Appendix K Geographic Mitigation Assessment

Supplemental Environmental Impact Statement/ Overseas Environmental Impact Statement Northwest Training and Testing

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APPENDIX K GEOGRAPHIC MITIGATION ASSESSMENT

K.1 Introduction

As described in Chapter 5 (Mitigation), the United States (U.S.) Department of the Navy (Navy) will implement mitigation measures to avoid or reduce potential impacts from the Northwest Training and Testing (NWTT) Supplemental Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (OEIS) Proposed Action. Chapter 2 (Description of Proposed Action and Alternatives) provides a description of activities that will be conducted under the Proposed Action. Mitigation measures the Navy will implement under the Proposed Action are organized into two categories: procedural mitigation and mitigation areas. Procedural mitigation measures are discussed in Chapter 5 (Mitigation) of this Final Supplemental EIS/OEIS. Procedural mitigation will be implemented whenever and wherever applicable activities take place within the Study Area. For example, the Navy will use trained Lookouts to observe for marine species (e.g., marine mammals) prior to, during, and after applicable activities in the NWTT Study Area. The purpose of this Appendix is to present the Navy's assessment of mitigation areas for the Study Area. Mitigation areas are geographic locations where the Navy will implement additional mitigation measures (i.e., geographic mitigation, in addition to procedural mitigation) for applicable acoustic, explosive, or physical disturbance and strike stressors. See Chapter 5 (Mitigation) for additional information about the Navy's mitigation development process, such as a brief history of mitigation developed for previous at-sea environmental compliance documents, definitions of mitigation terminology, and details on Navy monitoring, research, and reporting initiatives. See Chapter 3 (Affected Environment and Environmental Consequences) for additional information on the acoustic, explosive, and physical disturbance and strike stressors used under the Proposed Action.

K.2 Mitigation Area Development Process

The Navy's mitigation area development process included an assessment of the marine and terrestrial portions of the NWTT Study Area to develop mitigation areas for the Proposed Action. In doing so, the Navy reanalyzed existing mitigation areas developed under the 2015 NWTT Final EIS/OEIS, assessed habitats identified internally by the Navy or suggested through comments received during NEPA scoping and on the 2019 NWTT Draft Supplemental EIS/OEIS, and assessed habitats identified by regulatory agencies during the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) consultation and permitting processes.

The Navy conducted a detailed review and assessment of each potential mitigation measure individually and then all potential mitigation measures collectively to determine if, as a whole, the mitigation will be effective at avoiding or reducing potential impacts and practical to implement with regard to safety, sustainability, and the Navy's ability to meet mission requirements. The Navy assessed the manner and degree to which a potential mitigation area is likely to avoid or reduce potential impacts while still being practical to implement using the criteria discussed in Section K.2.1 (Biological Effectiveness Assessment Criteria) and Section K.2.2 (Operational Assessment Criteria). The Navy operational community (i.e., leadership from the aviation, surface, subsurface, and special warfare communities; leadership from the research and acquisition community; and training and testing experts), environmental planners, and scientists provided input on the effectiveness and practicality of mitigation implementation. Data inputs for mitigation area assessment and development included the operational information described in Section K.2.2 (Operational Assessment Criteria) and Section 5.2.3 (Practicality of Implementation), the best available science discussed in Chapter 3 (Affected Environment and Environmental Consequences), published literature, predicted activity impact footprints, and marine species monitoring and density

data. The Navy will not implement measures that did not meet the appropriate balance between being both effective as well as practical to implement, as described in the operational assessments in the sections below, Section K.3.4 (Geographic Mitigation Considered but Eliminated), and Section 5.5 (Measures Considered but Eliminated). Additional information about the Navy's operational assessment criteria, including information on factors that affect practicality of implementation, is included in Section 5.2.3 (Practicality of Implementation).

As discussed in Chapter 5 (Mitigation), the Navy coordinated its mitigation, including the development of mitigation areas, with the appropriate regulatory agencies, such as the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS), and U.S. Fish and Wildlife Service (USFWS) through the consultation and permitting processes. The Navy Record of Decision will document all mitigation measures the Navy will implement under the Proposed Action. The NMFS Record of Decision, MMPA Regulations and Letters of Authorization, ESA Biological Opinions, and other applicable consultation documents will include the subset of mitigation measures applicable to the resources for which the Navy has consulted.

K.2.1 Biological Effectiveness Assessment Criteria

Mitigation areas are designed to help avoid or reduce potential impacts in key areas of importance. Therefore, the mitigation benefit is discussed qualitatively in terms of the context of impact avoidance or reduction. The Navy considers a mitigation area to be effective if it meets the following criteria:

- **The mitigation area is a key area of biological or ecological importance or contains cultural resources:** The best available science suggests that the mitigation area contains submerged cultural resources (e.g., shipwrecks) or is particularly important to one or more species or resources for a biologically important life process (i.e., foraging, migration, reproduction) or ecological function (e.g., live hard bottom that provides critical ecosystem functions); and
- **The mitigation will result in an avoidance or reduction of impacts:** Implementing the mitigation will likely avoid or reduce potential impacts on: (1) species, stocks, or populations of marine mammals based on data regarding their seasonality, density, and behavior; or (2) other biological or cultural resources based on their distribution and physical properties. Furthermore, implementing the mitigation will not shift or transfer adverse effects from one species to another (e.g., to a more vulnerable or sensitive species).

K.2.2 Operational Assessment Criteria

Mitigation measures are expected to have some degree of impact on the training and testing activities that implement them (e.g., modifying where and when activities occur, ceasing an activity in response to a sighting). The Navy is able to accept a certain level of impact on its military readiness activities because of the benefit that mitigation measures provide for avoiding or reducing impacts on environmental and cultural resources. The Navy's focus during mitigation assessment and development is that mitigation measures must meet the appropriate balance between being both effective as well as practical to implement. To evaluate practicality, the Navy operational community conducted an extensive and comprehensive assessment to determine how and to what degree potential mitigation measures would be compatible with planning, scheduling, and conducting training and testing activities under the Proposed Action in order to meet the Navy's Title 10 requirements.

During its assessment to determine how and to what degree the implementation of mitigation would be compatible with meeting the purpose and need of the Proposed Action, the Navy considered a mitigation measure to be practical to implement if it met all criteria discussed below:

- **Implementing the mitigation is safe:** Mitigation measures must not increase safety risks to Navy personnel and equipment, or to the public. When assessing whether implementing a mitigation measure would be safe, the Navy factored in the potential for increased pilot fatigue; accelerated fatigue-life of aircraft; typical fuel restrictions of participating aircraft; locations of refueling stations; proximity to aircraft emergency landing fields, critical medical facilities, and search and rescue resources; space restrictions of the observation platforms; the ability to de-conflict platforms and activities to ensure that training and testing activities do not impact each other; and the ability to avoid interaction with non-Navy sea space and airspace uses, such as established commercial air traffic routes, commercial vessel shipping lanes, and areas used for energy exploration or alternative energy development. Other safety considerations included identifying if mitigation measures would reasonably allow Lookouts to safely and effectively maintain situational awareness while observing the mitigation zones during typical activity conditions, or if the mitigation would increase the safety risk for personnel. For example, the safety risk would increase if Lookouts were required to direct their attention away from essential mission requirements.
- **Implementing the mitigation is sustainable:** One of the primary factors that the Navy incorporates into the planning and scheduling of its training and testing activities is the amount and type of available resources, such as funding, personnel, and equipment. Mitigation measures must be sustainable over the life of the Proposed Action, meaning that they will not require the use of resources in excess of what is available. When assessing whether implementing a mitigation measure would be sustainable, the Navy considered if the measure would require excessive time on station or time away from homeport for Navy personnel, require the use of additional personnel (i.e., manpower) or equipment (e.g., adding a small boat to serve as an additional observation platform), or result in additional operational costs (e.g., increased fuel consumption, equipment maintenance, or acquisition of new equipment).
- **Implementing the mitigation allows the Navy to continue meeting its mission requirements:** The Navy considered if each individual measure and the iterative and cumulative impact of all potential measures would be within the Navy's legal authority to implement. The Navy also considered if mitigation would modify training or testing activities in a way that would prevent individual activities from meeting their mission objectives and if mitigation would prevent the Navy from meeting its national security requirements or statutorily-mandated Title 10 requirements, such as by:
  - Impacting training and testing realism or preventing ready access to ranges, operating areas, facilities, or range support structures (which would reduce realism and present sea space and airspace conflicts).
  - Impacting the ability for Sailors to train and become proficient in using sensors and weapon systems as would be required in areas analogous to where the military operates or causing an erosion of capabilities or reduction in perishable skills (which would result in a significant risk to personnel or equipment safety during military missions and combat operations).
  - Impacting the ability for units to meet their individual training and certification requirements (which would impact the ability to deploy with the required level of readiness necessary to accomplish any tasking by Combatant Commanders).
  - Impacting the ability to certify forces to deploy to meet national security tasking (which would limit the flexibility of Combatant Commanders and warfighters to project power, engage in multi-national operations, and conduct the full range of naval warfighting capabilities in support of national security interests).
  - Impacting the ability of researchers, program managers, and weapons system acquisition programs to conduct accurate acoustic research to meet research objectives, effectively test systems and platforms (and components of these systems and platforms) before full-scale

production or delivery to the fleet, or complete shipboard maintenance, repairs, or pierside testing prior to at-sea operations (which would not allow the Navy to ensure safety, functionality, and accuracy in military mission and combat conditions per required acquisition milestones or on an as-needed basis to meet operational requirements).

- Requiring the Navy to provide advance notification of specific times and locations of Navy platforms, such as platforms using active sonar (which would present national security concerns).
- Reducing the Navy's ability to be ready, maintain deployment schedules, or respond to national emergencies or emerging national security challenges (which would present national security concerns).

K.3 Mitigation Areas to be Implemented

As a result of its biological effectiveness and operational assessments, the Navy developed numerous mitigation areas in the NWTT Study Area. Section K.3.1 (Mitigation Areas for Seafloor Resources) describes geographic mitigation the Navy will implement to avoid or reduce potential impacts on seafloor resources throughout the NWTT Offshore Area and NWTT Inland Waters. Geographic mitigation developed for marine species is discussed in Section K.3.2 (Mitigation Areas for Marine Species in the NWTT Offshore Area) and Section K.3.3 (Mitigation Areas for Marine Species in NWTT Inland Waters).

K.3.1 Mitigation Areas for Seafloor Resources

As outlined in Table K-1 and shown in Figure K-1, the Navy will implement mitigation to avoid or reduce potential impacts from explosives and physical disturbance and strike stressors on submerged cultural resources (i.e., shipwrecks), sensitive seafloor resources, and any biological resources that inhabit, shelter, rest, feed, or occur in the mitigation areas.

Table K-1: Seafloor Resource Mitigation Areas in the NWTT Study Area

Mitigation Area Description
Stressor or Activity • Explosives • Physical disturbance and strikes
Resource Protection Focus • Live hard bottom • Artificial reefs • Shipwrecks
Mitigation Requirements • **Seafloor Resource Mitigation Areas (year-round)** – Within the anchor swing circle of live hard bottom, artificial reefs, and shipwrecks, the Navy will not conduct Precision Anchoring training exercises (except in designated areas). – Within a 350 yd. radius of live hard bottom, artificial reefs, and shipwrecks, the Navy will not conduct explosive mine countermeasure and neutralization activities or explosive mine neutralization activities involving Navy divers (except in designated locations), and the Navy will not place mine shapes, anchors, or mooring devices on the seafloor (except in designated areas).

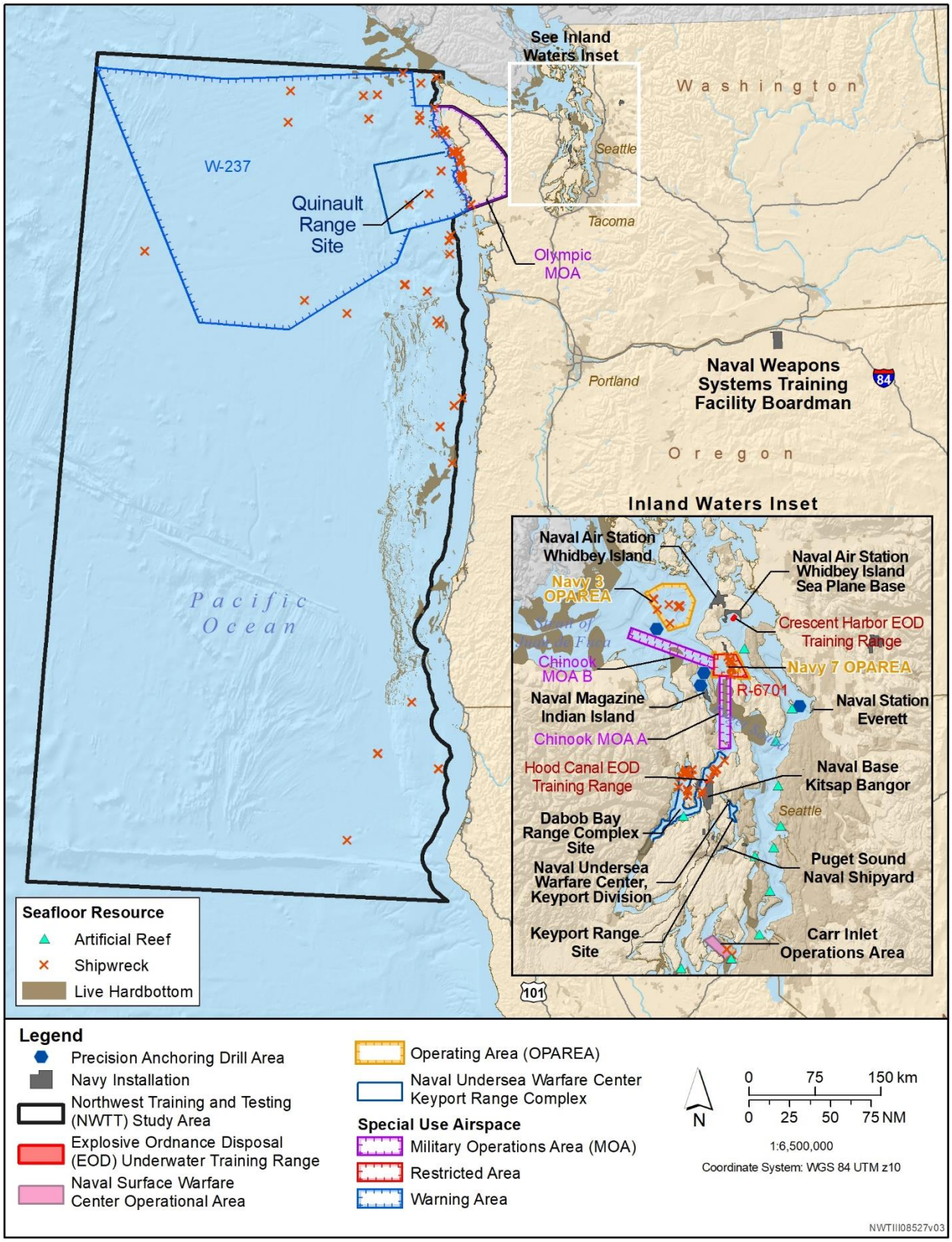

Figure K-1: Seafloor Resource Mitigation Areas in the NWTT Study Area

K.3.1.1 Resource Description

Live hard bottom habitats and artificial structures (e.g., artificial reefs, shipwrecks) provide attachment substrate for aquatic vegetation and invertebrates, such as corals, seaweed, macroalgae, and sponges. These habitats in turn support a community of organisms, such as fish, shrimp, crabs, barnacles, worms, and sea cucumbers. Dive sites occur throughout nearshore areas of the Study Area where there are shipwrecks and artificial reefs, making these resources highly valuable from a socioeconomic standpoint. Similarly, live hard bottom and artificial structures provide important habitat for commercially and recreationally important fish species. Historic shipwrecks are classified as archaeological resources and are an important part of maritime history. For additional information on the biological, cultural, and socioeconomic importance of seafloor resources and their associated ecosystem components, refer to Section 3.3 (Marine Habitats), Section 3.4 (Marine Mammals), Section 3.7 (Marine Vegetation), Section 3.8 (Marine Invertebrates), Section 3.9 (Fishes), Section 3.10 (Cultural Resources), and Section 3.12 (Socioeconomic Resources and Environmental Justice) of this Final Supplemental EIS/OEIS.

K.3.1.2 Mitigation Area Assessment

K.3.1.2.1 Biological Effectiveness

The seafloor resource mitigation is a continuation from the 2015 NWTT Final EIS/OEIS. Figure K-1 shows the relevant seafloor resources and the Navy training or testing locations that overlap them. The Navy developed mitigation areas as either the anchor swing circle diameter or a 350-yard (yd.) radius around a seafloor resource, as indicated by the best available georeferenced data. Without this mitigation, explosives and physical disturbance and strike stressors could potentially impact live hard bottom, artificial reefs, shipwrecks, and their associated ecosystem components during certain training and testing activities in the Study Area.

