippi River	None
	Choctawhatchee Bay	Waters of Choctawhatchee Bay east from Point Washington and Jolly Bay west to Fort Walton Beach.	GoMEX and Mississippi River	None
	Terrebonne-Timbalier Bay Estuarine System	Estuarine waters from Bay Junop in the west to Bayou LaFourche in the east. Area extends out 1 km from the barrier islands: Isles Dernieres, Timbalier Island, and East Timbalier Island.	GoMEX and Mississippi River	None
	St. Joseph Bay	Includes St. Joseph Bay, Crooked Island Sound and coastal waters coastal waters out to 2 km	GoMEX and Mississippi River	None

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status*[1]	*Distribution of the Stock/DPS*	*Proposed Action Area(s) with Overlap*	*Critical Habitat within Proposed Action Area(s)*
		from shore from Cape San Blas north to above Crooked Island Sound.		
	Barataria Bay Estuarine System	The stock area includes Caminada Bay, Barataria Bay Bastian Bay, Bay Coquette, and Gulf coastal waters extending 1 km from the shoreline from west from Bayou Lafourche east to Bay Coquette.	GoMEX and Mississippi River	None
	Mississippi Sound, Lake Borgne, Bay Boudreau	The stock area extends to Mobile Bay in the east, Lake Borgne in the west, Bay Boudreau in the southwest, and southward 1 km of Gulf coastal waters beyond the barrier islands.	GoMEX and Mississippi River	None
	Northern Gulf of Mexico Continental Shelf	Waters from 20 to 200 m deep in the northern Gulf from the U.S.-Mexican border to the Florida Keys.	USEC-South; GoMEX and Mississippi River	None
	Gulf of Mexico Eastern Coastal	Extends from 84°W to Key West, FL in waters out to the 20 m isobath.	USEC-South; GoMEX and Mississippi River	None
	Gulf of Mexico Northern Coastal	Extends from 84°W to the Mississippi River Delta in waters out to the 20 m isobath.	GoMEX and Mississippi River	None
	Gulf of Mexico Western Coastal	Extends from the Mississippi River Delta to the Texas-Mexico border in waters out to the 20-m isobath.	GoMEX and Mississippi River	None
	Northern Gulf of Mexico Oceanic	Waters from the 200 m isobath to the seaward extent of the U.S. Exclusive Economic Zone.	USEC-South; GoMEX and Mississippi River	None
Common dolphin, Short-beaked (*Delphinus delphis delphinus*)	California/ Oregon/ Washington	U.S. EEZ from Canada to Mexico and are the most abundant cetacean off California coming all the way into the shoreline.	PNW	None
	Western North Atlantic	U.S. EEZ waters from southern Florida to Canada with sightings concentrated over the continental shelf between the 100-m and 2000-m isobaths and over prominent underwater topography.	USEC-South	None

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status*[1]	*Distribution of the Stock/DPS*	*Proposed Action Area(s) with Overlap*	*Critical Habitat within Proposed Action Area(s)*
Dall's porpoise (*Phocoenoides dalli*)	Alaska	Alaskan waters up to St. Lawrence Island in the Bering Sea and not including the upper Cook Inlet and shallow eastern flats of the Bering Sea.	SEAK	None
	California/ Oregon/ Washington	U.S. EEZ waters from the Canadian border to the Mexican border.	PNW	None
Harbor porpoise (*Phocoena phocoena*)	Gulf of Maine/Bay of Fundy	Northwest Atlantic from North Carolina to the Gulf of St. Lawrence.	USEC-MidATL	None
	Northern Oregon/WA Coast	Lincoln City, OR to Cape Flattery, WA	PNW	None
	Southeast Alaska	Dixon Entrance to Cape Suckling, Alaska in nearshore areas, bays, tidal areas, and river mouths	SEAK	None
Killer whale (*Orcinus orca*)	Eastern North Pacific - Alaska Resident	Southeastern Alaska to the Aleutian Islands and Bering Sea.	SEAK	None
	Eastern North Pacific - Northern Resident	Washington State through part of Southeast Alaska.	SEAK	None
	Gulf of Alaska, Aleutian Islands, Bering Sea Transient	Prince William Sound through the Aleutian Islands and Bering Sea.	SEAK	None
	West Coast Transient	Occurring from California through Southeast Alaska.	PNW; SEAK	None
Pacific white-sided dolphin (*Lagenorhynchus obliquidens*)	North Pacific	The Gulf of Alaska, west to Amchitka in the Aleutian Islands, sometimes encountered in the southern Bering Sea high seas and along the continental margins, and are known to enter the inshore passes of Alaska.	SEAK	None
	California /Oregon /Washington [Northern and Southern]	U.S. EEZ from Canada to Mexico primarily in shelf and slope waters and are known to enter the inshore passes of Washington.	PNW	None

Common Name (Scientific Name)	***MMPA Stock, DPS and ESA-Listing Status[1]***	***Distribution of the Stock/DPS***	***Proposed Action Area(s) with Overlap***	***Critical Habitat within Proposed Action Area(s)***
	Western North Atlantic	U.S. EEZ waters from southern Florida to Canada mostly along the continental shelf and deeper oceanic waters.	USEC-South	None
Pilot whale, long-finned (*Globicephala melas melas*)	Western North Atlantic	Along the continental shelf edge off the northeastern U.S.	USEC-MidATL	None
Pilot whale, short-finned (*Globicephalus macrorhynchus*)	Western North Atlantic	U.S. EEZ waters from southern Florida to Canada primarily along the continental shelf break and not typically north of George's Bank.	USEC-South	None
Risso's dolphin (*Grampus griseus*)	Western North Atlantic	U.S. EEZ waters from southern Florida to Canada along the continental shelf edge and into oceanic waters.	USEC-MidATL; USEC-South	None
Sperm whale (*Physeter macrocephalus*)	North Pacific; **Endangered**	From the Canadian/ Washington border through the Gulf of Alaska, out the Aleutian chain, and North in the Bering Sea to St. Matthews Island	SEAK	None
Spinner dolphin (*Stenella longirostris*)	Northern Gulf of Mexico	U.S. EEZ of the Gulf of Mexico primarily occurring in oceanic waters and generally east of the Mississippi River.	GoMEX and Mississippi River	None

[1] All marine mammals in the United States are offered protection under the Marine Mammal Protection Act. Some species are offered further protection under the Endangered Species Act.
[2] NOAA requested comments on a proposed rule to revise the critical habitat designation for this DPS by designating six new areas along the U.S. West Coast (84 FR 49214, September 19, 2019). The comment period ended on December 18, 2019, but at the time of this draft, no other regulatory action has been taken.
[3] Provisionally being considered a separate stock for management purposes, although there is currently no information to differentiate this stock from the Atlantic Ocean and Gulf of Mexico stocks.