The mitigation areas are particularly important to one or more resources for a biologically important ecological function (i.e., live hard bottom habitat and artificial reefs that provide critical ecosystem functions). Mitigating within the anchor swing circle will protect seafloor resources during Precision Anchoring training exercises when factoring in environmental conditions that could affect anchoring position and swing circle size, such as winds, currents, and water depth. For other activities that will implement the mitigation, a 350 yd. radius around a seafloor resource is a conservatively sized mitigation area that will provide protection well beyond the maximum expected impact footprint (e.g., crater and expelled material radius) of the explosives and non-explosive practice munitions used in the Study Area. The mitigation area size was designed to extend beyond the military expended material with the largest footprint for all Study Areas where this mitigation measure is implemented. The military expended material with the largest footprint (which is used in the Atlantic Fleet Training and Testing Study Area and Hawaii-Southern California Training and Testing Study Area, but not in the NWTT Study Area) is an explosive mine with a 650 lb. net explosive weight, which has an estimated impact footprint of approximately 14,800 square feet (ft.) and an associated radius of 22.7 yd. (U.S. Department of the Navy, 2018b). The largest explosive applicable to this mitigation in the NWTT Study Area has a charge size of 60 lb. net explosive weight, which has an estimated impact footprint of 281 square ft. and an associated radius of 3.15 yd. Therefore, the 350 yd. mitigation area is well beyond the maximum expected direct impact footprint for the activities listed in Table K-1, and it further mitigates some level of indirect impact from explosive disturbances. As described in Section 3.3 (Marine Habitats), other habitat types, such as soft bottom, are expected to recover relatively quickly from potential disturbances; therefore, there would be a limited benefit of implementing this mitigation for other habitat types.

K.3.1.2.2 Operational Assessment

Input from the operational community indicates that the mitigation detailed in Table K-1 is practical to implement. To facilitate mitigation implementation, the Navy will include maps of the best available georeferenced data for live hard bottom, artificial reefs, and shipwrecks in its Protective Measures Assessment Protocol. Mitigation areas apply to georeferenced resources because the Navy requires accurate resource identification and mapping for mitigation to be both effective as well as practical to implement.

Implementing additional mitigation for other activities or types of seafloor resources would not allow the Navy to continue meeting its mission requirements to successfully accomplish military readiness objectives. Expanding the mitigation to protect additional seafloor features where marine species are known to occur (e.g., soft bottom, which provides habitat for resources such as worms and clams) would essentially result in the Navy not conducting training and testing activities throughout a significant portion of the Study Area. This would prohibit the Navy from accessing its mission-essential activity locations. For example, operational parameters require that explosive Mine Countermeasure and Neutralization Testing activities occur within a specific range of water depths (e.g., shallower than 1,000 ft., and typically 300 ft.). As described in Section K.3.1 (Mitigation Areas for Seafloor Resources) and Section K.3.2 (Mitigation Areas for Marine Species in the NWTT Offshore Area), the Navy will implement mitigation to not conduct Mine Countermeasure and Neutralization Testing within Seafloor Resource Mitigation Areas, the Juan de Fuca Eddy Marine Species Mitigation Area, the Olympic Coast National Marine Sanctuary Mitigation Area, the Stonewall and Heceta Bank Humpback Whale Mitigation Area, and the Point St. George Humpback Whale Mitigation Area. Additionally, within 20 nautical miles (NM) from shore in the Marine Species Coastal Mitigation Area, the Navy will implement seasonal restrictions on the number of explosive Mine Countermeasure and Neutralization Testing events as well as the number of explosives in bins E4 and E7 that can be used during the event annually and over a 7-year period. These mitigation areas collectively overlap a significant portion of the suitable sea space where Mine Countermeasure and Neutralization Testing can occur based on operational parameters. Further restrictions on the locations or timing of this activity would be impractical to implement because such mitigation would preclude ready access to the necessary environmental and oceanographic conditions that replicate military mission and combat conditions (which would reduce event realism), prevent the Navy from testing systems and platforms (and components of these systems and platforms) before full-scale production or delivery to the fleet (which would not allow the Navy to ensure safety, functionality, and accuracy in military mission and combat conditions per required acquisition milestones or on an as-needed basis to meet operational requirements).

In many instances, expanding seafloor resource mitigation would push training and testing activities farther offshore, which would also have implications for safety and sustainability. Moving activities farther offshore would increase the distance from aircraft emergency landing fields, critical medical facilities, and search and rescue resources; would require excessive time on station or time away from homeport for Navy personnel; and would result in significant increases to operational costs.

In summary, the operational community determined that implementing mitigation for seafloor resources beyond what is detailed in Table K-1 would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements. For additional information on the biological, cultural, and socioeconomic importance of seafloor resources and their associated ecosystem components, refer to Section 3.3 (Marine Habitats), Section 3.4 (Marine Mammals), Section 3.5 (Sea Turtles), Section 3.6 (Marine Birds), Section 3.7 (Marine Vegetation), Section 3.8 (Marine Invertebrates),

Section 3.9 (Fish), Section 3.11 (Cultural Resources), and Section 3.12 (Socioeconomic Resources and Environmental Justice).

K.3.2 Mitigation Areas for Marine Species in the NWTT Offshore Area

As detailed in Table K-2, shown in Figure K-2, Figure K-3, Figure K-4, and Figure K-5, and described in the sections below, the Navy developed mitigation areas in the NWTT Offshore Area to further avoid or reduce potential impacts on marine mammals, sea turtles, ESA-listed fish, and marbled murrelets.

Table K-2: Marine Species Mitigation Areas in the NWTT Offshore Area

Mitigation Area Description
Stressor or Activity • Sonar (mitigation does not apply to active sonar sources used for safety of navigation) • Explosives • Physical disturbance and strikes
Resource Protection Focus • Marine mammals (humpback whale, gray whale, Southern Resident killer whale, harbor porpoise) • Sea turtles (leatherback sea turtle) • Seabirds (marbled murrelet) • Fish (bull trout, steelhead, Chinook salmon, coho salmon, chum salmon, sockeye salmon, green sturgeon)
Mitigation Requirements[1] • **Marine Species Coastal Mitigation Area (year-round or seasonal if specified)** – Within 50 NM from shore in the Marine Species Coastal Mitigation Area: ▪ The Navy will not conduct explosive training activities. ▪ The Navy will not conduct explosive testing activities (except explosive Mine Countermeasure and Neutralization Testing). ▪ The Navy will not conduct non-explosive missile training activities. ▪ The Navy will issue annual seasonal awareness notification messages to alert ships and aircraft to the possible presence of increased concentrations of Southern Resident killer whales from December 1 to June 30, humpback whales from May 1 through December 31, and gray whales from May 1 to November 30. For safe navigation and to avoid interactions with large whales, the Navy will instruct vessels to remain vigilant to the presence of Southern Resident killer whales, humpback whales, and gray whales that may be vulnerable to vessel strikes or potential impacts from training and testing activities. Platforms will use the information from the awareness notification messages to assist their visual observation of applicable mitigation zones during training and testing activities and to aid in the implementation of procedural mitigation. – Within 20 NM from shore in the Marine Species Coastal Mitigation Area: ▪ The Navy will conduct a maximum combined total of 33 hours of surface ship hull-mounted MF1 mid-frequency active sonar during testing annually within 20 NM from shore in the Marine Species Coastal Mitigation Area, the Juan de Fuca Eddy Marine Species Mitigation Area, and the Olympic Coast National Marine Sanctuary Mitigation Area. ▪ To the maximum extent practical, the Navy will conduct explosive Mine Countermeasure and Neutralization Testing from July 1 through September 30 when operating within 20 NM from shore. ▪ From October 1 through June 30, the Navy will conduct a maximum of one explosive Mine Countermeasure and Neutralization Testing event, not to exceed the use of 20 explosives from bin E4 and 3 explosives from bin E7 annually, and not to exceed the use of 60 explosives from bin E4 and 9 explosives from bin E7 over 7 years. ▪ The Navy will not conduct non-explosive large-caliber gunnery training activities. ▪ The Navy will not conduct non-explosive bombing training activities.

Table K-2: Marine Species Mitigation Areas in the NWTT Offshore Area (continued)

Mitigation Area Description
– Within 12 NM from shore in the Marine Species Coastal Mitigation Area: ▪ The Navy will not conduct Anti-Submarine Warfare Tracking Exercise – Helicopter, – Maritime Patrol Aircraft, – Ship, or – Submarine training activities (which involve the use of mid-frequency or high-frequency active sonar). ▪ The Navy will not conduct non-explosive Anti-Submarine Warfare Torpedo Exercise – Submarine training activities (which involve the use of mid-frequency or high-frequency active sonar). ▪ The Navy will conduct a maximum of one Unmanned Underwater Vehicle Training event within 12 NM from shore at the Quinault Range Site. Unmanned Underwater Vehicle Training events within 12 NM from shore at the Quinault Range Site will be cancelled or moved to another training location if Southern Resident killer whales are detected at the planned training location during the event planning process, or immediately prior to the event, as applicable. ▪ During explosive Mine Countermeasure and Neutralization Testing, the Navy will not use explosives in bin E7 closer than 6 NM from shore in the Quinault Range Site. ▪ The Navy will not conduct non-explosive small- and medium-caliber gunnery training activities.
• **Olympic Coast National Marine Sanctuary Mitigation Area (year-round)** – Within the Olympic Coast National Marine Sanctuary Mitigation Area: ▪ The Navy will conduct a maximum of 32 hours of surface ship hull-mounted MF1 mid-frequency active sonar during training annually. ▪ The Navy will conduct a maximum combined total of 33 hours of surface ship hull-mounted MF1 mid-frequency active sonar during testing annually within 20 NM from shore in the Marine Species Coastal Mitigation Area, the Juan de Fuca Eddy Marine Species Mitigation Area, and the Olympic Coast National Marine Sanctuary Mitigation Area. ▪ The Navy will not conduct explosive Mine Countermeasure and Neutralization Testing activities. ▪ The Navy will not conduct non-explosive bombing training activities.
• **Juan de Fuca Eddy Marine Species Mitigation Area (year-round)** – Within the Juan de Fuca Eddy Marine Species Mitigation Area: ▪ The Navy will conduct a maximum combined total of 33 hours of surface ship hull-mounted MF1 mid-frequency active sonar during testing annually within 20 NM from shore in the Marine Species Coastal Mitigation Area, the Juan de Fuca Eddy Marine Species Mitigation Area, and the Olympic Coast National Marine Sanctuary Mitigation Area ▪ The Navy will not conduct explosive Mine Countermeasure and Neutralization Testing activities.
• **Stonewall and Heceta Bank Humpback Whale Mitigation Area (May 1–November 30)** – Within the Stonewall and Heceta Bank Humpback Whale Mitigation Area from May 1 to November 30: ▪ The Navy will not use surface ship hull-mounted MF1 mid-frequency active sonar during training or testing. ▪ The Navy will not conduct explosive Mine Countermeasure and Neutralization Testing.
• **Point St. George Humpback Whale Mitigation Area (July 1–November 30)** – Within the Point St. George Humpback Whale Mitigation Area from July 1 to November 30: ▪ The Navy will not use surface ship hull-mounted MF1 mid-frequency active sonar during training or testing. ▪ The Navy will not conduct explosive Mine Countermeasure and Neutralization Testing.

[1] Should national security present a requirement to conduct training or testing prohibited by the mitigation requirements specified in this table, naval units will obtain permission from the appropriate designated Command authority prior to commencement of the activity. The Navy will provide NMFS with advance notification and include relevant information about the event (e.g., sonar hours, explosives use, non-explosive practice munitions use) in its annual activity reports to NMFS.

The Navy will continue to implement the following mitigation area measures in the NWTT Offshore Area from the 2015 NWTT Final EIS/OEIS (which were therefore also included in the 2019 NWTT Draft Supplemental EIS/OEIS):

- Requirements to not conduct explosive activities (except for a new testing activity, Mine Countermeasure and Neutralization Testing) and certain non-explosive training and testing activities within 50 NM from shore in the Marine Species Coastal Mitigation Area.
- Requirements to restrict certain non-explosive activities within 20 NM and 12 NM from shore in the Marine Species Coastal Mitigation Area.
- Requirements to not conduct explosive activities and non-explosive bombing within the Olympic Coast National Marine Sanctuary Mitigation Area. For this Supplemental EIS/OEIS, the Navy extended this explosive mitigation requirement to Mine Countermeasure and Neutralization Testing activities, a new activity not covered in the 2015 NWTT Final EIS/OEIS.
- Annual restrictions on the use of surface ship hull-mounted MF1 mid-frequency active sonar during training and testing within the Olympic Coast National Marine Sanctuary Mitigation Area. Additional information about how this mitigation measure was expanded for testing is provided below with the other new measures developed for this Final Supplemental EIS/OEIS.

The Navy identified several opportunities to increase its mitigation measures applicable to the NWTT Offshore Area based on its initial analysis of the best available science and potential mitigation suggested by scoping comments and during development of the 2019 NWTT Draft Supplemental EIS/OEIS:

- Requirements to not use surface ship hull-mounted MF1 mid-frequency active sonar during training or testing, and to not conduct explosive Mine Countermeasure and Neutralization Testing within the Stonewall and Heceta Bank Humpback Whale Mitigation Area from May through November.
- Requirements to not use surface ship hull-mounted MF1 mid-frequency active sonar during training or testing, and to not conduct explosive Mine Countermeasure and Neutralization Testing within the Point St. George Humpback Whale Mitigation Area from July through November.

For this Final Supplemental EIS/OEIS, the Navy further identified additional opportunities to increase its mitigation measures in the NWTT Offshore Area based on its ongoing analysis of the best available science and potential mitigation suggested by comments on the 2019 NWTT Draft Supplemental EIS/OEIS and during the MMPA and ESA consultation processes. The Navy newly developed or modified the following mitigation area measures for this Final Supplemental EIS/OEIS:

- Seasonal awareness notification mitigation within 50 NM from shore to alert ships and aircraft operating within the Marine Species Coastal Mitigation Area to the possible seasonal presence of concentrations of humpback whales, gray whales, and Southern Resident killer whales.
- Requirements to conduct explosive Mine Countermeasure and Neutralization Testing from July 1 to September 30 to the maximum extent practical when operating within 20 NM from shore.
- Requirements from October 1 through June 30 to conduct a maximum of one explosive Mine Countermeasure and Neutralization Testing event, not to exceed the use of 20 explosives from bin E4 and 3 explosives from bin E7 annually, and not to exceed the use of 60 explosives from bin E4 and 9 explosives from bin E7 over 7 years within 20 NM from shore in the Marine Species Coastal Mitigation Area.
- Requirements to not conduct explosive Mine Countermeasure and Neutralization Testing event within a new mitigation area known as the Juan de Fuca Eddy Marine Species Mitigation Area.
- Requirements to not use explosives in bin E7 closer than 6 NM from shore at the Quinault Range Site.

- Annual restrictions on the use of surface ship hull-mounted MF1 mid-frequency active sonar during testing in three combined mitigation areas: within 20 NM from shore in the Marine Species Coastal Mitigation Area, the new Juan de Fuca Eddy Marine Species Mitigation Area, and within the Olympic Coast National Marine Sanctuary Mitigation Area. As described above for measures continued from the 2015 NWTT Final EIS/OEIS, the annual restriction for testing previously only applied to the Olympic Coast National Marine Sanctuary Mitigation Area. Furthermore, for this Final Supplemental EIS/OEIS, the Navy removed an exception in the mitigation language that excluded the Quinault Range Site from the annual sonar restrictions. Now, the Navy's annual restrictions will apply throughout the entire Olympic Coastal National Marine Sanctuary Mitigation Area, including within the portion of the mitigation area that overlaps the Quinault Range Site.
- Requirements to conduct a maximum of one Unmanned Underwater Vehicle Training event within 12 NM from shore at the Quinault Range Site, and to cancel or move Unmanned Underwater Vehicle Training events within 12 NM from shore at the Quinault Range Site if Southern Resident killer whales are detected at the planned training location during the event planning process, or immediately prior to the event, as applicable.

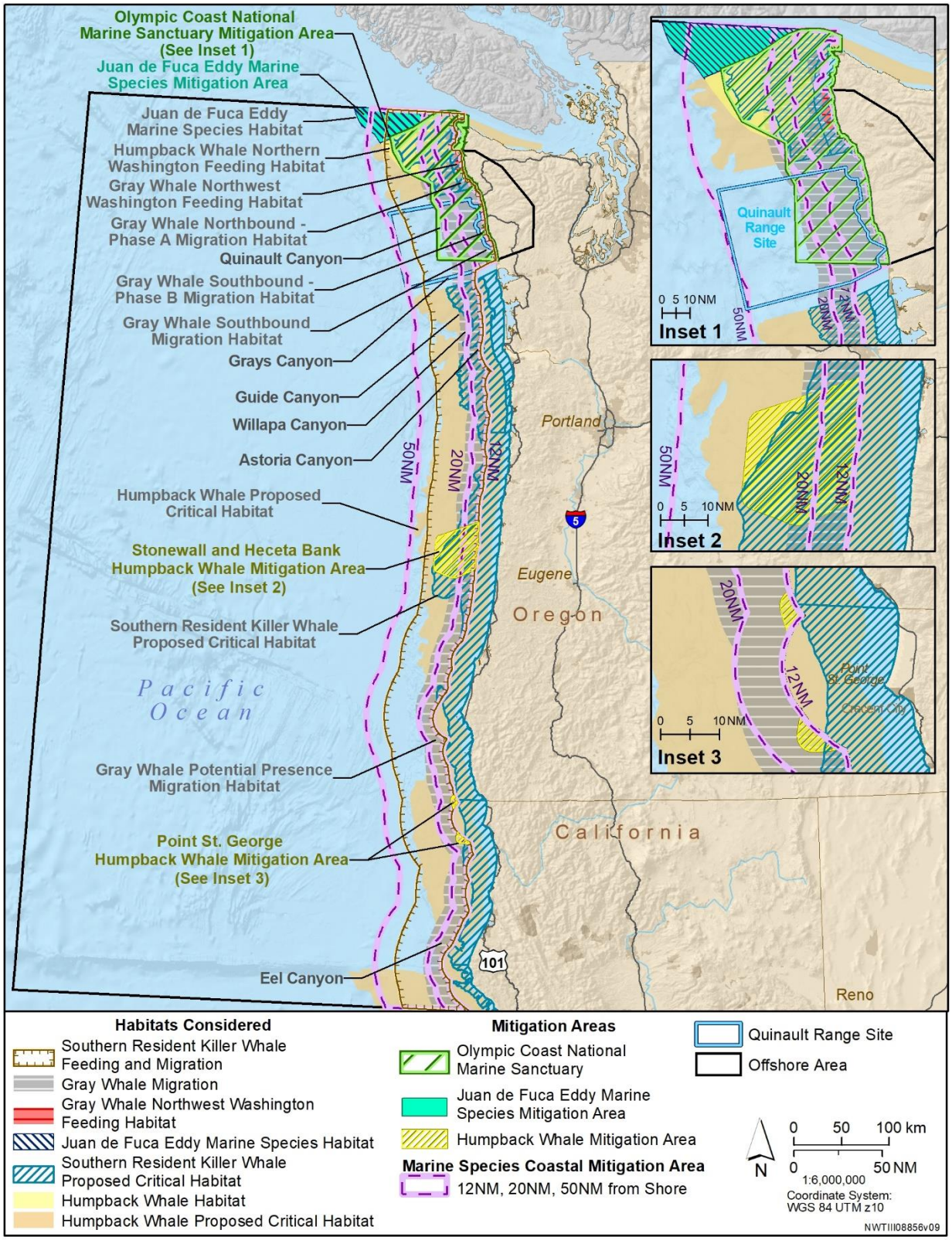

Figure K-2: Marine Species Mitigation Areas and Marine Mammal Habitats Considered in the NWTT Offshore Area

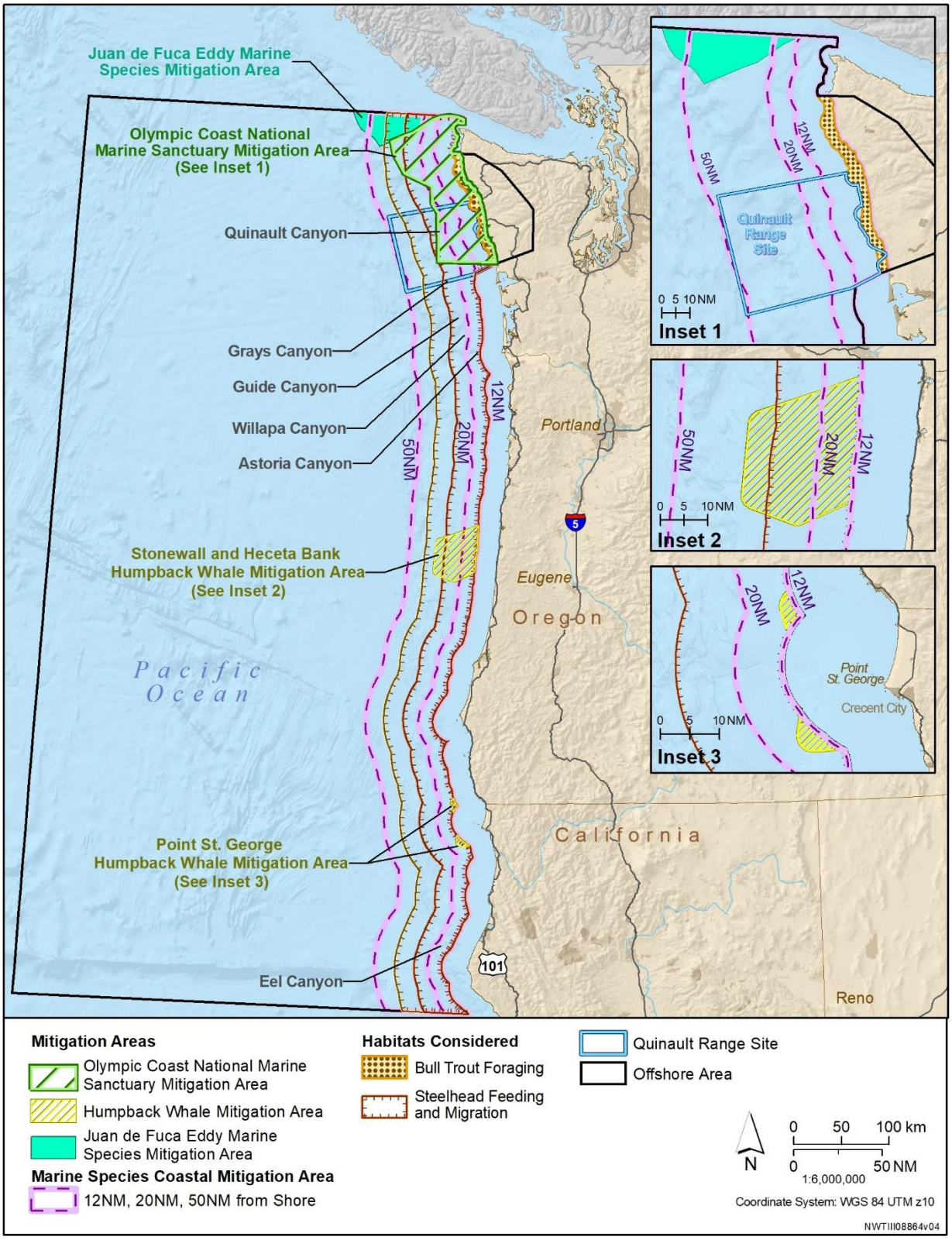

Figure K-3: Marine Species Mitigation Areas and Bull Trout and Steelhead Habitats Considered in the NWTT Offshore Area

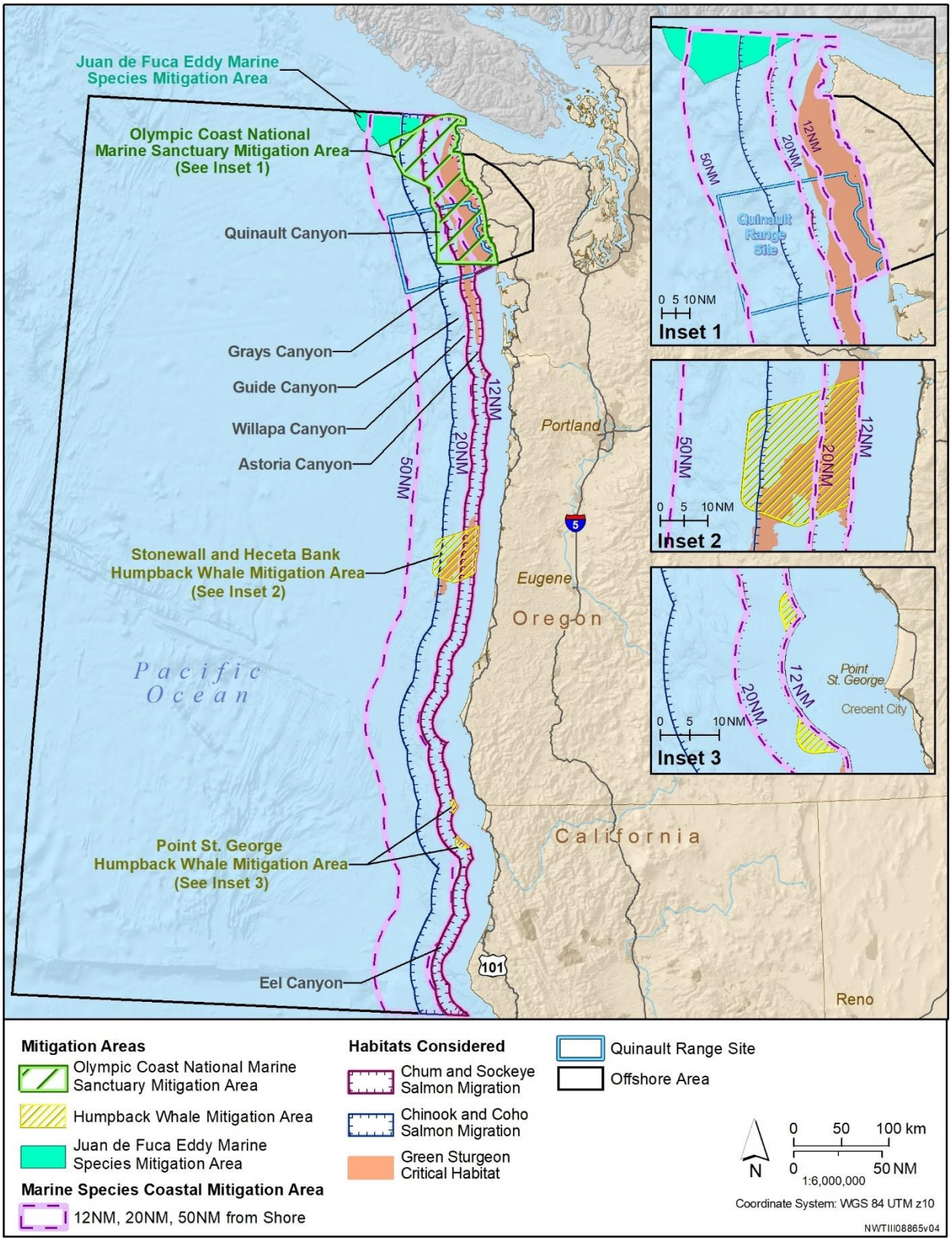

Figure K-4: Marine Species Mitigation Areas and Salmon and Green Sturgeon Habitats Considered in the NWTT Offshore Area

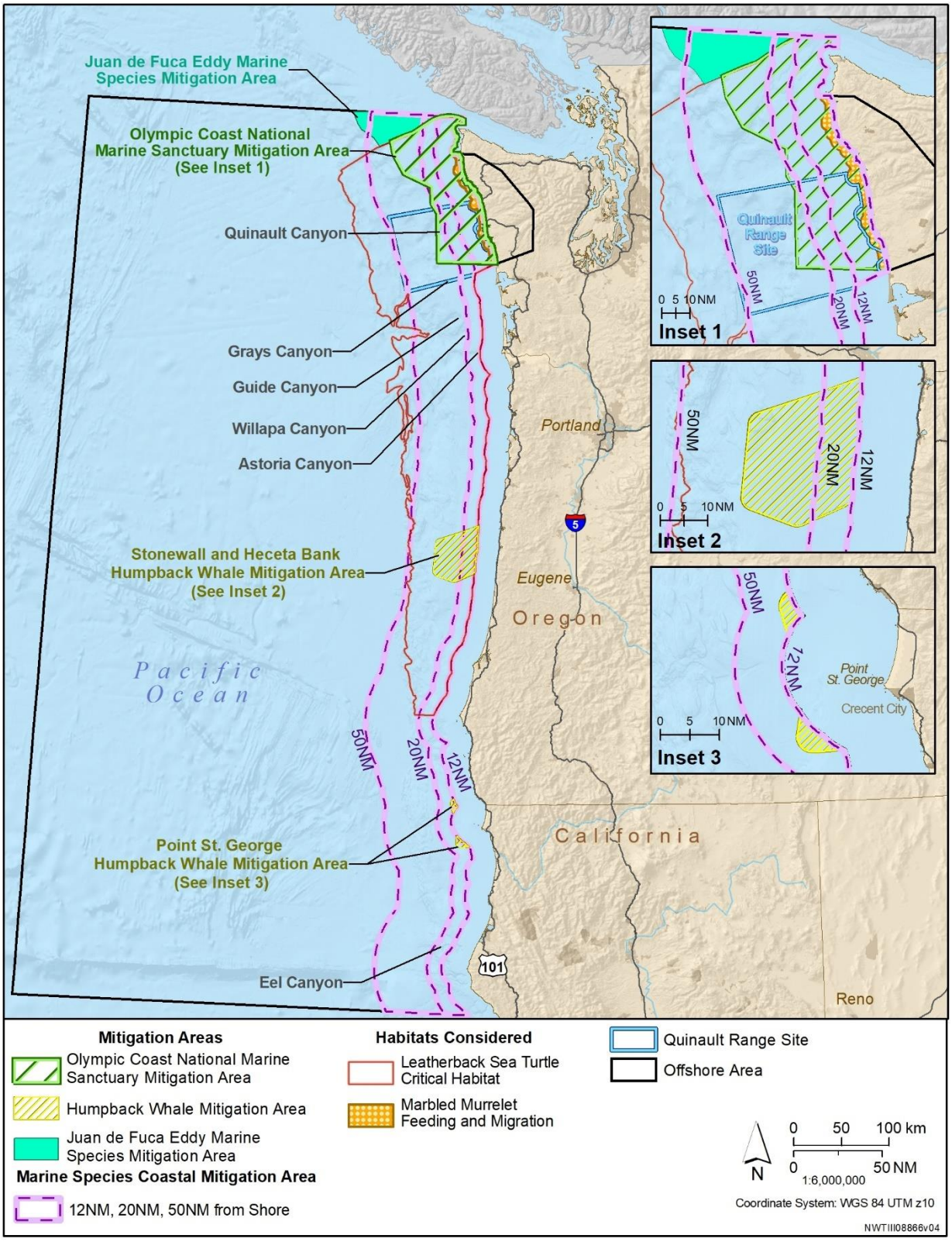

Figure K-5: Marine Species Mitigation Areas and Sea Turtle and Marbled Murrelet Habitats Considered in the NWTT Offshore Area

K.3.2.1 Resource Description

The Navy conducted a comprehensive assessment of the NWTT Offshore Area to identify habitats that serve as key areas of importance for biological life processes (i.e., foraging, migration, reproduction) for marine species. These key habitat areas, which include areas established by NMFS or the USFWS as critical habitat, identified by Calambokidis et al. (2015) as biologically important areas for marine mammals, or otherwise identified through the best available science are described in the sections below, organized by species. The portions of the habitats that overlap the NWTT Offshore Area are shown in Figure K-2, Figure K-3, Figure K-4, and Figure K-5. A map of Marine Protected Areas in the NWTT Offshore Area is presented in Section 6.1.2 (Marine Protected Areas).

Because the purpose of developing mitigation areas is to avoid or reduce potential impacts on marine species within key areas of biological importance, the sections below focus on areas identified as important foraging, migration, and reproduction habitats for marine species. Therefore, not all marine species or areas with known marine species occurrence are discussed in the sections below. For example, although blue whales occur seasonally in the NWTT Offshore Area, the best available science does not indicate that any particular area within the NWTT Offshore Area serves as a key area of biological importance for this species.

K.3.2.1.1 Humpback Whale

Humpback whales are distributed worldwide in all major oceans and most seas. They are most abundant during the summer on high-latitude feeding grounds, and during the winter in the tropical and subtropical breeding habitats (Barlow et al., 2011; Bettridge et al., 2015; Calambokidis et al., 2017; Calambokidis et al., 2010; Keen et al., 2018; Wade et al., 2016). Humpback whales are typically most abundant in shelf and slope waters (<2,000 meters [m] deep), are often associated with areas of high productivity (Becker et al., 2010; Becker et al., 2012; Forney et al., 2012), and primarily feed along the shelf break and continental slope (Green et al., 1992). Humpback whales are present in the NWTT Offshore Area year-round, with peak occurrence off the Washington and Oregon coasts from May through November, and off the northern California coast from April through December (Calambokidis et al., 2004; Calambokidis et al., 2010; Dohl et al., 1983; Forney & Barlow, 1998; Green et al., 1992). Passive acoustic recorders deployed along the coast of Washington from 2014 to 2017 detected humpback whales within the southern portion of Quinault Range primarily from November through April. Moving south from Quinault off the Washington coast, recorders have primarily detected humpback whales off Westport from October through June, off Willapa from October through April, and just north of the Columbia River mouth from September through December (Emmons et al., 2019). Humpback whale detections were greatest in these areas in fall through spring (i.e., September through June).