Table H- 5. Pinniped (Otariids and Phocids), Sirenians, Carnivores (Mustelids and Ursids) Species, MMPA Stock, and DPS Presence in the Proposed Action Areas

Common Name (Scientific Name)	***MMPA Stock, DPS and ESA-Listing Status[1]***	***Distribution of the Stock/DPS***	***Proposed Action Area(s)***	***Critical Habitat within Proposed Action Area(s)***
Pinnipeds - Otariids				
California sea lion (*Zalophus californianus*)	United States	Range from Canada to Baja California, Mexico. Breed on islands in southern California, western Baja California and Gulf of California, Mexico.	PNW	None
Northern fur seal (*Callorhinus ursinus*)	California	Range from California to Alaska. Breed on San Miguel Island and Farallon Islands.	SEAK	None
	Eastern Pacific	Range from California to Alaska. Breed on Pribilof and Aleutian Islands.	SEAK	None
Steller sea lion (*Eumetopias jubatus*)	Western DPS, **Endangered:**	West of 144˚W (although mixing of stocks occurs in Southeast Alaska). Haulouts occur in Aleutians and to Russia and northern Japan.	SEAK	58 FR 45269, August 27, 1993
	Eastern DPS	East of 144˚W (although mixing of stocks occurs in Southeast Alaska).Haulouts occur in Southeast Alaska, British Columbia, Washington, Oregon, and California coasts.	PNW; SEAK	None
Pinnipeds - Phocids				
Gray seal (*Halichoerus grypus*)	Western North Atlantic	Distributed from New Jersey to Labrador; separated into three breeding aggregations in eastern Canada: Sable Island, Gulf of St. Lawrence and sites along the coast of Nova Scotia.	USEC-MidATL	None
Harbor seal (*Phoca vitulina*)	Western North Atlantic	Year-round in coastal waters of eastern Canada and Maine. Seasonally along the coasts from southern New	USEC-MidATL; USEC-South	None

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status*[1]	*Distribution of the Stock/DPS*	*Proposed Action Area(s)*	*Critical Habitat within Proposed Action Area(s)*
		England to Virginia and as far south as Florida.		
	Oregon/Washington stock	Haulouts distributed along outer coasts of Oregon and Washington.	PNW	None
	Alaska	Haulouts distributed throughout the Aleutian Islands, Pribilof Islands, Bristol Bay, N. Kodiak, S. Kodiak, Prince William Sound, Cook Inlet/Shelikof Strait, Glacier Bay/Icy Strait, Lynn Canal/Stephens Passage*, Sitka/Chatham Strait*, Dixon/Cape Decision*, Clarence Strait*.	SEAK*	None
Harp seal (*Pagophilus groenlandicus*)	Western North Atlantic	Highly migratory; "Front herd" breeds off the coast of Newfoundland and Labrador, and the "Gulf herd" breeds near Magdalen Islands in the middle of the Gulf of St. Lawrence.	USEC-MidATL	None
Northern elephant seal (*Mirounga angustirostris*)	California breeding	Breed and give birth in California and Baja California, primarily on offshore islands. Highly migratory; Offshore waters of Mexico and California to western Aleutian Islands (depending on sex).	PNW; SEAK	None
Sirenians				
West Indian Manatee (*Trichechus manatus*)	Florida; **Threatened**	Range includes southeastern U.S. (primarily Florida), east coast of Mexico, Central America, northeastern South America, Cuba, Hispaniola, Puerto Rico and Jamaica as well as Trinidad and Tobago.	USEC-MidATL; USEC-South; GoMEX and Mississippi River	42 FR 47840, September 22, 1977
Carnivores - Mustelids				
Sea otter (*Enhydra lutris*)	Northern sea otter (Southcentral Alaska,	Southcentral stock extends from Cape Yakatag to Cook Inlet, including Prince	SEAK*	74 FR 51988, October, 8, 2009

Common Name (Scientific Name)	***MMPA Stock, DPS and ESA-Listing Status[1]***	***Distribution of the Stock/DPS***	***Proposed Action Area(s)***	***Critical Habitat within Proposed Action Area(s)***
	Southeast Alaska*, Southwest Alaska, Washington); Southwest Alaska DPS- **Endangered**	William Sound , the Kenai Peninsula coast, and Kachemake Bay; Southeast stock extends from Dixon Entrance to Cape Yakataga; and Southwest stock include Alaska Peninsula and Bristol Bay coasts and the Aleutian, Barren, Kodiak, and Pribilof Islands.		

[1] All marine mammals in the United States are offered protection under the Marine Mammal Protection Act. Some species are offered further protection under the Endangered Species Act.

* Stock boundaries likely to overlap with SEAK proposed action area

Table H- 6. Presence of Mysticetes in the Proposed Action Areas

Common Name (Scientific name)	*USEC-MidATL*	*USEC-South*	*Great Lakes*	*GoMEX and Mississippi River*	*SEAK*
Blue whale *(Balaenoptera musculus)*	-	-	-	-	Rare*
Bryde's whale *(Balaenoptera edeni)*	-	-	-	Potentially***	-
Fin whale *(Balaenoptera physalus)*	Potentially**	Potentially**	-	-	Rare***
Gray whale *(Eschrichtius robustus)*	-	-	-	-	Potentially
Humpback whale *(Megaptera novaeangliae)*	Potentially***	Potentially***	-	Potentially	Present
Minke whale *(Balaenoptera acutorostrata)*	Potentially***	Potentially***		Rare***	Present
North Atlantic right whale (*Eubalaena glacialis)*	Present	Present	-	-	-
North Pacific right whale (*Eubalaena japonica)*	-	-	-	-	Rare****
Sei whale (*Balaenoptera borealis)*	Rare***	Rare***	-	-	-

[1] The likelihood of occurrence is designated as "Not Present," "Rare," "Potentially," or "Present" based on species-specific literature research from NOAA stock assessment reports. "Rare" means occurrences have been documented but are extremely rare or extralimital. "Potentially" means the species may occur or there is casual occurrence history, and "Present" means there is a strong possibility of occurrence in the proposed action area. "Not Present" means occurrence is unlikely based on current distribution information and is shown in the table with a dash and gray cell. For some species, their occurrence is seasonal and the occurrence described in the table is based on their expected seasonal presence in the proposed action area (e.g. few gray whales would be expected to "summer" near Sitka, but during that season, there is a potential presence of gray whales in the SEAK proposed action area).