In 2019, NMFS proposed to designate critical habitat for the Central America, Mexico, and Western North Pacific Distinct Population Segments of humpback whales (84 Federal Register [FR] 54354). As shown in Figure K-2, the proposed critical habitat units for the Central America and Mexico Distinct Population Segments overlap the NWTT Offshore Area. The primary essential feature identified for these proposed humpback whale critical habitat areas is prey species (primarily euphausiids and small pelagic schooling fishes) of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth. Calambokidis et al. (2015) identified a total of seven areas as biologically important humpback whale feeding habitats off the United States West Coast, three of which are located in the NWTT Offshore Area: (1) May to November at Stonewall and Heceta Bank, (2) July to November at Point St. George, and (3) May to November off Northern Washington. These areas were substantiated through long-term data obtained through vessel

surveys; passive acoustic monitoring; photo-identification; satellite-tagging studies; genetic data; opportunistic sightings from whale watching and fishing vessels; and expert judgment.

From May to November, humpback whales aggregate to feed on krill and small fish in an area off northern Washington and an area off Oregon over Stonewall Bank and Heceta Bank. Enhanced vertical and horizontal mixing associated with Heceta Bank results in higher prey densities, which improves foraging conditions for humpback whales and harbor porpoise (Tynan et al., 2005). Humpback whales and harbor porpoise aggregate in this area in the summer when prey concentrations are thought to be highest. From July to November, humpback whales feed in an area off Oregon and California at Point St. George, an area that has similar productive upwelling conditions as Heceta Bank.

Shipboard surveys in July 2005 found that humpback whale sightings were also concentrated around the edge of what appears to be the semi-permanent eddy associated with the outflow from the Strait of Juan de Fuca (Dalla-Rosa et al., 2012). The Juan de Fuca Eddy system is located off Cape Flattery and contains elevated macronutrients levels from spring to fall, derived primarily from upwelling of nutrient-rich deep waters from the California Undercurrent combined with lesser contributions from the Strait of Juan de Fuca outflow (MacFadyen et al., 2008). The full extent of the Juan de Fuca Eddy is not incorporated into the Northern Washington humpback whale biologically important feeding area because the development of biologically important areas was restricted to U.S. waters only. Therefore, the Northern Washington biologically important humpback whale feeding area extends northward to the boundary of the U.S. Exclusive Economic Zone (Calambokidis et al., 2015; Ferguson et al., 2015a; Ferguson et al., 2015b). However, humpback whale aggregations feed across this political boundary in the nutrient rich waters throughout the Juan de Fuca Eddy. For this reason, the Navy is also recognizing the waters within the Juan de Fuca Eddy between the Northern Washington biologically important area and the northern boundary of the NWTT Offshore Area as a key area of importance for humpback whale feeding from May to November. This habitat is represented in Figure K-2 as the Juan de Fuca Eddy Marine Species Habitat.

Humpback whales that feed in these areas are thought to be from the Central North Pacific stock or California, Oregon, and Washington stock; and from the Hawaii Distinct Population Segment (which is not currently listed under the ESA), the Mexico Distinct Population Segment (which is ESA-listed as threatened), and the Central America Distinct Population Segment (which is ESA-listed as endangered). Photo-identification studies suggest that humpback whales feeding in the NWTT Offshore Area are part of a small sub-population that primarily feeds from central Washington to southern Vancouver Island (Calambokidis et al., 2004; Calambokidis et al., 2008).

In summary, humpback whales feed in habitats in the eastern North Pacific, both within and outside of the NWTT Offshore Area. Within the NWTT Offshore Area, the best available science indicates that foraging occurs primarily within the proposed critical habitat, the three identified biologically important areas, and at the Juan de Fuca Eddy; therefore, these habitat areas can be considered particularly important to humpback whales relative to other locations in the NWTT Offshore Area. For additional information about humpback whales and their habitat use and geographic range, see Section 3.4.1.13.3 (Distribution) of this Final Supplemental EIS/OEIS.

K.3.2.1.2 Gray Whale

Off the West Coast of the United States, gray whales migrate annually between winter breeding grounds off Mexico and summer feeding grounds from California to the Arctic from October through July (Calambokidis et al., 2015). Because gray whales have been studied so extensively, their migration

patterns and feeding habitats are relatively well-defined. As shown in Figure K-2, five areas that overlap the NWTT Offshore Area were identified as biologically important gray whale migration or feeding habitats by Calambokidis et al. (2015). From January to July, adult and juvenile gray whales migrate north predominately in waters from the shoreline out to 8 kilometers (km) (4.3 NM) from shore, which is referred to as the Northbound – Phase A migration. From March to July, cow-calf pairs migrate north predominately in waters from the shoreline out to 5 km (2.7 NM) from shore, which is referred to as the Northbound – Phase B migration. Gray whales are not known to migrate during August or September. From October to March, all age classes of gray whales migrate south predominately in waters from the shoreline out to 10 km (5.4 NM) from shore, which is referred to as the Southbound migration. Although most gray whales use migration habitat within 10 km, 8 km, and 5 km from shore during their various phases of migration, some whales have been observed migrating farther distances from shore. To account for this, a biologically important area for potential presence was developed for waters between the shoreline and 47 km (25.4 NM) from shore during the migration season from January to July and October to December. Gray whales migrating in these habitats are thought to be predominately from the Eastern North Pacific population (Carretta et al., 2017), which is not ESA-listed. Data from tagging, photo-identification, and genetic surveys also indicate a potential for migrating gray whales to be from the Western North Pacific population, which is listed under the ESA as endangered (Mate et al., 2015; Muir et al., 2016; Weller et al., 2013; Weller et al., 2002; Weller et al., 2012).

In addition to the migration areas, Calambokidis et al. (2015) identified a total of six areas as biologically important gray whale feeding habitats off the United States West Coast, one of which is located in the NWTT Offshore Area. From May to November, a gray whale aggregation feeds in an area off northwest Washington. Gray whales that feed in this area are thought to be from the Pacific Coast Feeding Group subpopulation of the Eastern North Pacific population (Calambokidis et al., 2015). Research conducted on gray whales in this area between June and November from 1984 to 2011 found that use of the feeding area in the mouth of the Strait of Juan de Fuca and northern portion of the habitat in coastal waters varies annually, but typically peaks in October and August, respectively (Scordino et al., 2017). The potential presence of migration and feeding areas were substantiated through long-term data obtained through vessel, aerial, and land-based surveys; photo-identification; genetic and tagging studies; opportunistic sightings from whale watching and fishing vessels; and expert judgment.

In summary, gray whales feed in and migrate through habitats throughout the North Pacific, Arctic, and along the United States West Coast, both within and outside of the NWTT Offshore Area. Within the NWTT Offshore Area, the best available science indicates that feeding and migration occur primarily within the biologically important areas identified by Calambokidis et al. (2015); therefore, these habitat areas can be considered particularly important to gray whales relative to other locations in the NWTT Offshore Area. For additional information about gray whales and their habitat use and geographic range, see Section 3.4.1.14.3 (Distribution) of this Final Supplemental EIS/OEIS.

K.3.2.1.3 Southern Resident Killer Whale

Waters in the NWTT Offshore Area that extend out to 41 NM offshore are considered important Southern Resident killer whale feeding and migration habitat from December through June. This area was substantiated through tagging data, visual surveys, and acoustic data (National Oceanic and Atmospheric Administration, 2014a). Southern Resident killer whales are listed under the ESA as endangered.

In the Pacific Northwest, Southern Resident killer whales have seasonal shifts in distribution from the Salish Sea and Puget Sound to locations as far north as Southeast Alaska and as far south as central

California (Cogan, 2015; Dahlheim et al., 2008; Ford et al., 2014; Hanson et al., 2018; Hanson et al., 2015; Houghton et al., 2015; National Marine Fisheries Service, 2016; National Oceanic and Atmospheric Administration, 2011, 2014c; Olson et al., 2018; Rice et al., 2017). The seasonal timing of salmon returning to different river systems likely influences movements of Southern Resident killer whales. These large piscivorous mammals require a substantial amount of fish (300–400 lbs. per day) to sustain their metabolic requirements. During winter months, Southern Resident killer whale diet consists primarily of Chinook salmon (National Oceanic and Atmospheric Administration, 2014a), but may contain other salmon and non-salmon species such as rockfish as well.

The use of Puget Sound and the Strait of Juan de Fuca by Southern Resident killer whales has declined in recent years as the species shifts its range to forage for Chinook salmon or other prey species elsewhere in response to prey availability (Shields et al., 2018). Hanson et al. (2013) assessed the winter and spring distribution (January–June) of Southern Resident killer whales by deploying passive acoustic recorders on the U.S. West Coast during 2006–2011. Detections were recorded for all months at the recorder off Westport, Washington, with a peak number of detections per month in March. Southern Resident killer whale detections were recorded for all months except June at the recorder off the Columbia River mouth, with similar detection rates from January through May. Overall, the findings suggest the potential importance of returning Columbia River spring Chinook salmon in the Southern Resident killer whale diet. Additional information about Southern Resident killer whale prey species is included in the fish sections below.

Southern Resident killer whales spend progressively less time in inland waters and more time off the coasts of Washington, Oregon, and California during the winter months (Black, 2011; Cogan, 2015; Hanson et al., 2017; National Marine Fisheries Service, 2016; Olson & Osborne, 2017). In the NWTT Offshore Area, data suggest that almost all (96.5 percent) locations of satellite-tagged Southern Resident killer whales were on the continental shelf within 34 km (19 NM) from shore at depths less than 200 m, and 78 percent were in waters less than 100 m (Hanson et al., 2017). Southern Resident killer whales may also occur out to 41 NM from shore but are expected to do so less regularly (National Oceanic and Atmospheric Administration, 2014a). The distribution of satellite-tag locations confirms that Southern Resident killer whales generally inhabit nearshore waters and over multiple years have spent the highest amount of time near the mouth of the Columbia River and Westport, Washington (Hanson et al., 2018; Hanson et al., 2017; U.S. Department of the Navy, 2018a). Southern Resident killer whales were also acoustically detected by the monitoring hydrophones as far as 62 km (33 NM) off Cape Flattery (Hanson et al., 2018; U.S. Department of the Navy, 2018a) within the Juan de Fuca Eddy (Dalla-Rosa et al., 2012; MacFadyen et al., 2008), in the area represented in Figure K-2 as the Juan de Fuca Eddy Marine Species Habitat.

In 2019, NMFS published a proposal to expand Southern Resident killer whale critical habitat by including 15,627 square miles of marine waters along the U.S. West Coast between the 20 ft. depth contour and the 656 ft. depth contour, from the U.S. international border with Canada south to Point Sur, California (84 FR 49214). As shown in Figure K-2, the proposed expansion overlaps the NWTT Offshore Area and is intended to incorporate the seasonal shift in Southern Resident killer whale distribution (Cogan, 2015; Dahlheim et al., 2008; Ford et al., 2014; Hanson et al., 2015; Houghton et al., 2015; National Marine Fisheries Service, 2016; National Oceanic and Atmospheric Administration, 2011, 2014c; Rice et al., 2017), including as far south as Monterey Bay and central California where K1 and L1 pods have been sighted in recent years (Carretta et al., 2018; Millman, 2019). Consistent with the 2006 designated critical habitat that overlaps NWTT Inland Waters (71 FR 69054), the offshore expansion

identified the primary essential features as: (1) water quality to support growth and development; (2) prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth; and (3) passage conditions to allow for migration, resting, and foraging.

In summary, Southern Resident killer whales feed in and migrate through habitats throughout nearshore coastal waters in the Pacific Northwest, both within and outside of the NWTT Offshore Area. Within the NWTT Offshore Area, the best available science indicates that foraging and migration occurs primarily within 41 NM from shore (National Oceanic and Atmospheric Administration, 2014a) and within the proposed critical habitat; therefore, these habitat areas can be considered particularly important to Southern Resident killer whales relative to other locations in the NWTT Offshore Area. For additional information about Southern Resident killer whales and their habitat use and geographic range, see Section 3.4.1.16.3 (Distribution) of this Final Supplemental EIS/OEIS.

K.3.2.1.4 Harbor Porpoise

In the eastern North Pacific from Alaska south to Point Conception, California, harbor porpoise are found in nearshore coastal and inland waters, generally within a mile or two of shore (Barlow, 1988; Carretta et al., 2015; Carretta et al., 2017; Dahlheim et al., 2015; Dohl et al., 1983; Hamilton et al., 2009; Muto et al., 2017; Muto et al., 2018). Harbor porpoise are present in the NWTT Offshore Area year-round, and were the most frequently sighted marine mammal during aerial surveys conducted in waters off Washington, Oregon, and Northern California covering the approximate nearshore half of the NWTT Offshore Area in the spring, summer, and fall of 2011 and 2012 (Adams et al., 2014). Harbor porpoise occurrence and selection of foraging locations are driven in part by oceanographic influences, such as surface salinity and upwelling conditions.

One area in the NWTT Offshore Area, Heceta Bank, is known to be an important feeding area for harbor porpoise. The Navy identified this area through data on oceanographic modeling and line-transect surveys. Enhanced vertical and horizontal mixing associated with Heceta Bank results in higher prey densities, which improves foraging for humpback whales and harbor porpoise (Tynan et al., 2005). Humpback whales and harbor porpoise aggregate in this area in the summer, when prey concentrations are thought to be highest. For this reason, the Navy assumes that the extent of the foraging habitat and season (May through November) used by humpback whales at Heceta Bank also applies to harbor porpoise. This habitat is represented in Figure K-2 as the Stonewall and Heceta Bank Humpback Whale habitat.

In summary, harbor porpoise feed in habitats throughout the eastern North Pacific, both within and outside of the NWTT Offshore Area. Within the NWTT Offshore Area, the best available science indicates that Heceta Bank serves as an important foraging location for harbor porpoise relative to other locations in the NWTT Offshore Area. For additional information about harbor porpoise and their habitat use and geographic range, see Section 3.4.1.26.3 (Distribution) of this Final Supplemental EIS/OEIS.

K.3.2.1.5 Bull Trout

The Coastal-Puget Sound Distinct Population Segment of bull trout, which is listed as threatened under the ESA, encompasses all Pacific Coast drainages within the United States north of the Columbia River in Washington. This population is thought to contain the only anadromous form of bull trout in the United States. Anadromous bull trout in marine waters off Washington enter their natal streams in late spring and early summer, and overwinter in the Pacific Ocean or migrate through marine water to non-natal rain-fed streams, in part for feeding opportunities (Brenkman & Corbett, 2005; Goetz, 2016).

As shown in Figure K-3, one area within the NWTT Offshore Area has been designated by the USFWS as critical habitat for the Coastal-Puget Sound Distinct Population Segment of bull trout. Along the United States West Coast, the critical habitat extends throughout several rivers and estuaries (75 FR 63898). Essential features for the critical habitat include foraging and migration habitats. There is minimal overlap of bull trout critical habitat within the NWTT Offshore Area. The overlap occurs within the Quinault Range Site over approximately 1 mile of nearshore area at Pacific Beach. As with other marine waters, bull trout may use these waters for foraging on smaller fish in the intertidal and subtidal zones of the photic zone, primarily in water less than 10 m deep (Goetz, 2016). The Navy recently sponsored a study conducted by NMFS scientists to characterize the distribution of ESA-listed salmonids, including bull trout, within and adjacent to the NWTT Study Area. From May through September 2019, of the 17 bull trout tagged, 16 were detected at the stationary acoustic receivers located in river locations, while a single individual was detected at a marine location 5.6 NM from shore (Huff et al., 2020).

In summary, the Coastal-Puget Sound Distinct Population Segment of bull trout feeds in and migrates through habitats off the United States West Coast, both within and outside of the NWTT Offshore Area. Within the NWTT Offshore Area, the best available science indicates that migration and foraging occur primarily within the critical habitat designated by the USFWS; therefore, this habitat can be considered particularly important to bull trout relative to other locations in the NWTT Offshore Area. For additional information about bull trout and their habitat use and geographic range, see Section 3.9.2.4.1.6 (Bull Trout [*Salvelinus confluentus*]) of this Final Supplemental EIS/OEIS.

K.3.2.1.6 Steelhead

Eleven Distinct Population Segments of steelhead occur in the NWTT Offshore Area that are listed as threatened or endangered under the ESA. Critical habitat has not been designated in the NWTT Offshore Area for steelhead. Steelhead may move immediately offshore on entering the marine environment, rather than migrating north through coastal waters (Beamish et al. 2005). They are thought to feed in the high seas, with the largest catches seen at distances beyond 46 km (25 NM) offshore (Beamish et al. 2005; Quinn and Myers 2004). Similar to stream-type Chinook salmon, most juvenile and adult steelhead (with the exception of those in the southern Distinct Population Segments) migrate into open ocean areas beyond the continental shelf during the oceanic portion of their life cycle. However, it should be noted that unlike stream-type Chinook salmon, steelhead juveniles migrate west (not north) beyond the continental shelf almost immediately upon entering marine habitat (Daly et al., 2014). Adults from northern Distinct Population Segments tend to migrate off-shelf before returning to their natal waters. Thus, their migration over the shelf would be temporary and localized to specific areas.