*Considered extremely rare or unlikely in the proposed action area.

** Fin and minke whale sightings have been documented inshore of the 100 m isobath and may potentially overlap with the 12 nm boundary, so considered potential presence (Hayes et al. 2020).

*** The 100 m isobath is further offshore that the 12 nm boundary; however, in some locations, there are certain areas where there is a potential for overlap. In these areas of overlap, these species would be considered rare or an occasional visitor, but unlikely within the extent of the 12 nm toward shore boundary. However, since distribution may shift in response to prey availability, they are included.

Common Name (Scientific name)	***USEC-MidATL***	***USEC-South***	***Great Lakes***	***GoMEX and Mississippi River***	***SEAK***

**** Right whale distribution is poorly understood, but based on historical data and right whale catch data, logbook records from American whale ships (Townsend 1935) indicate that right whales were caught in the SEAK proposed action area (the areas bordering the Pacific Ocean vs the more inland waterways), but would be unlikely near where the ATONs are currently located.

Table H- 7. Mysticete Species, MMPA stock, and DPS Presence in the Proposed Action Areas

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status[1]*	*Distribution of the Stock/DPS*	*Proposed Action Area(s)*	*Critical Habitat within Proposed Action Area(s)*
Blue whale (*Balaenoptera musculus*)	Western North Atlantic; Endangered	Western North Atlantic from Arctic to mid-latitude waters; Rare occurrences in Florida and Gulf of Mexico waters	USEC-MidATL; USEC-South; GoMEX and Mississippi River	None
	Eastern North Pacific; Endangered	Migrate between waters Gulf of California, Mexico and Costa Rica and the California Coast.	SEAK	None
Bryde's whale (*Balaenoptera edeni*)	Northern Gulf of Mexico, Gulf of Mexico DPS; Endangered	Northeastern Gulf of Mexico in the De Soto canyon, along continental shelf break between 100 m and 400 m depth.	GoMEX and Mississippi River	None
Fin whale (*Balaenoptera physalus*)	Western North Atlantic; Endangered	Offshore waters of Cape Hatteras north to Nova Scotia.	USEC-MidATL; USEC-South	None
	Northeast Pacific; Endangered	Alaskan waters, including the Bering Sea and Gulf of Alaska (Central Alaskan Coast, Aleutian Islands).	SEAK	None
Gray whale (*Eschrichtius robustus*)	Eastern North Pacific	Migrate between Chukchi, Beaufort and northwestern Bering Seas (summer) to lagoons of Baja California, Mexico (winter).	SEAK	None
	Western North Pacific DPS; Endangered	Okhotsk Sea, Russia and Bering Sea (summer) and eastern Asia (winter).	SEAK	None
Humpback whale[2] (*Megaptera novaeangliae*)	Gulf of Maine stock (formerly Western North Atlantic); West Indies DPS	Migrate from feeding grounds in Gulf of Maine and to the Caribbean (majority off of Dominican Republic).	USEC-MidATL; USEC-South	None
	Western North Pacific stock (Hawaii DPS; Western North Pacific DPS- Endangered)	Migrate between feeding grounds in Alaska (Gulf of Alaska, Bering Sea, west along the Aleutian Islands to the Kamchatka Peninsula) and wintering grounds in Hawaii and Asia.	SEAK	Proposed Rule: 84 FR 54354, October 9, 2019

Common Name (Scientific Name)	***MMPA Stock, DPS and ESA-Listing Status[1]***	***Distribution of the Stock/DPS***	***Proposed Action Area(s)***	***Critical Habitat within Proposed Action Area(s)***
	Central North Pacific stock (Hawaii DPS; Mexico DPS-Threatened; Central American DPS-Endangered)	Feeding areas of this stock overlap with Western North Pacific stock in British Columbia to Bering Sea. Dispersed between Alaskan and Hawaiian waters.	SEAK	Proposed Rule: 84 FR 54354, October 9, 2019
Minke whale *(Balaenoptera acutorostrata)*	Canadian Eastern Coastal	Coastal and offshore waters of Canada and New England to the Caribbean and Gulf of Mexico.	USEC-MidATL; USEC-South; GoMEX and Mississippi River	None
	Alaska	Waters of the Chukchi and Bering Seas and inshore waters of Gulf of Alaska.	SEAK	None
North Atlantic right whale (*Eubalaena glacialis*)	Western Stock; Endangered	Coastal waters of southeastern U.S. to New England waters and the Canadian Bay of Fundy, Scotian Shelf and Gulf of St. Lawrence.	USEC-MidATL; USEC-South	81 FR 4837, January 27, 2016
North Pacific right whale (*Eubalaena japonica*)	Eastern North Pacific; Endangered	Gulf of Alaska and Bering Sea, along the California coast to Baja California, Mexico.	SEAK	73 FR 19000, April 08, 2008
Sei whale (*Balaenoptera borealis*)	Nova Scotia; Endangered	Continental shelf waters of the northeastern U.S. and extends northwestward to south of Newfoundland, Canada.	USEC-MidATL; USEC-South	None

[1] All marine mammals in the United States are offered protection under the Marine Mammal Protection Act. Some species are offered further protection under the Endangered Species Act.