Steelhead are thought to rely heavily on offshore marine waters for feeding, with high seas tagging programs indicating steelhead make more extensive migrations offshore in their first year than any other Pacific salmonids (Quinn & Myers, 2005). Commercial fisheries catch data indicate similar trends (Quinn & Myers, 2005). The species spends approximately 1 to 3 years in freshwater, then migrates rapidly through estuaries, bypassing the coastal migration routes of other salmonids, moving into oceanic offshore feeding grounds (Daly et al., 2014; Quinn & Myers, 2005). NMFS pelagic trawl survey data from off the coasts of Oregon and Washington showed that juvenile steelhead were consistently caught at the westernmost stations located 55 km (30 NM) from shore (depicted in Figure K-3), indicating a more offshore distribution for the species (Daly et al., 2014). Pearcy and Fisher (1990) found that catches of juvenile steelhead were generally highest at stations located more than 28 km (15 NM) from shore.

In summary, steelhead feed in and migrate through habitats off the United States West Coast, both within and outside of the NWTT Offshore Area. Within the NWTT Offshore Area, the best available science indicates that waters within 30 NM from shore are particularly important migration and feeding habitat for steelhead year-round relative to other locations in the NWTT Offshore Area. For additional information about steelhead and their habitat use and geographic range, see Section 3.9.2.4.1.5 (Steelhead [*Oncorhynchus mykiss*]) of this Final Supplemental EIS/OEIS.

K.3.2.1.7 Chinook Salmon

Nine Evolutionarily Significant Units of Chinook salmon that are listed as threatened or endangered under the ESA occur in the NWTT Offshore Area. Critical habitat has not been designated in the NWTT Offshore Area for Chinook salmon. Most Chinook salmon exhibit an ocean-type life history, meaning they emigrate to the ocean as sub-yearling smolts. Chinook salmon that originate within or north of the Columbia River system tend to migrate north into waters off the coasts of Washington, British Columbia, and Alaska. Nicholas and Hankin (1989) found that Chinook salmon from rivers south of Cape Blanco generally rear in the ocean off southern Oregon and northern California. In general, ocean-type fish (e.g., fall and summer-run Chinook) and spring-run Chinook that return to the lower Columbia River Basin tend to be primarily distributed on the continental shelf during their marine residence (Sharma, 2009). Most stream-type fish (e.g., most spring-run Chinook) are more common beyond the continental shelf, with most migrating far offshore in waters off British Columbia or Alaska after their first year of marine residence (Quinn & Myers, 2005; Sharma, 2009). These fish would only be present on the continental shelf for short periods when migrating between estuaries and open ocean areas beyond the shelf. As such, their migration over the continental shelf would be temporary and localized. Juvenile Chinook are generally found within 55 km (30 NM) of the Washington, Oregon, and California coast, with the vast majority found less than 28 km (15 NM) offshore (Fisher & Pearcy, 1995; Pacific Fishery Management Council, 2016; Pearcy & Fisher, 1990). Commercial fisheries catch data suggest that most maturing Chinook salmon off the West Coast are found within 60 km (32 NM) of the coastline, as depicted in Figure K-4 (Pacific Fishery Management Council, 2016).

In summary, Chinook salmon migrate through habitats off the United States West Coast, both within and outside of the NWTT Offshore Area. Within the NWTT Offshore Area, the best available science indicates that waters within 32 NM from shore are particularly important migration habitat for Chinook salmon year-round relative to other locations in the NWTT Offshore Area. For additional information about Chinook salmon and their habitat use and geographic range, see Section 3.9.2.4.1.1 (Chinook Salmon [*Oncorhynchus tshawytscha*]) of this Final Supplemental EIS/OEIS.

K.3.2.1.8 Coho Salmon

Four Evolutionarily Significant Units of coho salmon occur in the NWTT Offshore Area that are listed as threatened or endangered under the ESA. Critical habitat has not been designated in the NWTT Offshore Area for coho salmon. Coho salmon are on a relatively fixed life cycle compared with other salmonids, spending approximately 18 months in freshwater and another 18 months in the ocean. Within the NWTT Offshore Area, most adult coho salmon migrate north from their respective freshwater habitats ((Pacific Fishery Management Council, 2000)). The three most northern coho salmon Evolutionarily Significant Units may migrate as far north as Alaska. The degree to which juveniles migrate offshore depends on the strength of upwelling, with strong upwelling years leading to wider dispersal, farther from shore (Pearcy, 1993). However, juveniles and adults tend to be distributed over the continental shelf. Although coho salmon may be found further offshore than Chinook salmon, juvenile and maturing coho salmon are most abundant within 60 km (32 NM) off the coasts of Washington, Oregon, and California, as depicted in Figure

K-4 (Pacific Fishery Management Council, 2016). The majority of juveniles are found within 37 km (20 NM) of the coast (Pearcy, 1993; Pearcy & Fisher, 1990).

In summary, coho salmon migrate through habitats off the United States West Coast, both within and outside of the NWTT Offshore Area. Within the NWTT Offshore Area, the best available science indicates that waters within 32 NM from shore are particularly important migration habitat for coho salmon year-round relative to other locations in the NWTT Offshore Area. For additional information about coho salmon and their habitat use and geographic range, see Section 3.9.2.4.1.2 (Coho Salmon [*Oncorhynchus kisutch*]) of this Final Supplemental EIS/OEIS.

K.3.2.1.9 Chum Salmon

Two Evolutionarily Significant Units of chum salmon occur in the NWTT Offshore Area that are listed as threatened under the ESA. Critical habitat has not been designated in the NWTT Offshore Area for chum salmon. Chum generally move north and west along the coast upon entering saltwater, and move offshore (off-shelf) by the end of their first ocean year (Byron & Burke, 2014; Quinn, 2005). However, like Chinook and coho salmon, chum salmon tend to return over the continental shelf when returning home to their natal streams. Pearcy and Fisher (1990) observed the highest catch per unit effort of juvenile chum salmon inshore of 37 km (20 NM), though some were caught over 55 km (30 NM) offshore. Hartt and Dell (1986) observed that the vast majority of juvenile chum from Washington state migrate northward within a narrow coastal belt less than 20 NM, as depicted in Figure K-4. Pearcy and Fisher (1990) noted that juvenile chum salmon were less abundant than either coho or Chinook salmon off the Oregon and Washington coast. Neave et al. (1976) indicated that catches of chum salmon off the coast of the continental United States in proximity to the NWTT Offshore Area were lower than areas further to the north and further offshore (e.g., the Gulf of Alaska, the Bering Sea, and areas far offshore in the North Pacific).

In summary, chum salmon migrate through habitats off the United States West Coast, both within and outside of the NWTT Offshore Area. Within the NWTT Offshore Area, the best available science indicates that waters within 20 NM from shore are particularly important migration habitat for chum salmon year-round relative to other locations in the NWTT Offshore Area. For additional information about chum salmon and their habitat use and geographic range, see Section 3.9.2.4.1.3 (Chum Salmon [*Oncorhynchus keta*]) of this Final Supplemental EIS/OEIS.

K.3.2.1.10 Sockeye Salmon

Two Evolutionarily Significant Units of sockeye salmon occur in the NWTT Offshore Area that are listed as threatened or endangered under the ESA. Critical habitat has not been designated in the NWTT Offshore Area for sockeye salmon. Juvenile sockeye salmon exit the Ozette River and undertake a rapid northward coastal migration toward Alaska in a narrow band along the coast (Tucker et al., 2015). Similarly, juvenile Snake River sockeye salmon exit the Columbia River plume and undertake a rapid northward coastal migration along the continental shelf. In general, it is thought that sockeye follow a similar migration pattern as chum once they enter the ocean, moving north and west along the coast, and offshore by the end of their first ocean year (Byron & Burke, 2014; Quinn, 2005). However, sockeye salmon tend to return over the continental shelf when returning home to their natal streams. Pearcy and Fisher (1990) observed the highest catch per unit effort of juvenile sockeye salmon inshore of 37 km (20 NM), as depicted in Figure K-4, though some were caught over 55 km (30 NM) offshore. They noted that, similar to juvenile chum salmon, juvenile sockeye salmon were less abundant than either coho or Chinook salmon off the Oregon and Washington coast.

In summary, sockeye salmon migrate through habitats off the United States West Coast, both within and outside of the NWTT Offshore Area. Within the NWTT Offshore Area, the best available science indicates that waters within 20 NM from shore are particularly important migration habitat for sockeye salmon year-round relative to other locations in the NWTT Offshore Area. For additional information about sockeye salmon and their habitat use and geographic range, see Section 3.9.2.4.1.4 (Sockeye Salmon [*Oncorhynchus nerka*]) of this Final Supplemental EIS/OEIS.

K.3.2.1.11 Green Sturgeon

The primary concentration of green sturgeon is located in the coastal waters of Washington, Oregon, and Vancouver Island, and near San Francisco and Monterey Bay (Huff et al., 2012). The NWTT Offshore Area overlaps with the marine distribution of green sturgeon, and corresponding species life history events in this area include subadult and adult growth and maturation, migration between estuarine and marine areas, and spawning migration. In marine waters, green sturgeon prefer areas with high seafloor complexity and boulder presence at depths of 20–60 m (Huff et al., 2011). They forage in coastal waters on benthic prey species.

As shown in Figure K-4, one area within the NWTT Offshore Area has been designated by NMFS as critical habitat for the Southern Distinct Population Segment of green sturgeon, which is listed as threatened under the ESA. Along the United States West Coast, the critical habitat extends throughout several rivers and estuaries. Essential features for the critical habitat include foraging and migration habitats (74 FR 52300). The Southern Distinct Population Segment of green sturgeon disperse from their natal rivers and migrate northward along the continental shelf as adults. The months when green sturgeon is expected to be present in the NWTT Offshore Area are October through June.

In summary, the Southern Distinct Population Segment of green sturgeon feeds in and migrates through habitats off the United States West Coast, both within and outside of the NWTT Offshore Area. Within the NWTT Offshore Area, the best available science indicates that migration and foraging occur primarily within the critical habitat designated by NMFS (primarily at depths of 20–60 m); therefore, this habitat can be considered particularly important to green sturgeon relative to other locations in the NWTT Offshore Area. For additional information about green sturgeon and their habitat use and geographic range, see Section 3.9.2.4.3.2 (Green Sturgeon [*Acipenser medirostris*]) of this Final Supplemental EIS/OEIS.

K.3.2.1.12 Leatherback Sea Turtle

Leatherback sea turtles are globally distributed throughout oceans of the world. In the northern Pacific Ocean, they forage widely in temperate waters (National Marine Fisheries Service, 2015). Population modeling conducted by Gaspar and Lalire (2017) compare Pacific juvenile leatherback predicted distributions with passive dispersion (juvenile turtles drifting or following currents) and active dispersion, where juvenile turtles respond to habitat cues (e.g., water temperature) and actively swim to foraging grounds often counter to prevailing currents. Leatherback sea turtles occur throughout the year in the coastal and offshore waters of the northwestern United States. Telemetry studies have shown areas of concentration along the central California coast and in the waters of Oregon and Washington (Benson et al., 2011). Aerial surveys off Washington, Oregon, and California indicate that most leatherbacks occur in waters over the continental slope, with a few over the continental shelf (Eckert, 1993).

As shown in Figure K-5, one area that overlaps the NWTT Offshore Area has been designated by NMFS as critical habitat for leatherback sea turtles, which are listed as endangered under the ESA. The critical habitat extends along the Washington and Oregon coastlines from Cape Flattery to Cape Blanco. The essential feature for this critical habitat is the occurrence of important jellyfish prey species (77 FR

4169). Leatherback sea turtles are most likely to occur along the coasts of Washington and Oregon during the summer and early fall when water temperatures are warmer and when aggregations of jellyfish form (Benson et al., 2007; Green et al., 1992). The waters off the Oregon and California coasts have been repeatedly recognized as one of the most important leatherback foraging areas in the Pacific Ocean (National Marine Fisheries Service & U.S. Fish and Wildlife Service, 1998). Leatherbacks forage on jellyfish in this area year-round.

In summary, leatherback sea turtles feed throughout the northern Pacific Ocean and along the United States West Coast, both within and outside of the NWTT Offshore Area. Within the NWTT Offshore Area, the best available science indicates that foraging occurs primarily within the critical habitat designated by NMFS; therefore, this habitat can be considered particularly important to leatherback sea turtles relative to other locations in the NWTT Offshore Area. For additional information about leatherback sea turtles and their habitat use and geographic range, see Section 3.5.1.4.2 (Habitat and Geographic Range) of this Final Supplemental EIS/OEIS.

K.3.2.1.13 Marbled Murrelet

The marbled murrelet is listed as threatened under the ESA in Washington, Oregon, and California (57 FR 45328). Critical habitat has not been designated in the marine environment for marbled murrelets, but does occur in the terrestrial mature and old growth forests within 48 km of the Washington, Oregon, and California coasts. The U.S. Fish and Wildlife Service (1997) recovery plan established six marbled murrelet conservation zones that extend 2 km (1.1 NM) seaward from shore to assist the design of management actions and evaluation of impacts. Waters in the NWTT Offshore Area that extend from the Washington shoreline out to 1.1 NM from shore overlap a portion of marbled murrelet Conservation Zone 2. Marbled murrelet Conservation Zones 3, 4, 5, and 6 are located outside of or adjacent to the Study Area, however, individual marbled murrelets from these zones could occur in Conservation Area 2 due to the transient nature of this species. For information on Conservation Zone 1, which overlaps a portion of NWTT Inland Waters, see Section K.3.3.1.8 (Marbled Murrelet).

Marbled murrelets occur year-round in marine waters off the coasts of Washington, Oregon, and California. In the summer breeding season, the marine distribution of marbled murrelets is primarily within 5 km (2.7 NM) from the coasts, as depicted in Figure K-5 (U.S. Fish and Wildlife Service, 2016). Due to energetic costs associated with transiting from foraging areas to suitable inland nesting habitat, selection of foraging locations is primarily driven by availability of summer prey species (e.g., sand lance, smelt, herring, other small schooling fish) in nearshore locations close to nesting sites (Ralph & Miller, 1995). In the winter non-breeding season, marbled murrelets are thought to disperse farther offshore, although the highest concentrations still occur close to shore and in protected waters (Nelson, 1997). Occurrence of marbled murrelets is primarily driven by local oceanographic conditions that affect availability of winter prey species (e.g., krill and amphipods), such as sea surface temperature, upwellings, and currents (Piatt et al., 2007). Marbled murrelets were observed 60 km (32 NM) off the coast of Northern California in October 2011 and 46 km (25 NM) off the coast of Oregon in February 2012 (Adams et al., 2014). Sightings of marbled murrelets beyond these distances have rarely occurred.

In summary, marbled murrelets feed in and migrate through (e.g., transit from foraging areas to inland nesting habitat) marine waters of Washington, Oregon, and California, both within and outside of the NWTT Offshore Area. Within the NWTT Offshore Area, the best available science indicates that waters within 5 km (2.7 NM) from shore (i.e., within the NWTT Offshore Area portion of the Study Area that abuts the Washington coast) are particularly important feeding and migration habitat for marbled murrelets year-round relative to other locations in the NWTT Offshore Area. For additional information about

marbled murrelets and their habitat use and geographic range, see Section 3.6.1.7 (Marbled Murrelet [*Brachyramphus marmoratus*]) of this Final Supplemental EIS/OEIS.

K.3.2.2 Mitigation Area Assessment

K.3.2.2.1 Biological Effectiveness

As shown in Figure K-2, Figure K-3, Figure K-4, and Figure K-5, each habitat considered in the NWTT Offshore Area either partially overlaps or is fully contained within one or more mitigation areas. To demonstrate the level of overlap, Table K-3 identifies the percent of each habitat considered that is contained within each mitigation area in the NWTT Offshore Area. These percentages factor in only the portions of each habitat located inside the Study Area. A qualitative discussion of the biological effectiveness of mitigation areas in the NWTT Offshore Area is provided in the sections below.

K.3.2.2.1.1 Marine Species Coastal Mitigation Area

The Marine Species Coastal Mitigation Area includes three subareas based on distance from shore (50 NM, 20 NM, and 12 NM) within the NWTT Offshore Area portion of the Study Area. The Navy established the boundaries of these subareas to encompass the maximum area of key marine mammal, ESA-listed fish, sea turtle, and marbled murrelet habitats within which implementing mitigation is practical when balanced against impacts to safety, sustainability, and the ability to continue meeting mission requirements, as described in Section K.3.2.2.2 (Operational Assessment).