[2] NOAA identified 14 DPS worldwide and revised ESA listings (81 FR 62259, September 8, 2016). The DPS that occur in waters under U.S jurisdiction do not necessarily equate to exiting MMPA stocks. No changes to current stock structures are proposed at the time of the drafting of this document.

Table H- 8. Presence of Odontocetes in the Proposed Action Areas

Common Name (Scientific name)	***Likelihood[1] of Marine Mammal Occurrence while WCC is Operational***					
	USEC-MidATL	***USEC-South***	***Great Lakes***	***GoMEX and Mississippi River***	***PNW***	***SEAK***
Atlantic spotted dolphin (*Stenella frontalis)*	Present	Present	-	Present	-	-
Atlantic white-sided dolphin (*Lagenorhynchus albirostris)*	Potentially	-	-	-	-	-
Common bottlenose dolphin (*Tursiops truncatus*)	Present	Present	-	Present	-	-
Common dolphin, short-beaked (*Delphinus delphis delphis)*	-	Potentially**	-	-		-
Dall's porpoise (*Phocoenoides dalli*)	-	-	-	-	-	Potentially
Harbor porpoise (*Phocoena phocoena)*	Present	-	-	-	Present	Present
Killer whale (*Orcinus orca*)	-	-	-	-	-	Present
Pacific white-sided dolphin (*Lagenorhynchus obliquidens)*	-	-	-	-	Potentially***	Potentially
Pantropical spotted dolphin (*Stenella attenuata)*	-	Potentially	-	-	-	-
Pilot whale, long-finned (*Globicephala melas*)	Potentially**	-	-	-	-	-
Pilot whale, short-finned (*Globicephalus macrorhynchus*)	-	Potentially**	-	-	-	-
Risso's dolphin (*Grampus griseus*)	Potentially	Potentially	-	-	-	-
Sperm whale (*Physeter macrocephalus*)	-	-	-	-	-	Rare**
Spinner dolphin (*Stenella longirostris*)	-	-	-	Potentially	-	-

Common Name (Scientific name)	Likelihood[1] of Marine Mammal Occurrence while WCC is Operational					
	USEC-MidATL	USEC-South	Great Lakes	GoMEX and Mississippi River	PNW	SEAK

[1] The likelihood of occurrence is designated as "Not Present," "Rare," "Potentially," or "Present" based on species-specific literature research from NOAA stock assessment reports. "Rare" means occurrences have been documented but are extremely rare or extralimital. "Potentially" means the species may occur or there is casual occurrence history, and "Present" means there is a strong possibility of occurrence in the proposed action area.

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

** The 100 m isobath is further offshore that the 12 nm boundary; however, in some locations, there are certain areas where there is a potential for overlap. In these areas of overlap, these species would be considered rare or an occasional visitor, but unlikely within the extent of the 12 nm toward shore boundary. However, since distribution may shift in response to prey availability, they are included.

*** Although unlikely within the 12 nm toward shore boundary off the PNW proposed action area. Since distribution may shift in response to prey availability, they are included.

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Table H- 9. Odontocete Species, MMPA Stock, and DPS Presence in the Proposed Action Areas

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status[1]*	*Distribution of the Stock/DPS*	*Proposed Action Area(s) with Overlap*	*Critical Habitat within Proposed Action Area(s)*
Atlantic spotted dolphin (*Stenella frontalis*)	Northern Gulf of Mexico	U.S. EEZ of the Gulf of Mexico from continental shelf waters 10-200m to slope waters <500 m deep.	GoMEX and Mississippi River	None
	Western North Atlantic	U.S. EEZ waters from southern Florida to Canada in continental slope waters.	USEC-MidATL; USEC-South	None
Atlantic white-sided dolphin (*Lagenorhynchus albirostris*)	Western North Atlantic	Northwest Atlantic from North Carolina to Maine primarily in the Gulf of Maine.	USEC-MidATL	None
Common bottlenose dolphin – Atlantic (*Tursiops truncatus*)	Biscayne Bay	Within Biscayne Bay from Haulover Inlet south to Card Sound Bridge.	USEC-South	None
	Charleston Estuarine System	Centered near Charleston, South Carolina and bounded in the north by Prince Inlet and the south to the North Edisto River.	USEC-MidATL	None
	Florida Bay	Florida Bay between mainland Florida and the Florida Keys.	USEC-South	None
	Indian River Lagoon Estuarine System (Florida)	Bounded in the north by the Ponce de Leon inlet and the south by the Jupiter inlet and estuarine waters in between including but not limited to the Intracoastal Waterway, Mosquito Lagoon, Indian River, Banana River and the St. Lucie Estuary.	USEC-South	None
	Jacksonville Estuarine System	Bounded in the north by the Florida/Georgia border at Cumberland Sound and extends south to Jacksonville Beach, Florida.	USEC-South	None
	Northern Georgia/Southern South Carolina Estuarine System	The southern extent of the North Edisto River southwestward to the northern extent of Ossabaw Sound, including St. Helena, Port Royal, Calibogue and Wassaw Sounds. Includes estuarine waters of the rivers and creeks as well as 1 km of nearshore coastal waters.	USEC-South	None
	Northern North Carolina Estuarine System	Primarily waters of the Pamlico Sound estuarine system, including the Core, Roanoke, and Albemarle sounds, and the Neuse River. Also found in coastal	USEC-MidATL	None