The 50 NM from shore portion of the Marine Species Coastal Mitigation Area overlaps every important feeding, migration, or critical habitat described in Section K.3.2.1 (Resource Description) for humpback whales, gray whales, Southern Resident killer whales, harbor porpoise, bull trout, steelhead, Chinook salmon, coho salmon, chum salmon, sockeye salmon, green sturgeon, leatherback sea turtles, and marbled murrelets. The Olympic Coast National Marine Sanctuary and Quinault, Grays, Guide, Willapa, Astoria, and Eel canyons are also located within 50 NM from shore in the Marine Species Coastal Mitigation Area. Mitigation within 50 NM from shore will result in an avoidance of potential impacts on marine mammals, ESA-listed fish, sea turtles, and marbled murrelets within their important habitat areas from all explosive training activities, all explosive testing activities except explosive Mine Countermeasure and Neutralization Testing activities, and non-explosive missile training exercises. The mitigation requirements will also consequently help the Navy avoid potential impacts from active sonar used in conjunction with applicable explosive events that are required to be conducted greater than 50 NM from shore, such as mid-frequency and high-frequency active sonar used during explosive torpedo events (e.g., MF1 and MF4 sonar during Torpedo [Explosive] Testing). The Navy will issue annual seasonal awareness notification messages to further help avoid potential impacts from vessel strikes and training and testing activities on humpback whales, gray whales, and Southern Resident killer whales in the Marine Species Coastal Mitigation Area. The awareness notification messages will coincide with the seasons in which humpback whales, gray whales, and Southern Resident killer whales are most likely to be observed in concentrations in the mitigation area. Southern Resident killer whales are most likely to be observed in the NWTT Offshore Area in winter and spring (December 1 to June 30), which correlates with prey availability. Gray whales and humpback whales are most likely to be observed in the NWTT Offshore from late spring through fall (May 1 to November 30 and May 1 through December 31, respectively), which correlates to feeding or migration seasons.

Table K-3: Percent of Habitat Considered Contained Within Mitigation Areas in the NWTT Offshore Area

Habitat Considered	*50 NM from Shore in Marine Species Coastal Mitigation Area*	*20 NM from Shore in Marine Species Coastal Mitigation Area*	*12 NM from Shore in Marine Species Coastal Mitigation Area*	*Olympic Coast National Marine Sanctuary Mitigation Area*	*Juan de Fuca Eddy Marine Species Mitigation Area*	*Combined Mitigation Areas: 20 NM from Shore, Olympic Coast National Marine Sanctuary, Juan de Fuca Eddy*	*Stonewall and Heceta Bank Humpback Whale Mitigation Area*	*Point St. George Humpback Whale Mitigation Area*
Humpback Whale Northern Washington Feeding BIA	100%	55%	24%	90%	-	90%	-	-
Humpback Whale Stonewall and Heceta Bank Feeding BIA	100%	37%	-	-	-	37%	100%	-
Humpback Whale Point St. George Feeding BIA	100%	100%	-	-	-	100%	-	100%
Humpback Whale Proposed CH	98%	36%	3%	9%	-	39%	<1%	<1%
Gray Whale Northwest Washington Feeding BIA	100%	100%	100%	100%	-	100%	-	-
Gray Whale Northbound – Phase A Migration BIA	100%	100%	100%	96%	-	100%	-	-
Gray Whale Northbound – Phase B Migration BIA	100%	100%	100%	96%	-	100%	-	-
Gray Whale Southbound – All Migration BIA	100%	100%	100%	96%	-	100%	-	-
Gray Whale Potential Presence Migration BIA	100%	73%	16%	27%	-	76%	5%	<1%
SRKW Proposed CH	100%	72%	26%	45%	-	79%	11%	<1%
Juan de Fuca Eddy	84%	5%	-	-	100%	100%	-	-
Bull Trout CH	100%	100%	100%	100%	-	100%	-	-
Steelhead Habitat	100%	52%	11%	21%	-	57%	4%	<1%
Chinook Salmon Habitat	100%	47%	10%	19%	-	52%	4%	<1%
Coho Salmon Habitat	100%	47%	10%	19%	-	52%	4%	<1%
Chum Salmon Habitat	100%	100%	22%	34%	-	100%	4%	1%
Sockeye Salmon Habitat	100%	100%	22%	34%	-	100%	4%	1%
Green Sturgeon CH	100%	91%	53%	59%	-	91%	17%	-
Leatherback Sea Turtle CH	85%	26%	8%	15%	-	29%	4%	-
Marbled Murrelet Habitat	100%	100%	100%	99%	-	100%	-	-

Notes: CH = Critical Habitat; BIA = Biologically Important Area; SRKW = Southern Resident killer whale

The 20 NM from shore portion of the Marine Species Coastal Mitigation Area overlaps important feeding, migration, or critical habitat described in Section K.3.2.1 (Resource Description) for gray whales, humpback whales, Southern Resident killer whales, leatherback sea turtles, Chinook salmon, coho salmon, chum salmon, sockeye salmon, steelhead, green sturgeon, bull trout, and marbled murrelets. The mitigation area also overlaps a significant portion of the Olympic Coast National Marine Sanctuary, and Astoria and Eel canyons. Mitigation requirements within 20 NM from shore will result in an avoidance or reduction of potential impacts from surface ship hull-mounted MF1 mid-frequency active sonar, non-explosive large-caliber gunnery training, and non-explosive bombing training on marine species within these habitats.

With regard to explosive Mine Countermeasure and Neutralization Testing, mitigation to limit the number of explosives used over a 7-year period is designed primarily to reduce potential impacts of ESA-listed fish and marbled murrelets over the duration of the Proposed Action. This mitigation would reduce the maximum potential exposure to explosives in bin E4 and bin E7 by approximately 40 percent in the months and locations where the following ESA-listed fish and bird species are expected to be present in the NWTT Offshore Area: green sturgeon Southern Distinct Population Segment, Chinook salmon Upper Columbia River Spring-Run Evolutionarily Significant Unit, Chinook salmon Central Valley Spring-Run Evolutionarily Significant Unit, coho salmon Oregon Coast Evolutionarily Significant Unit, coho salmon Southern Oregon/Northern California Coast Evolutionarily Significant Unit, chum salmon Columbia River Evolutionarily Significant Unit, steelhead Upper Willamette River Distinct Population Segment, steelhead Central California Coast Distinct Population Segment, bull trout Coastal-Puget Sound Distinct Population Segment, and marbled murrelet.

Similarly, mitigation to conduct explosive Mine Countermeasure and Neutralization Testing from July 1 through September 30 to the maximum extent practical when operating within 20 NM from shore and to conduct a maximum of one explosive event from October 1 through June 30 within 20 NM from shore is designed primarily to avoid or reduce potential impacts on ESA-listed fish species based on their typical occurrence seasonally and at certain water depths, as summarized below. The mitigation will also benefit foraging or migrating humpback whales, migrating gray whales, foraging or transiting Southern Resident killer whales, and foraging marbled murrelets. For reference, within 20 NM from shore in the Marine Species Coastal Mitigation Area, water depths range from 92 to 106 m in the Quinault Range Site (outside of the Olympic Coast National Marine Sanctuary), and from 53 to 2,558 m elsewhere in the NWTT Offshore Area.

- Bull Trout Coastal-Puget Sound Distinct Population Segment: Predicted occurrence is May–September. Average life history depth for adults and juveniles is less than 10 m.
- Steelhead Upper Willamette River Distinct Population Segment: Predicted adult occurrence is February–May, and predicted juvenile occurrence is April–June. Average life history depth for adults and juveniles is less than 10 m.
- Steelhead Central California Coast Distinct Population Segment: Predicted adult occurrence is October–April, and predicted juvenile occurrence is November–June. Average life history depth for adults and juveniles is less than 10 m.
- Chinook Salmon Upper Columbia River Spring-Run Evolutionarily Significant Unit: Predicted adult occurrence is March–May, and predicted juvenile occurrence is April–June. Average life history depth for adults is typically 29 m and occasionally 110 m. Average life history depth for juveniles is 10–30 m in summer through fall.
- Chinook Salmon Snake River Spring/Summer-Run Evolutionarily Significant Unit: Predicted adult occurrence is March-July, and predicted juvenile occurrence is April-June. Average life history

depth for adults is typically 29 m and occasionally 110 m. Average life history depth for juveniles is 10–30 m in summer through fall.

- Chinook Salmon Central Valley Spring-Run Evolutionarily Significant Unit: Predicted adult occurrence is March–July, and predicted juvenile occurrence is December–March. Average life history depth for adults is typically 29 m and occasionally 110 m. Average life history depth for juveniles is 10–30 m in summer through fall.
- Coho Salmon Oregon Coast Evolutionarily Significant Unit: Predicted adult occurrence is October–December, and predicted juvenile occurrence is March–July. Average life history depth for adults is typically 10–30 m and occasionally 74 m. Average life history depth for juveniles is less than 30 m.
- Coho Salmon Southern Oregon/Northern California Coast Evolutionarily Significant Unit: Predicted adult occurrence is September–October, and predicted juvenile occurrence is March–June. Average life history depth for adults is typically 10–30 m and occasionally 74 m. Average life history depth for juveniles is less than 30 m.
- Chum Salmon Columbia River Evolutionarily Significant Unit: Predicted adult occurrence is October–November, and predicted juvenile occurrence is March–May. Average life history depth for adults is typically less than 10 m and rarely up to 40 m. Average life history depth for juveniles is typically less than 15 m.

The 12 NM from shore portion of the Marine Species Coastal Mitigation Area overlaps important feeding, migration, or critical habitats described in Section K.3.2.1 (Resource Description) for gray whales, humpback whales, Southern Resident killer whales, leatherback sea turtles, Chinook salmon, coho salmon, chum salmon, sockeye salmon, steelhead, green sturgeon, bull trout, and marbled murrelets. The 12 NM from shore portion of the Marine Species Coastal Mitigation Area also overlaps a portion of the Olympic Coast National Marine Sanctuary and marine protected areas, including the Flattery Rocks National Wildlife Refuge, Quillayute Needles National Wildlife Refuge, and Copalis National Wildlife Refuge. These marine protected areas are located in the nearshore portion of the Study Area that abuts the Washington shoreline, well within 12 NM from shore. Additional information on marine protected areas is presented in Section 6.1.2 (Marine Protected Areas) of this Final Supplemental EIS/OEIS. Mitigation requirements within 12 NM from shore will result in an avoidance or reduction of potential impacts from non-explosive small- and medium-caliber gunnery training, non-explosive torpedo training (which involves mid-frequency and high-frequency active sonar), and Anti-Submarine Warfare Tracking Exercise – Helicopter, Maritime Patrol Aircraft, Ship, or Submarine training activities (which involve mid-frequency active sonar [including surface ship hull-mounted MF1 mid-frequency active sonar and MF4 dipping sonar] and high-frequency active sonar). Mitigation to conduct a maximum of one Unmanned Underwater Vehicle Training event within 12 NM from shore at the Quinault Range Site, and to cancel or move Unmanned Underwater Vehicle Training events if Southern Resident killer whales are detected within 12 NM from shore at the Quinault Range Site, is expected to help the Navy avoid any potential impacts on Southern Resident killer whales during Unmanned Underwater Vehicle Training events. Mitigation during explosive Mine Countermeasure and Neutralization Testing to not use explosives in bin E7 closer than 6 NM from shore in the Quinault Range Site is primarily designed to avoid overlap of the larger of the explosive bins used in this activity with marbled murrelets and ESA-listed fish species. The Navy's combined mitigation within the Marine Species Coastal Mitigation Area will result in all live fire training activities being conducted at least 12 NM from shore, with many activities conducted beyond 20 NM or 50 NM from shore, as described previously.

K.3.2.2.1.2 Olympic Coast National Marine Sanctuary Mitigation Area

Mitigation within the Olympic Coast National Marine Sanctuary Mitigation Area is designed to avoid or reduce potential impacts from surface ship hull-mounted MF1 mid-frequency active sonar, explosives during Mine Countermeasure and Neutralization Testing activities, and non-explosive practice munitions during non-explosive bombing training in important feeding or migration habitat for gray whales, humpback whales, Southern Resident killer whales, leatherback sea turtles, Chinook salmon, coho salmon, chum salmon, sockeye salmon, steelhead, green sturgeon, bull trout, marbled murrelet, and other sanctuary resources.

Mitigation within the Olympic Coast National Marine Sanctuary Mitigation Area may result in an avoidance or reduction of potential impacts to a wide assemblage of other resources that inhabit, forage in, and migrate through the sanctuary, such as additional species of marine mammals, invertebrates, birds, and fishes. As detailed in Section 6.1.2.1 (Olympic Coast National Marine Sanctuary) of the 2015 NWTT Final EIS/OEIS, the Olympic Coast National Marine Sanctuary consists of an area of 2,408 square NM of marine waters and the submerged lands off the Olympic Peninsula Coastline of Washington. The sanctuary extends approximately 38 NM seaward, covering much of the continental shelf and the Quinault Canyon. Due to the Juan de Fuca Eddy ecosystem created from localized currents at the entrance to the Strait of Juan de Fuca and the diversity of bottom habitats, the Olympic Coast National Marine Sanctuary supports a variety of marine life. Habitats within the sanctuary include kelp forest, surfgrass, seafloor (sand and silt, gravel and cobbles), deep-sea coral and sponge gardens, rocky reefs, intertidal zone, nearshore subtidal, deep-water benthic, and water column habitat. The diversity of habitats, and the nutrient-rich upwelling zone (which exhibits the greatest volume of upwelling in North America) that drives high primary productivity in this province, contribute to the high species diversity in the Olympic Coast National Marine Sanctuary, with 309 species of fish, more than 56 species of seabirds and 24 species of shorebirds, occurring in the sanctuary (Office of National Marine Sanctuaries, 2008). The sanctuary is thought to provide important foraging and migration habitat for 29 species of marine mammals, including toothed and baleen whales, seals and sea lions, and sea otters (Office of National Marine Sanctuaries, 2008).

Mitigation within the Olympic Coast National Marine Sanctuary Mitigation Area will also help the Navy avoid or reduce potential impacts on other marine protected areas in the NWTT Offshore Area. The Flattery Rocks National Wildlife Refuge, Quillayute Needles National Wildlife Refuge, and Copalis National Wildlife Refuge are located within the boundaries of the Olympic Coast National Marine Sanctuary in the nearshore portion of the Study Area that abuts the Washington shoreline (well within 12 NM from shore). Additional information on marine protected areas is presented in Section 6.1.2 (Marine Protected Areas) of this Final Supplemental EIS/OEIS.

Because the Olympic Coast National Marine Sanctuary Mitigation Area is located entirely within 50 NM from shore in the Marine Species Coastal Mitigation Area, the Navy's combined mitigation will ensure that marine resources, including marine mammals, ESA-listed fish, sea turtles, and marbled murrelets, are not exposed to explosives in the sanctuary from any training or testing activity under the Proposed Action. Furthermore, additive mitigation within 20 NM and 12 NM from shore in the Marine Species Coastal Mitigation Area will help the Navy further avoid or reduce potential impacts from active sonar and non-explosive practice munitions on sanctuary resources.

K.3.2.2.1.3 Juan de Fuca Eddy Marine Species Mitigation Area

Mitigation within the Juan de Fuca Eddy Marine Species Mitigation Area is primarily designed to avoid or reduce potential impacts from surface ship hull-mounted MF1 mid-frequency active sonar and explosives during Mine Countermeasure and Neutralization Testing activities on Southern Resident killer whales and humpback whales within important feeding and migration habitats. Waters within the Juan de Fuca Eddy Marine Species Mitigation Area (including areas off Cape Flattery) are important foraging habitat for aggregations of humpback whales and migration habitat for Southern Resident killer whales as they transit between Inland Waters and the Offshore Area, as described in Section K.3.2.1.1 (Humpback Whale) and K.3.2.1.3 (Southern Resident Killer Whale). The mitigation area is also potentially used by migrating gray whales, as well as other species of marine mammals, including sperm whales. Sperm whale concentrations typically correlate with areas of high productivity near drop-offs and areas with strong currents and steep topography (Gannier & Praca, 2007; Jefferson et al., 2015), such as the conditions present seasonally in the Juan de Fuca Eddy (MacFadyen et al., 2008). The mitigation area's nutrient-rich waters and seasonal upwelling provide an abundance of marine mammal prey species and favorable foraging conditions for concentrations of marine mammals. The mitigation will also help avoid or reduce potential impacts on leatherback sea turtles, Chinook salmon, coho salmon, chum salmon, and steelhead. Additionally, the mitigation would result in the Navy avoiding any overlap between explosive Mine Countermeasure and Neutralization Testing activities with the ESA-listed Ozette Lake Evolutionarily Significant Unit of sockeye salmon.

The Navy assessed the potential biological effectiveness of developing additional mitigation in this mitigation area. However, the Navy does not generally schedule other training and testing activities in this portion of the Study Area due to the high volume of commercial vessel traffic. As described in Section K.3.2.2.2 (Operational Assessment), when scheduling activities, the Navy considers the need to minimize sea space and airspace conflicts between its own activities and with consideration for public safety. Because it is unlikely that other Navy training and testing would take place in this area, the Navy determined that further mitigation would not effectively avoid or reduce potential impacts on marine species due to the extremely low potential for impacts to occur.

K.3.2.2.1.4 Stonewall and Heceta Bank Humpback Whale Mitigation Area

Mitigation in the Stonewall and Heceta Bank Humpback Whale Mitigation Area is primarily designed to avoid or reduce potential impacts from surface ship hull-mounted MF1 mid-frequency active sonar and explosive Mine Countermeasure and Neutralization Testing activities on humpback whales in an important seasonal feeding area. The mitigation will also help avoid or reduce potential impacts on harbor porpoises, which are also known to congregate for feeding in this location. Humpback whales and harbor porpoise aggregate over Heceta Bank in the summer, when prey concentrations are thought to be highest.