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status[1]*	*Distribution of the Stock/DPS*	*Proposed Action Area(s) with Overlap*	*Critical Habitat within Proposed Action Area(s)*
		waters, within 1 km from shore, from Beaufort, NC to Virginia Beach, VA, including the lower Chesapeake Bay.		
	Northern South Carolina Estuarine System	Estuarine waters from Murrells Inlet, South Carolina, southwest to Price Inlet, South Carolina and including coastal waters out to 1 km.	USEC-MidATL	None
	Southern Georgia Estuarine System	South to the Georgia/Florida border at the Cumberland River/Sound north to the Altamaha River/Sound, encompasses all estuarine waters in between, including but not limited to the Intracoastal Waterway, Hampton River, St. Andrew and Jekyll Sounds and their tributaries, St. Simons Sound and tributaries, and the Turtle/Brunswick River estuary.	USEC-MidATL	None
	Central Georgia Estuarine System	North to Ossabaw Sound, and south to the Altamaha River, including nearshore coastal waters out to 1 km.	USEC-MidATL	None
	Southern North Carolina Estuarine System	South to the Little River Inlet estuary extending north to the southern Pamlico Sound including estuarine and nearshore coastal waters (≤3 km from shore).	USEC-MidATL	None
	Western North Atlantic, Central Florida Coastal	Coastal waters to the 200 m isobath from 29.4°N south to the western end of Vaca Key.	USEC-South	None
	Western North Atlantic, Northern Florida Coastal	Coastal waters the 200 m isobath from the Georgia/Florida border south to 29.4°N.	USEC-South	None
	Western North Atlantic, Northern Migratory Coastal	Coastal waters to approximately the 200 m north to Long Island, NY and south to Cape Lookout, NC.	USEC-MidATL	None
	Western North Atlantic, South Carolina-Georgia Coastal	Coastal waters to approximately the 200 m isobath from the Little River Inlet, SC, south to the Georgia/Florida border.	USEC-MidATL	None
	Western North Atlantic, Southern Migratory Coastal	Coastal waters to 200 m depth from Cape Lookout, NC, and coastal waters 0–20 m in depth Assateague, VA, including the Chesapeake Bay.	USEC-MidATL	None
	Western North Atlantic, Offshore	Primarily distributed along the outer continental shelf and continental slope in the Northwest Atlantic Ocean from Georges Bank to the Florida Keys.	USEC-MidATL; USEC-South	None

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status*[1]	*Distribution of the Stock/DPS*	*Proposed Action Area(s) with Overlap*	*Critical Habitat within Proposed Action Area(s)*
	Western North Atlantic, Coastal	Distributed along the Atlantic coast south of Long Island, NY around the Florida peninsula and along the Gulf of Mexico coast.	USEC-MidATL; USEC-South; GoMEX and Mississippi River	None
Common bottlenose dolphin – Gulf of Mexico (*Tursiops truncatus*)	Northern Gulf of Mexico Bay, Sound, and Estuary*	Gulf of Mexico bays, sounds and estuaries from the Florida Keys to the Texas/Mexico border.	USEC-South; GoMEX and Mississippi River	None
	Choctawhatchee Bay	Waters of Choctawhatchee Bay east from Point Washington and Jolly Bay west to Fort Walton Beach.	GoMEX and Mississippi River	None
	Terrebonne-Timbalier Bay Estuarine System	Estuarine waters from Bay Junop in the west to Bayou LaFourche in the east. Area extends out 1 km from the barrier islands: Isles Dernieres, Timbalier Island, and East Timbalier Island.	GoMEX and Mississippi River	None
	St. Joseph Bay	Includes St. Joseph Bay, Crooked Island Sound and coastal waters coastal waters out to 2 km from shore from Cape San Blas north to above Crooked Island Sound.	GoMEX and Mississippi River	None
	Barataria Bay Estuarine System	The stock area includes Caminada Bay, Barataria Bay Bastian Bay, Bay Coquette, and Gulf coastal waters extending 1 km from the shoreline from west from Bayou Lafourche east to Bay Coquette.	GoMEX and Mississippi River	None
	Mississippi Sound, Lake Borgne, Bay Boudreau	The stock area extends to Mobile Bay in the east, Lake Borgne in the west, Bay Boudreau in the southwest, and southward 1 km of Gulf coastal waters beyond the barrier islands.	GoMEX and Mississippi River	None
	Northern Gulf of Mexico Continental Shelf	Waters from 20 to 200 m deep in the northern Gulf from the U.S.-Mexican border to the Florida Keys.	USEC-South; GoMEX and Mississippi River	None
	Gulf of Mexico Eastern Coastal	Extends from 84°W to Key West, FL in waters out to the 20 m isobath.	USEC-South; GoMEX and Mississippi River	None
	Gulf of Mexico Northern Coastal	Extends from 84°W to the Mississippi River Delta in waters out to the 20 m isobath.	GoMEX and Mississippi River	None
	Gulf of Mexico Western Coastal	Extends from the Mississippi River Delta to the Texas-Mexico border in waters out to the 20-m isobath.	GoMEX and Mississippi River	None

Common Name (Scientific Name)	***MMPA Stock, DPS and ESA-Listing Status[1]***	***Distribution of the Stock/DPS***	***Proposed Action Area(s) with Overlap***	***Critical Habitat within Proposed Action Area(s)***
	Northern Gulf of Mexico Oceanic	Waters from the 200 m isobath to the seaward extent of the U.S. Exclusive Economic Zone.	USEC-South; GoMEX and Mississippi River	None
Common dolphin, Short-beaked (*Delphinus delphis delphinus*)	California/ Oregon/ Washington	U.S. EEZ from Canada to Mexico and are the most abundant cetacean off California coming all the way into the shoreline.	PNW	None
	Western North Atlantic	U.S. EEZ waters from southern Florida to Canada with sightings concentrated over the continental shelf between the 100-m and 2000-m isobaths and over prominent underwater topography.	USEC-South	None
Dall's porpoise (*Phocoenoides dalli*)	Alaska	Alaskan waters up to St. Lawrence Island in the Bering Sea and not including the upper Cook Inlet and shallow eastern flats of the Bering Sea.	SEAK	None
	California/ Oregon/ Washington	U.S. EEZ waters from the Canadian border to the Mexican border.	PNW	None
Harbor porpoise *(Phocoena phocoena*)	Gulf of Maine/Bay of Fundy	Northwest Atlantic from North Carolina to the Gulf of St. Lawrence.	USEC-MidATL	None
	Northern Oregon/WA Coast	Lincoln City, OR to Cape Flattery, WA	PNW	None
	Southeast Alaska	Dixon Entrance to Cape Suckling, Alaska in nearshore areas, bays, tidal areas, and river mouths.	SEAK	None
Killer whale (*Orcinus orca*)	Eastern North Pacific - Alaska Resident	Southeastern Alaska to the Aleutian Islands and Bering Sea.	SEAK	None
	Eastern North Pacific - Northern Resident	Washington State through part of Southeast Alaska.	SEAK	None
	Gulf of Alaska, Aleutian Islands, Bering Sea Transient	Prince William Sound through the Aleutian Islands and Bering Sea.	SEAK	None
	West Coast Transient	Occurring from California through Southeast Alaska.	PNW; SEAK	None
Pacific white-sided dolphin (*Lagenorhynchus obliquidens*)	North Pacific	The Gulf of Alaska, west to Amchitka in the Aleutian Islands, sometimes encountered in the southern Bering Sea high seas and along the continental margins, and are known to enter the inshore passes of Alaska.	SEAK	None