In addition to containing humpback whale and harbor porpoise feeding habitat, the Stonewall and Heceta Bank Humpback Whale Mitigation Area overlaps important habitats for several other species, including gray whale potential presence of migration, Southern Resident killer whale feeding and migration and critical habitat, leatherback sea turtle and green sturgeon critical habitat, and Chinook salmon, coho salmon, chum salmon, and sockeye salmon migration habitat. Beyond these species, other species of marine mammals have been observed in the vicinity of Heceta Bank. The enhanced vertical and horizontal mixing associated with Heceta Bank that results in higher prey densities and improved foraging conditions for humpback whales and harbor porpoise may also serve to influence the presence of other marine mammal species in this area (Tynan et al., 2005). For example, sperm whales, Baird's

beaked whale, Cuvier's beaked whales, Pacific white-sided dolphins, northern right whale dolphins, Risso's dolphins, and Dall's porpoise have been observed at Heceta Bank in spring or summer during past surveys (Tynan et al., 2005). Sperm whales have been observed at Heceta Bank during spring and summer, possibly indicating a correlation between the abundance of prey species, such as large cephalopods (e.g., squid) and fish (Tynan et al., 2005). Therefore, while it is known that mitigation within the Stonewall and Heceta Bank Humpback Whale Mitigation Area will help avoid or reduce potential impacts within important humpback whale and harbor porpoise foraging habitat, it is likely that the mitigation will also benefit additional species, including numerous species of marine mammals, who may feed in or migrate through this area.

Because the Stonewall and Heceta Bank Humpback Whale Mitigation Area is located entirely within 50 NM from shore in the Marine Species Coastal Mitigation Area, the Navy's combined mitigation will ensure that marine species are not exposed to explosives in the mitigation area from any training or testing activity under the Proposed Action. Furthermore, additive mitigation within the portion of the Stonewall and Heceta Bank Humpback Whale Mitigation Area located within 20 NM from shore will help the Navy further avoid or reduce potential impacts from additional sources of active sonar, as well as non-explosive practice munitions.

K.3.2.2.1.5 Point St. George Humpback Whale Mitigation Area

Mitigation in the Point St. George Humpback Whale Mitigation Area is primarily designed to avoid or reduce potential impacts from mid-frequency active sonar and explosive Mine Countermeasure and Neutralization Testing activities on humpback whales in an important seasonal feeding area. In addition to containing humpback whale feeding habitat, the Point St. George Humpback Whale Mitigation Area overlaps important habitats for several other species, including gray whale potential presence of migration, Southern Resident killer whale feeding and migration, leatherback sea turtle critical habitat, and Chinook salmon, coho salmon, chum salmon, and sockeye salmon migration.

Because the Point St. George Humpback Whale Mitigation Area is located entirely within 50 NM and 20 NM from shore in the Marine Species Coastal Mitigation Area, the Navy's combined mitigation will ensure that marine species are not exposed to explosives in the mitigation area from any training or testing activity under the Proposed Action, and potential impacts from additional sources of active sonar, as well as non-explosive practice munitions will be avoided or reduced.

K.3.2.2.2 Operational Assessment

The Navy conducts training and testing activities in the NWTT Offshore Area because this portion of the Study Area provides valuable access to sea space and airspace conditions analogous to areas where the Navy operates or may need to operate in the future. In particular, the unique and complex bathymetric and oceanographic environment in the NWTT Offshore Area (e.g., the presence of numerous submarine canyons) presents a challenging anti-submarine warfare training opportunity. The Navy selects training locations in the NWTT Offshore Area to allow for the realistic tactical development of the myriad training scenarios Navy units are required to complete to be mission effective. Certain activities require large areas of the littorals or open ocean for realistic and safe training. Other activities may be conducted on a smaller and more localized scale, with training or testing at discrete locations that are critical to certain aspects of military readiness. The Navy chooses training locations based on proximity to training ranges (e.g., W-237), available airspace (e.g., Olympic MOA; avoiding airspace conflicts with major airports such as Seattle-Tacoma International Airport), unobstructed sea space, and aircraft emergency landing fields (e.g., Naval Air Station Whidbey Island).

Testing locations are typically located near systems command support facilities, which provide critical safety, platform, and infrastructure support and technical expertise necessary to conduct testing (e.g., proximity to air squadrons). The testing community is required to install and test systems on platforms in proximity to where those platforms are stationed. The Navy conducts testing activities in the NWTT Offshore Area because it provides a variety of bathymetric and environmental conditions necessary to ensure functionality and accuracy of systems and platforms in areas analogous to where the military operates. The Navy has used the same non-explosive torpedo testing areas in the NWTT Offshore Area for decades because these areas provide critical bathymetric features and consistency for comparative data collection.

The Quinault Range Site is an active range integral to the Navy's national defense mission. The Quinault Range Site has been used continuously in the research, development, testing, and evaluation of Navy systems (e.g., ships and warfare technology) for more than four decades. The Quinault Range Site provides unique opportunities for the Navy to conduct both training and testing, including acoustic and oceanographic research to observe systems with different acoustic parameters (e.g., frequency, directionality, signal) under a variety of environmental conditions (e.g., wind, waves, pre- and post-storms). The Navy conducts training and testing activities at the Quinault Range Site that cannot effectively or efficiently be conducted elsewhere in the Study Area or in other areas where the Navy trains and tests. The Navy established the Quinault Range Site due to its range of environmental conditions and proximity to the Navy's port and laboratory facilities in Puget Sound. The Quinault Range Site has ideal water depths, seafloor types, and an abundance of three-dimensional bathymetric phenomena (e.g., Quinault Canyon) that are of particular interest for important research on shallow-water acoustic propagation and other ocean acoustics research, as well as optimal conditions for various testing events, such as active sonar Countermeasure Testing and explosive Mine Countermeasure and Neutralization Testing.

Training and testing schedules are based on national tasking, the number and duration of training cycles identified in the Optimized Fleet Response Plan and various training plans, forecasting of future testing requirements, and emerging requirements. When scheduling activities, the Navy also considers the need to minimize sea space and airspace conflicts throughout the NWTT Offshore Area. The Navy schedules training and testing to minimize conflicts between its own activities and with consideration for public safety (e.g., safe distances from commercial vessel traffic). Daily fluctuations in training and testing schedules and objectives could mean that, on any given day, vessels or aircraft may depend on discrete locations of the NWTT Offshore Area for discrete purposes. The Navy requires flexibility in the timing of its use of active sonar and explosives in order to meet individual training and testing schedules and deployment schedules. For example, the schedules of explosive missile training exercises are driven by deployment requirements and national command authority assignments. Navy vessels, aviation squadrons, and testing programs have a limited amount of time available for training and testing. The Navy must factor in variables such as maintenance and weather when scheduling event locations and timing. Some active sonar activities in the NWTT Offshore Area, such as the use of dipping sonar, is conducted by transient naval units that are not stationed in the Pacific Northwest. Therefore, the Navy must maintain flexibility in the season, location, and time of day in which these activities are conducted. The schedules for testing events require flexibility because the testing community oftentimes has a need for rapid development to quickly resolve tactical deficiencies. Overall, training and testing schedules can be cyclical and are partially driven by geo-political situations, which precludes the Navy from implementing additional seasonal restrictions on the use of active sonar (including hull-mounted

mid-frequency active sonar and dipping sonar) and explosives (including explosive Mine Countermeasure and Neutralization Testing) in the NWTT Offshore Area.

Explosive Mine Countermeasure and Neutralization Testing is required under the Proposed Action to ensure systems can effectively neutralize threat mines that will otherwise restrict passage through an area, and to ensure U.S. Navy mines remain effective against enemy ships. Explosive Mine Countermeasure and Neutralization Testing activities do not have a nighttime testing requirement; therefore, this activity is scheduled to be conducted in daylight hours and it is unlikely that events would extend past sunset. The Navy will implement mitigation to not conduct explosive Mine Countermeasure and Neutralization Testing within the Olympic Coast National Marine Sanctuary Mitigation Area, Stonewall and Heceta Bank Humpback Whale Mitigation Area, Point St. George Humpback Whale Mitigation Area, and Seafloor Resource Mitigation Areas within a 350 yd. radius of live hard bottom, artificial reefs, and shipwrecks. As detailed in Section 5.3.3.6 (Explosive Mine Countermeasure and Neutralization Activities), the Navy will use the smallest practical explosive charge size for each activity; therefore, it would not be practical to implement additional charge size restrictions for this activity without impacting the Navy's ability to meet testing program requirements.

The Navy will conduct explosive Mine Countermeasure and Neutralization Testing from July 1 through September 30 to the maximum extent practical when operating within 20 NM from shore. From a logistics perspective, factors that could potentially make implementing this measure impractical include but are not limited to platform availability, range availability, and sea state. During the MMPA and ESA consultation processes, the Navy identified several additional practical and effective geographic mitigation measures for this activity, including restricting explosives within the Juan de Fuca Eddy Marine Species Mitigation Area, conducting a maximum of one explosive Mine Countermeasure and Neutralization Testing event from October 1 through June 30 within 20 NM from shore in the Marine Species Coastal Mitigation Area (not to exceed the use of 20 explosives from bin E4 and 3 explosives from bin E7 annually, and not to exceed the use of 60 explosives from bin E4 and 9 explosives from bin E7 over 7 years), and not using explosives in bin E7 closer than 6 NM from shore in the Quinault Range Site. Further, as described in Section 5.3.3.6 (Explosive Mine Countermeasure and Neutralization Activities), the Navy has committed to conducting activities in daylight in Beaufort Sea state number 3 conditions or less as part of its procedural mitigation for this event.

Operational parameters require explosive Mine Countermeasure and Neutralization Testing events to occur in certain bottom types, sea states, weather conditions, and water conditions (e.g., water clarity), and within a specific range of water depths (e.g., shallower than 1,000 ft. and typically 300 ft.). Some of these parameters could potentially prevent the Navy from conducting explosive Mine Countermeasure and Neutralization Testing during portions of the winter (e.g., December through April) when weather conditions are oftentimes unfavorable (e.g., Beaufort Sea state of 4 or above) in the NWTT Offshore Area; however, average sea states in any given month can fluctuate from year to year. In addition to weather considerations, scheduling for this event is also dependent on the availability of transient personnel and testing program platforms that are not stationed in the Pacific Northwest. As a result, it would be impractical for the Navy to definitively require all explosive events to be conducted within a three-month summer window to align with time periods of lower predicted marine species presence. Although explosive events will be conducted from July through September to the maximum extent practical, the Navy must maintain the flexibility to potentially be able to conduct one explosive Mine Countermeasure and Neutralization Testing event year-round within 20 NM from shore, in case it is not practical (e.g., logistically feasible) to conduct both events during the three-month summer window.

Further seasonal restrictions on the timing of explosive Mine Countermeasure and Neutralization Testing (e.g., prohibiting all events from occurring from October through June within 20 NM from shore) would be impractical to implement, and such mitigation could potentially preclude the Navy from meeting its mine warfare test objectives.

From a mission perspective, the availability of some parameters (e.g., water depths and bottom types) for certain test objectives may only be found in certain portions of the Quinault Range Site. The Quinault Range Site is the only portion of the NWTT Offshore Area that extends as far landward as 3 NM from shore (outside of the Olympic Coast National Marine Sanctuary); therefore, events with test objectives that require access to these shallower water depths would be limited to certain portions of the Quinault Range Site. The mitigation areas developed for this event collectively overlap a significant portion of the suitable sea space where this activity can occur based on operational parameters. For example, explosive events are prohibited from occurring year-round within a significant portion of the Quinault Range Site due to overlap with the Olympic Coast National Marine Sanctuary Mitigation Area. Further restrictions on the locations or timing of explosive Mine Countermeasure and Neutralization Testing for mitigation, such as prohibiting all events from occurring within certain distances from shore (e.g., within 12 NM, 20 NM, or 50 NM from shore), or requiring events to be conducted in deeper waters (e.g., deeper than 650 ft. to avoid potential impacts on marine mammals and ESA-listed fish) would be impractical to implement because such mitigation would preclude ready access to the range of water depths in which this activity is required to be conducted. The bathymetry of the NWTT Offshore Area includes a steep slope between water depths of 650 ft. and 1,000 ft. (the maximum water depth for this activity based on operational parameters), which creates very limited sea space between these water depths. Similarly, there is limited sea space shallower than 1,000 ft. beyond 50 NM and 20 NM from shore. Requiring activities to be conducted in certain water depths (e.g., waters deeper than 100 m [327 ft.], waters deeper than 650 ft.) or beyond 50 NM or 20 NM from shore would significantly limit the available sea space for this testing activity within the Study Area. Based on operational parameters established to meet testing program requirements, 300 ft. is the typical testing depth of explosive Mine Countermeasure and Neutralization Testing. Limiting testing to waters deeper than the typical testing depth requirement or beyond 50 NM or 20 NM from shore would be impractical to implement because such mitigation would preclude ready access to areas with the necessary environmental and oceanographic conditions to meet test program requirements. Similarly, limiting explosives in bin E4 to 6 NM from shore or greater, or all explosive bins to 12 NM from shore or greater would prevent the Navy from conducting testing in shallower environments within the Quinault Range Site, which may be necessary to meet certain mission requirements. In addition to depth limitations, events are limited by bottom type (e.g., bottom composition such as sand, mud, and rocks; and bottom profile such as roughness and ridge height), which varies widely in the Offshore Area. Therefore, not all areas that would meet certain depth requirements would necessarily also have a bottom type conducive to a particular test event. Such distance from shore or water depth restrictions would prevent the Navy from effectively testing systems and platforms (and components of these systems and platforms) before full-scale production or delivery to the fleet, which would not allow the Navy to ensure safety, functionality, and accuracy in military mission and combat conditions per required acquisition milestones or on an as-needed basis to meet operational requirements.

Expanding geographic mitigation requirements for other activities (e.g., limiting active sonar activities in the Quinault Range Site, developing additional distance-from-shore restrictions for explosive training or the use of active sonar, or creating stand-off distances around mitigation areas to expand their size) in the NWTT Offshore Area beyond what is described in Table K-2 would encroach upon the primary water

space where those training and testing activities are required to occur in this portion of the Study Area. Active sonar is the only reliable technology for detecting and tracking potential enemy diesel-electric submarines. The Navy needs to maintain access to sea space with the unique, challenging, and diverse environmental and oceanographic features (e.g., bathymetry, topography, surface fronts, and variations in sea surface temperature) analogous to military mission and combat conditions to achieve the highest skill proficiency and most accurate testing results possible. Eliminating opportunities for the Navy to train and test in a myriad of at-sea conditions would put U.S. forces at a tactical disadvantage during military missions and combat operations. This would also present a risk to national security if potential adversaries were to be alerted to the environmental conditions within which the U.S. Navy is prohibited from training and testing. Completely restricting large areas of ocean or other smaller areas that are critical to Navy training and testing would make training and concealment much more difficult and would adversely impact the Navy's ability to perform its statutory mission. For example, training with active sonar in varying ocean floor topographies, such as near canyons, is essential to national security; therefore, additional restrictions on the use of active sonar near Quinault, Grays Canyon, Guide, Willapa, Astoria, or Eel Canyons, would be impractical to implement because such mitigation would preclude ready access to areas with the necessary environmental and oceanographic conditions that replicate military mission and combat conditions. Preventing access to critical training waterspace would have a significant impact on the ability for units to meet their individual training and certification requirements (impacting the ability to deploy with the required level of readiness necessary to accomplish their missions), to certify forces to deploy to meet national security tasking (limiting the flexibility of Combatant Commanders and warfighters to project power, engage in multi-national operations, and conduct the full range of naval warfighting capability in support of national security interests).

The Navy requires extensive sea space so that individual training and testing activities can occur at sufficient distances such that these activities do not interfere with one another, so the Navy can safely avoid interaction with non-Navy sea space and airspace uses, and so that Navy units can train to communicate and operate in a coordinated fashion over tens or hundreds of square miles, as required during military missions and combat operations. Threats to national security are constantly evolving. The Navy requires the ability to adapt training and testing to meet these emerging threats. Restricting access to broad-scale areas of water would impact the ability for Navy training and testing to evolve as threats evolve. During the MMPA and ESA consultation processes, the Navy was able to identify several additional practical and effective mitigation area measures for mid-frequency activity sonar testing, including conducting a maximum combined total of 33 hours of surface ship hull-mounted MF1 mid-frequency active sonar during testing annually within 20 NM from shore in the Marine Species Coastal Mitigation Area, the Juan de Fuca Eddy Marine Species Mitigation Area, and the Olympic Coast National Marine Sanctuary Mitigation Area. The Navy's anticipated level of training and testing activity evolves over time. Through the collection of several years' worth of classified data regarding the number of active sonar hours used to meet training and testing requirements, the Navy has an increased understanding of the usage of sonar, the competing training and testing requirements, and outside global realities that may cause sonar usage to fluctuate. These data allow for a more accurate projection of the number of active sonar hours required to meet training and testing requirements into the reasonably foreseeable future. In light of this information, the Navy was able to better formulate a range of reasonable alternatives that meet Navy training and testing requirements for the Proposed Action. Therefore, further reductions in proposed activity levels (either in total throughout the Study Area or in certain seasons or locations based on the presence of marine species) beyond those identified

in Table K-2 would preclude the Navy from meeting the training and testing requirements detailed in Chapter 2 (Description of Proposed Action and Alternatives).