Common Name (Scientific Name)	***MMPA Stock, DPS and ESA-Listing Status[1]***	***Distribution of the Stock/DPS***	***Proposed Action Area(s) with Overlap***	***Critical Habitat within Proposed Action Area(s)***
	California /Oregon /Washington [Northern and Southern]	U.S. EEZ from Canada to Mexico primarily in shelf and slope waters and are known to enter the inshore passes of Washington.	PNW	None
	Western North Atlantic	U.S. EEZ waters from southern Florida to Canada mostly along the continental shelf and deeper oceanic waters.	USEC-South	None
Pilot whale, long-finned (*Globicephala melas melas*)	Western North Atlantic	Along the continental shelf edge off the northeastern U.S.	USEC-MidATL	None
Pilot whale, short-finned (*Globicephalus macrorhynchus*)	Western North Atlantic	U.S. EEZ waters from southern Florida to Canada primarily along the continental shelf break and not typically north of George's Bank.	USEC-South	None
Risso's dolphin (*Grampus griseus*)	Western North Atlantic	U.S. EEZ waters from southern Florida to Canada along the continental shelf edge and into oceanic waters.	USEC-MidATL; USEC-South	None
Sperm whale (*Physeter macrocephalus*)	North Pacific; Endangered	From the Canadian/ Washington border through the Gulf of Alaska, out the Aleutian chain, and North in the Bering Sea to St. Matthews Island	SEAK	None
Spinner dolphin (*Stenella longirostris*)	Northern Gulf of Mexico	U.S. EEZ of the Gulf of Mexico primarily occurring in oceanic waters and generally east of the Mississippi River.	GoMEX and Mississippi River	None

[1] All marine mammals in the United States are offered protection under the Marine Mammal Protection Act. Some species are offered further protection under the Endangered Species Act.

[2] NOAA requested comments on a proposed rule to revise the critical habitat designation for this DPS by designating six new areas along the U.S. West Coast (84 FR 49214, September 19, 2019). The comment period ended on December 18, 2019, but at the time of this draft, no other regulatory action has been taken.

[3] Provisionally being considered a separate stock for management purposes, although there is currently no information to differentiate this stock from the Atlantic Ocean and Gulf of Mexico stocks.

Table H- 10. Presence of Pinniped (Otariids and Phocids), Sirenians, Carnivores (Mustelids) in the Proposed Action Areas

Common Name (Scientific Name)	Likelihood[1] of Marine Mammal Occurrence while WCC is operational					
	USEC-MidATL	USEC-South	Great Lakes	GoMEX and Mississippi River	PNW	SEAK
Pinnipeds -Otariids						
California sea lion (*Zalophus californianus*)	-	-	-	-	Present	-
Northern fur seal (*Callorhinus ursinus*)	-	-	-	-	-	Present
Steller sea lion (*Eumetopias jubatus*)	-	-	-	-	Present	Present
Pinnipeds - Phocids						
Gray seal (*Halichoerus grypus*)	Present*	-	-	-	-	-
Harbor seal (*Phoca vitulina*)	Present*	-	-	-	Present	Present
Harp seal (*Pagophilus groenlandicus*)	Rare	-	-	-	-	-
Northern elephant seal (*Mirounga angustirostris*)	-	-	-	-	Potentially	Potentially
Sirenians						
West Indian Manatee (*Trichechus manatus*)	Present*	Present	-	Present	-	-
Carnivores - Mustelids						
Sea otter (*Enhydra lutris*)	-	-	-	-	Potentially	Present

[1] All marine mammals in the United States are offered protection under the Marine Mammal Protection Act. Some species are offered further protection under the Endangered Species Act.

*Present in certain areas, but seasonally.

Table H- 11. Pinniped (Otariids and Phocids), Sirenians, Carnivores (Mustelids) Species, MMPA Stock, and DPS Presence in the Proposed Action Areas

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status*[1]	*Distribution of the Stock/DPS*	*Proposed Action Area(s)*	*Critical Habitat within Proposed Action Area(s)*
Pinnipeds - Otariids				
California sea lion (*Zalophus californianus*)	United States	Range from Canada to Baja California, Mexico. Breed on islands in southern California, western Baja California and Gulf of California, Mexico.	PNW	None
Northern fur seal (*Callorhinus ursinus*)	California	Range from California to Alaska. Breed on San Miguel Island and Farallon Islands.	SEAK	None
	Eastern Pacific	Range from California to Alaska. Breed on Pribilof and Aleutian Islands.	SEAK	None
Steller sea lion (*Eumetopias jubatus*)	Western DPS, Endangered:	West of 144˚W (although mixing of stocks occurs in Southeast Alaska). Haulouts occur in Aleutians and to Russia and northern Japan.	SEAK	58 FR 45269, August 27, 1993
	Eastern DPS	East of 144˚W (although mixing of stocks occurs in Southeast Alaska).Haulouts occur in Southeast Alaska, British Columbia, Washington, Oregon, and California coasts.	PNW; SEAK	None
Pinnipeds - Phocids				
Gray seal (*Halichoerus grypus*)	Western North Atlantic	Distributed from New Jersey to Labrador; separated into three breeding aggregations in eastern Canada: Sable Island, Gulf of St. Lawrence and sites along the coast of Nova Scotia.	USEC-MidATL	None
Harbor seal (*Phoca vitulina*)	Western North Atlantic	Year-round in coastal waters of eastern Canada and Maine. Seasonally along	USEC-MidATL; USEC-South	None

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status*[1]	*Distribution of the Stock/DPS*	*Proposed Action Area(s)*	*Critical Habitat within Proposed Action Area(s)*
		the coasts from southern New England to Virginia and as far south as Florida.		
	Oregon/Washington stock	Haulouts distributed along outer coasts of Oregon and Washington.	PNW	None
	Alaska	Haulouts distributed throughout the Aleutian Islands, Pribilof Islands, Bristol Bay, N. Kodiak, S. Kodiak, Prince William Sound, Cook Inlet/Shelikof Strait, Glacier Bay/Icy Strait, Lynn Canal/Stephens Passage*, Sitka/Chatham Strait*, Dixon/Cape Decision*, Clarence Strait*.	SEAK*	None
Harp seal (*Pagophilus groenlandicus*)	Western North Atlantic	Highly migratory; "Front herd" breeds off the coast of Newfoundland and Labrador, and the "Gulf herd" breeds near Magdalen Islands in the middle of the Gulf of St. Lawrence.	USEC-MidATL	None
Northern elephant seal (*Mirounga angustirostris*)	California breeding	Breed and give birth in California and Baja California, primarily on offshore islands. Highly migratory; Offshore waters of Mexico and California to western Aleutian Islands (depending on sex).	PNW; SEAK	None
Sirenians				
West Indian Manatee (*Trichechus manatus*)	Florida; Threatened	Range includes southeastern U.S. (primarily Florida), east coast of Mexico, Central America, northeastern South America, Cuba, Hispaniola, Puerto Rico and Jamaica as well as Trinidad and Tobago.	USEC-MidATL; USEC-South; GoMEX and Mississippi River	42 FR 47840, September 22, 1977
Carnivores - Mustelids				
Sea otter (*Enhydra lutris*)	Northern sea otter (Southcentral Alaska,	Southcentral stock extends from Cape Yakatag to Cook Inlet, including Prince	SEAK*	74 FR 51988, October, 8, 2009

Common Name (Scientific Name)	*MMPA Stock, DPS and ESA-Listing Status[1]*	*Distribution of the Stock/DPS*	*Proposed Action Area(s)*	*Critical Habitat within Proposed Action Area(s)*
	Southeast Alaska[*], Southwest Alaska, Washington); Southwest Alaska DPS-Endangered	William Sound , the Kenai Peninsula coast, and Kachemake Bay; Southeast stock extends from Dixon Entrance to Cape Yakataga; and Southwest stock include Alaska Peninsula and Bristol Bay coasts and the Aleutian, Barren, Kodiak, and Pribilof Islands.		

[1] All marine mammals in the United States are offered protection under the Marine Mammal Protection Act. Some species are offered further protection under the Endangered Species Act.

[*] Stock boundaries likely to overlap with SEAK proposed action area.

APPENDIX I ESA-LISTED SPECIES CONSIDERED IN THE 2018 NMFS BIOLOGICAL OPINION

Table I- 1 provides a comparison of ESA-listed species under NMFS' jurisdiction between the 2018 Biological Opinion for the Federal Aids to Navigation Program (USCG 2018) and ESA-listed species considered in this PEIS.

Table I- 1. Comparison of Species in the NMFS ATON BO and this PEIS

ESA-Listed Species Considered in the NMFS ATON BO	***ESA-Listed Species Considered in the WCC PEIS Under NMFS Jurisdiction***
Marine Mammals	
Beluga Whale (Delphinapterus leucas) – Cook Inlet DPS	Blue whale (*Balaenoptera musculus*) – Western North Atlantic; Eastern North Pacific
Blue Whale (Balaenoptera musculus)	Bryde's whale (*Balaenoptera edeni*) - Northern Gulf of Mexico, Gulf of Mexico DPS
Bowhead Whale (Balaena mysticetes)	Fin whale (*Balaenoptera physalus*) – Western North Atlantic; Northeast Pacific
False Killer Whale (*Pseudorca crassidens*) – Main Hawaiian Islands Insular DPS	Gray whale (*Eschrichtius robustus*) – Western North Pacific DPS
Fin Whale (Balaenoptera physalus)	Humpback whale (*Megaptera novaeangliae*) - Western North Pacific stock (Hawaii DPS; Western North Pacific DPS); Central North Pacific stock (Hawaii DPS; Mexico DPS**;** Central American DPS)
Gray Whale (*Eschrichtius robustus*) Western North Pacific	North Atlantic right whale (*Eubalaena glacialis*) – Western Stock
Gulf of Mexico Bryde's Whale (Balaenoptera edeni)	North Pacific right whale (*Eubalaena japonica*) – Eastern North Pacific
Humpback Whale (*Megaptera novaeangliae*) – Central America DPS; Mexico DPS; Western North Pacific DPS	Sei whale (*Balaenoptera borealis*) – Nova Scotia
Killer Whale (*Orcinus orca*) – Southern Resident DPS	Sperm whale (*Physeter macrocephalus*) – North Pacific
North Atlantic Right Whale (Eubalaena glacialis)	Steller sea lion (*Eumetopias jubatus*) – Western DPS
North Pacific Right Whale (Eubalaena japonica)	
Sei Whale (Balaenoptera borealis)	
Sperm Whale (Physeter macrocephalus)	
Bearded Seal (Erignathus barbatus) – Beringia DPS	
Guadalupe Fur Seal (*Arctocephalus* townsendi)	
Hawaiian Monk Seal (*Neomonachus* schauinslandi)	
Steller Sea Lion (*Eumetopias jubatus*) –	

ESA-Listed Species Considered in the NMFS ATON BO	*ESA-Listed Species Considered in the WCC PEIS Under NMFS Jurisdiction*
Western DPS	
Marine Reptiles	
Green Turtle (*Chelonia mydas*) – Central North Pacific DPS; Central West Pacific DPS; East Pacific DPS; North Atlantic DPS; South Atlantic DPS	Green sea turtle (*Chelonia mydas*) – East Pacific DPS; North Atlantic DPS
Hawksbill Turtle (Eretmochelys imbricata)	Hawksbill sea turtle (Eretmochelys imbricata)
Kemp's Ridley Turtle (*Lepidochelys kempii*)	Kemp's ridley sea turtle *(Lepidochelys kempii)*
Leatherback Turtle (*Dermochelys coriacea*)	Leatherback sea turtle (*Dermochelys coriacea*)
Loggerhead Turtle (*Caretta caretta*) – North Pacific Ocean DPS; Northwest Atlantic Ocean DPS	Loggerhead sea turtle (*Caretta caretta*) – North Pacific Ocean DPS; Northwest Atlantic Ocean DPS
Olive Ridley Turtle (*Lepidochelys olivacea*) All Other Areas; Mexico's Pacific Coast Breeding Colonies	Olive ridley sea turtle (*Lepidochelys olivacea*) – All other populations; Mexico's breeding population
Marine Invertebrates	
Black Abalone (Haliotis cracherodii)	Boulder star coral (Orbicella franksi)
White Abalone (Haliotis sorenseni)	Elkhorn coral (Acropora palmata)
Chambered nautilus (*Nautilus pompilius*) - Proposed	Lobed star coral (Orbicella annularis)
Acropora globiceps Coral	Mountainous star coral (Orbicella faveolata)
Acropora jacquelineae Coral	Pillar coral (Dendrogyra cylindrus)
Acropora retusa Coral	Rough cactus coral (Mycetophyllia ferox)
Acropora speciosa Coral	Staghorn coral (Acropora cervicornis)
Seriatopora aculeata Coral	
Euphyllia paradivisa Coral	
Isopora crateriformis Coral	
Elkhorn Coral (*Acropora palmata*)	
Lobed Star Coral (*Orbicella annularis*)	
Mountainous Star Coral (*Orbicella faveolata*)	
Rough cactus coral (*Mycetophyllia ferox*)	
Boulder star coral (*Orbicella franksi*)	
Pillar Coral (Dendrogyra cylindrus)	
Staghorn Coral (Acropora cervicornis)	
Fish	
Atlantic Salmon (*Salmo salar*) – Gulf of Maine DPS	Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) – New York Bight DPS; Chesapeake Bay DPS; Carolina DPS; South Atlantic DPS
Atlantic Sturgeon (Acipenser oxyrinchus *oxyrinchus*) – Carolina DPS; Chesapeake DPS; Gulf of	Bull trout (Salvelinus confluentus)

ESA-Listed Species Considered in the NMFS ATON BO	***ESA-Listed Species Considered in the WCC PEIS Under NMFS Jurisdiction***
Maine DPS; New York Bight DPS; South Atlantic DPS	
Bocaccio (Sebastes paucispinis) – Puget Sound/Georgia Basin DPS	Chinook salmon (*Oncorhynchus tshawytscha*) – Lower Columbia River ESU; Snake River Fall Run ESU; Snake River Spring/Summer Run ESU; Upper Columbia River Spring Run ESU; Upper Willamette River ESU
Chinook Salmon (*Oncorhynchus tshawytscha*) – California Coastal ESU; Central Valley Spring-Run ESU; Lower Columbia River ESU; Puget Sound ESU; Sacramento River Winter-Run ESU; Snake River Fall-Run ESU; Snake River Spring/Summer Run ESU; Upper Columbia River Spring-Run ESU; Upper Willamette River ESU	Chum salmon (*Oncorhynchus keta*) – Columbia River ESU
Chum Salmon (Oncorhynchus keta) – Columbia River ESU; Hood Canal Summer-Run ESU	Coho salmon (*Oncorhynchus kisutch*) – Lower Columbia River ESU; Oregon Coast ESU; Southern Oregon and Northern California Coast; Central California Coast
Coho Salmon (Oncorhynchus kisutch) – Central California Coast ESU; Lower Columbia River ESU; Oregon Coast ESU; Southern Oregon and Northern California Coasts ESU;	Eulachon (*Thaleichthys pacificus*) – Southern DPS
Eulachon (Thaleichthys pacificus) –Southern DPS	Giant manta ray (*Manta birostris*)
Green Sturgeon (Acipenser medirostris) – Southern DPS	Green sturgeon (*Acipenser medirostris*) – Southern DPS
Gulf Sturgeon (Acipenser oxyrinchus desotoi)	Gulf sturgeon (*Acipenser oxyrinchus desotoi*) – Southern DPS
Giant Manta Ray (*Manta birostris*)	Largetooth sawfish (*Pristis pristis*)
Nassau Grouper (Epinephelus striatus)	Nassau grouper (Epinephelus striatus)
Scalloped Hammerhead Shark (*Sphyrna lewini*) – Central and Southwest Atlantic DPS; Eastern Pacific DPS; Indo-West Pacific DPS	Oceanic whitetip shark (*Carcharhinus longimanus*)
Shortnose Sturgeon (Acipenser brevirostrum)	Scalloped hammerhead shark (*Sphyrna lewini*) – Central and Southwest Atlantic DPS
Smalltooth Sawfish (*Pristis pectinata*) – U.S. portion of range DPS	Shortnose sturgeon (Acipenser brevirostrum)
Sockeye Salmon (*Oncorhynchus nerka*) – Ozette Lake ESU; Snake River ESU	Smalltooth sawfish (*Pristis pectinata*) – U.S. DPS
Steelhead Trout (*Oncorhynchus mykiss*) – California Central Valley DPS; Central California Coast DPS; Lower Columbia River DPS; Middle Columbia River DPS; Northern California DPS; Puget Sound DPS; Snake River Basin DPS; South-Central California Coast DPS; Southern California DPS; Upper Columbia River DPS; Upper Willamette River DPS	Sockeye salmon (*Oncorhynchus nerka*) – Snake River; Ozette Lake

ESA-Listed Species Considered in the NMFS ATON BO	***ESA-Listed Species Considered in the WCC PEIS Under NMFS Jurisdiction***
Yelloweye Rockfish (*Sebastes rubberimus*) – Puget Sound/Georgia Basin DPS	Steelhead trout (*Oncorhynchus mykiss*) – Lower Columbia River; Middle Columbia River; Snake River Basin; Upper Columbia River; Upper Willamette River
Marine Vegetation	
Johnson's Seagrass (*Halophila johnsonii*)	Johnson's Seagrass (*Halophila johnsonii*)

APPENDIX J CHANGES BETWEEN DRAFT PEIS AND FINAL PEIS

Placeholder: *This appendix will identify the changes made between the Draft PEIS to the Final PEIS.*