Additional limitations on the locations where active sonar and explosives are allowed would require the Navy to shift its training activities to alternative locations farther offshore. This would have significant impacts on safety, sustainability, and the ability to meet mission requirements within limited available timeframes. Likewise, requiring weapons system program managers and research, testing, and development program managers to use alternative areas within limited available timeframes would deny them the necessary flexibility to rapidly field or develop systems to meet testing program requirements and emerging requirements. For example, blanket distance-from-shore requirements for active sonar within the Marine Species Coastal Mitigation Area, would require the Navy to relocate its activities to alternative locations, such as farther offshore in the NWTT Offshore Area. Moving activities farther offshore would be impractical due to decreased event realism, increased resource allocations and operational costs (due to extending distance offshore and proximity to Navy support facilities, which would increase fuel consumption, maintenance, and time on station), increased safety risks (associated with conducting training and testing at extended distances offshore and farther away from critical medical and search and rescue resources), and accelerated fatigue-life of aircraft and ships (leading to increased safety risk and higher maintenance costs). Increased resource allocations and operational costs would serve as a limiting factor for Navy surface units whose available underway times are constrained by available manpower and fuel expenses. This would also reduce training or testing opportunities during a platform's limited available timeframes because increased time spent transiting to more distant training areas or test sites results in decreased time available for training or testing. For example, although sonar maintenance is typically conducted near a ship's homeport, it could also occur at sea in the NWTT Offshore Area. Sonar maintenance must be performed as the system's performance warrants; therefore, it would not be practical to restrict the locations, season, or time of day of this activity. Such restrictions would diminish the ability for Navy Sailors to train and become proficient in using sensors and weapon systems as required in areas analogous to where the military operates (which would result in a significant risk to personnel safety during military missions and combat operations), would have a significant impact on the ability of units to meet their individual training and certification requirements (which would impact the ability to deploy with the required level of readiness necessary to accomplish any tasking by Combatant Commanders), and prevent program managers and weapons system acquisition programs from meeting testing requirements and required acquisition milestones.

In summary, the Navy developed the mitigation areas identified in Table K-2 to avoid or reduce potential impacts on marine mammals, sea turtles, ESA-listed fish, and ESA-listed seabirds in areas the best available science suggest are particularly important for foraging, migration, or reproduction in the NWTT Offshore Area. Further restrictions on the level, number, or timing (seasonal or time of day) of training or testing activities in the NWTT Offshore Area would be impractical due to implications for safety, sustainability, and mission requirements. The iterative and cumulative impact of mitigation measures that the Navy considered but eliminated, as described above and in Section K.3.4 (Geographic Measures Considered but Eliminated) and Section 5.5 (Measures Considered but Eliminated), would deny national Command authorities the flexibility to respond to national security challenges and for the Navy to effectively accomplish the training and testing necessary for deployment and maintaining military readiness.

K.3.3 Mitigation Areas for Marine Species in NWTT Inland Waters

As detailed in Table K-4, shown in Figure K-6, Figure K-7, and Figure K-8, and described in the sections below, the Navy developed mitigation areas in NWTT Inland Waters to further avoid or reduce potential impacts on marine mammals, ESA-listed fish, and marbled murrelets.

Table K-4: Marine Species Mitigation Areas in NWTT Inland Waters

Mitigation Area Description
Stressor or Activity • Sonar (mitigation does not apply to active sonar sources used for safety of navigation) • Explosives • Physical disturbance and strikes
Resource Protection Focus • Marine mammals (gray whale, Southern Resident killer whale) • Seabirds (marbled murrelet) • Fish (bull trout, Puget Sound Chinook salmon, Hood Canal summer-run chum salmon, green sturgeon, rockfish)
Mitigation Requirements[1] • **Northern Puget Sound Gray Whale Mitigation Area (March 1–May 31)** – Within the Northern Puget Sound Gray Whale Mitigation Area from March 1 to May 31: ▪ The Navy will not conduct Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises. • **Puget Sound and Strait of Juan de Fuca Mitigation Area (year-round or seasonal if specified)** – Within the Puget Sound and Strait of Juan de Fuca Mitigation Area: ▪ The Navy will not use low-frequency, mid-frequency, or high-frequency active sonar during training or testing within the Puget Sound and Strait of Juan de Fuca Mitigation Area, unless a required element necessitates that the activity be conducted in NWTT Inland Waters during (1) Unmanned Underwater Vehicle Training, (2) Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises, (3) activities conducted by Naval Sea Systems Command at designated locations, and (4) pierside sonar maintenance or testing at designated locations. ▪ The Navy will use the lowest active sonar source levels practical to successfully accomplish each event. ▪ Naval units will obtain permission from the appropriate designated Command authority prior to commencing pierside maintenance or testing with hull-mounted mid-frequency active sonar. ▪ The Navy will conduct a maximum of one Unmanned Underwater Vehicle Training activity annually at the NAVY 3 OPAREA, NAVY 7 OPAREA, and Manchester Fuel Depot (i.e., a maximum of one event at each location). ▪ The Navy will not use explosives during testing. ▪ The Navy will not use explosives during training except at the Hood Canal EOD Range and Crescent Harbor EOD Range during explosive mine neutralization activities involving the use of Navy divers. ▪ The Navy will not use explosives in bin E4 (>2.5–5 lb. net explosive weight) or above, and will instead use explosives in bin E0 (< 0.1 lb. net explosive weight) or bin E3 (> 0.5–2.5 lb. net explosive weight). ▪ During February, March, and April at the Hood Canal EOD Range, the Navy will not use explosives in bin E3 (> 0.5–2.5 lb. net explosive weight), and will instead use explosives in bin E0 (< 0.1 lb. net explosive weight). ▪ During August, September, and October at the Hood Canal EOD Range, the Navy will avoid using explosives in bin E3 (> 0.5–2.5 lb. net explosive weight) and will instead use explosives in bin E0 (< 0.1 lb. net explosive weight) to the maximum extent practical unless necessitated by mission requirements. ▪ At the Crescent Harbor EOD Range, the Navy will conduct explosive activities at least 1,000 m from the closest point of land. ▪ The Navy will not conduct non-explosive live fire events in the mitigation area (except firing blank weapons), including gunnery exercises, missile exercises, torpedo exercises, bombing exercises, and Kinetic Energy Weapon Testing.

Table K-4: Marine Species Mitigation Areas in NWTT Inland Waters (continued)

Mitigation Area Description
▪ Navy event planners will coordinate with Navy biologists during the event planning process prior to conducting (1) Unmanned Underwater Vehicle Training at the NAVY 3 OPAREA, Manchester Fuel Depot, Crescent Harbor Explosive Ordnance Disposal Range, and NAVY 7 OPAREA (for Southern Resident killer whales), (2) Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises (for Southern Resident killer whales and gray whales), (3) explosive mine neutralization activities involving the use of Navy divers (for Southern Resident killer whales), and (4) Small Boat Attack Exercises, which involve firing blank small-caliber weapons (for Southern Resident killer whales and gray whales). Navy biologists will work with NMFS and will initiate communication with the appropriate marine mammal detection networks to determine the likelihood of applicable marine mammal species presence in the planned training location. Navy biologists will notify event planners of the likelihood of species presence. To the maximum extent practical, Navy planners will use this information when planning specific details of the event (e.g., timing, location, duration) to avoid planning activities in locations or seasons where species presence is expected. The Navy will ensure environmental awareness of event participants. Environmental awareness will help alert participating crews to the possible presence of applicable species in the training location. Lookouts will use the information to assist visual observation of applicable mitigation zones and to aid in the implementation of procedural mitigation. Unmanned Underwater Vehicle Training events at the NAVY 3 OPAREA, Manchester Fuel Depot, Crescent Harbor Explosive Ordnance Disposal Range, and NAVY 7 OPAREA will be cancelled or moved to another training location if the presence of Southern Resident killer whales is reported through available monitoring networks during the event planning process, or immediately prior to the event, as applicable. ▪ The Navy will issue annual seasonal awareness notification messages to alert ships and aircraft operating within the Puget Sound and Strait of Juan de Fuca Mitigation Area to the possible presence of concentrations of Southern Resident killer whales from July 1 to November 30 in the Puget Sound and Strait of Juan de Fuca, and concentrations of gray whales from March 1 to May 31 in the Strait of Juan de Fuca and northern Puget Sound. For safe navigation and to avoid interactions with large whales, the Navy will instruct vessels to remain vigilant to the presence of Southern Resident killer whales and gray whales that may be vulnerable to vessel strikes or potential impacts from training and testing activities. Platforms will use the information from the awareness notification messages to assist their visual observation of applicable mitigation zones during training and testing activities and to aid in the implementation of procedural mitigation.

[1] Should national security present a requirement to conduct training or testing prohibited by the mitigation requirements specified in this table, naval units will obtain permission from the appropriate designated Command authority prior to commencement of the activity. The Navy will provide NMFS with advance notification and include relevant information about the event (e.g., sonar hours, explosives use, non-explosive practice munitions use) in its annual activity reports to NMFS.

The Northern Puget Sound Gray Whale Mitigation Area was newly developed for the Proposed Action and was included in the 2019 NWTT Draft Supplemental EIS/OEIS. Within the Puget Sound and Juan de Fuca Mitigation Area, the Navy will continue to implement the following mitigation area measures from the 2015 NWTT Final EIS/OEIS (which were therefore also included in the 2019 NWTT Draft Supplemental EIS/OEIS):

- Requirements for naval units to obtain approval from the appropriate designated Command authority prior to conducting active sonar pierside maintenance or testing with hull-mounted mid-frequency active sonar.
- Requirements for seasonal explosive charge size limitations and distance from shore restrictions for explosive mine neutralization activities involving the use of Navy divers. These requirements were presented in Section 5.3.3.7 (Explosive Mine Neutralization Activities Involving Navy Divers) of the 2019 NWTT Draft Supplemental EIS/OEIS; however, for this Final Supplemental EIS/OEIS, they were reorganized and are now included in Table K-4 as geographic mitigation vice procedural mitigation.
- Requirements for Navy event planners to coordinate with Navy biologists and NMFS during the event planning process prior to conducting Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises and Small Boat Attack Exercises.

While conducting the Proposed Action under its Phase II permits, the Navy has, in practice, been implementing several environmental protection measures that exceed the mitigation requirements specified in the 2015 NWTT Final EIS/OEIS and associated consultation documents. These environmental protection measures helped inform development of certain aspects of the Proposed Action for this Final Supplemental EIS/OEIS; however, the Navy had not formally committed to them as mitigation to allow flexibility for future activities. During the MMPA and ESA consultations for this Final Supplemental EIS/OEIS, the Navy determined it would be practical to codify those practices into formal mitigation area measures in NWTT Inland Waters for the Proposed Action. The Navy will implement the following mitigation area measures that are a continuation of current practice, but were not previously included in the 2015 NWTT Final EIS/OEIS or 2019 NWTT Draft Supplemental EIS/OEIS:

- Requirements to not use low-, mid-, or high-frequency active sonar during training or testing unless a required element necessitates the activity be conducted in NWTT Inland Waters during (1) Unmanned Underwater Vehicle Training, (2) Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises, (3) activities conducted by Naval Sea Systems Command at designated locations, and (4) pierside sonar maintenance or testing at designated locations.
- Requirements to use the lowest active sonar source levels practical to successfully accomplish each event.
- Requirements to not use explosives during testing.
- Requirements to not use explosives during training except at the Hood Canal Explosive Ordnance Disposal (EOD) Range and Crescent Harbor EOD Range during explosive mine neutralization activities involving the use of Navy divers, and for Navy event planners to coordinate with Navy biologists and NMFS, and initiate communication with the appropriate marine mammal detection networks during the event planning process prior to these events.
- Requirements to not conduct non-explosive live fire events (except firing blank weapons), including gunnery exercises, missile exercises, torpedo exercises, bombing exercises, and Kinetic Energy Weapon Testing.

The Navy also identified numerous opportunities to increase its mitigation measures applicable to the Puget Sound and Strait of Juan de Fuca Mitigation Area based on its ongoing analysis of the best available science and potential mitigation suggested by comments on the 2019 NWTT Draft Supplemental EIS/OEIS and during the MMPA and ESA consultation processes. The Navy developed the following new mitigation area measures for this Final Supplemental EIS/OEIS:

- Requirements to conduct a maximum of one Unmanned Underwater Vehicle Training activity annually at the NAVY 3 Operating Area (OPAREA), NAVY 7 OPAREA, and Manchester Fuel Depot (i.e., a maximum of one event at each location).
- Requirements for Navy event planners to coordinate with Navy biologists and NMFS during the event planning process prior to conducting Unmanned Underwater Vehicle Training at applicable locations, and to cancel or move events to another training location if the presence of Southern Resident killer whales is reported through available monitoring networks.
- Requirements to initiate communication with the appropriate marine mammal detection networks prior to conducting Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises and Small Boat Attack Exercises.
- Requirements to issue annual seasonal awareness notification messages to alert ships and aircraft operating within the Puget Sound and Strait of Juan de Fuca Mitigation Area to the possible presence of concentrations of Southern Resident killer whales and gray whales.

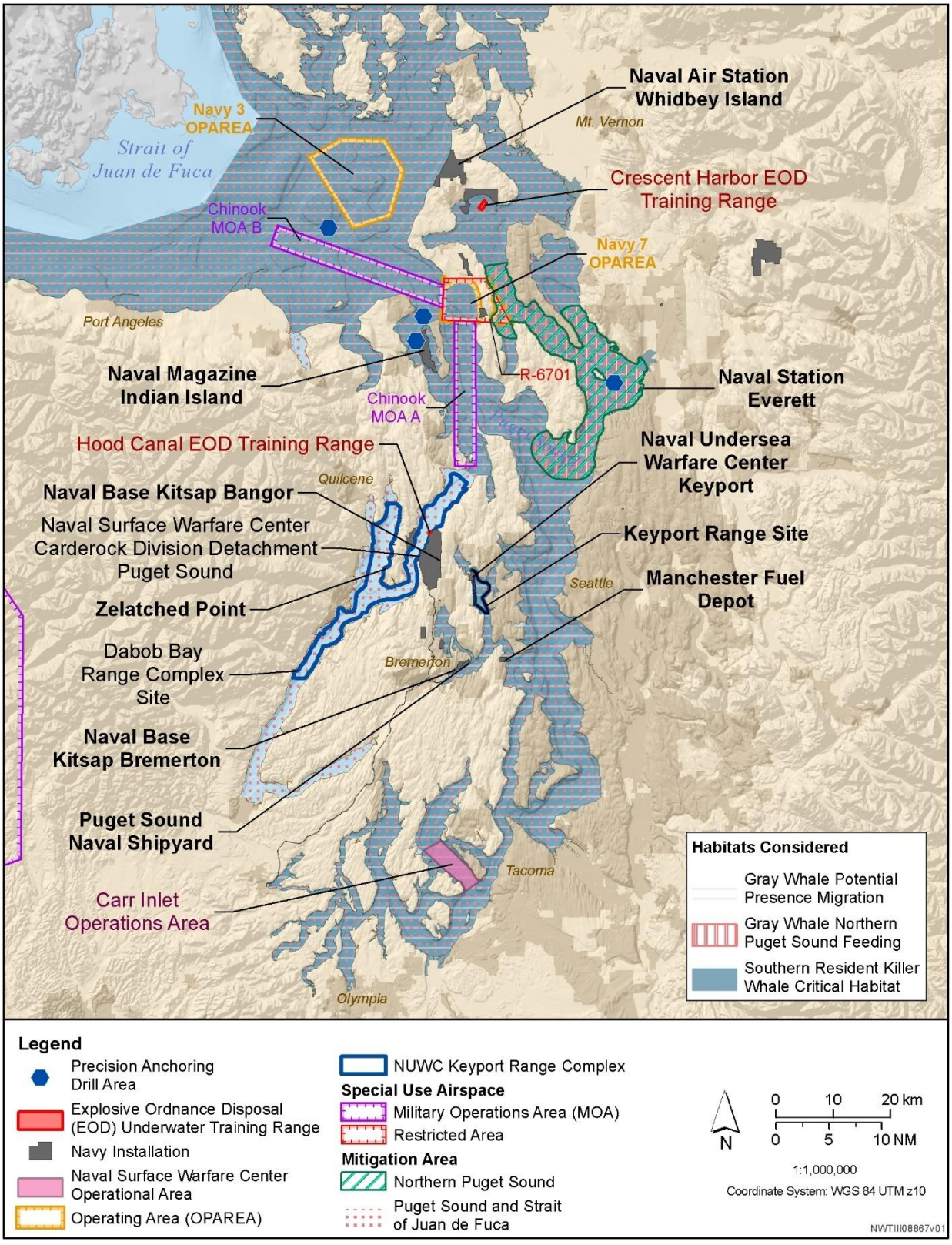

Figure K-6: Marine Species Mitigation Areas and Marine Mammal Habitats Considered in NWTT Inland Waters

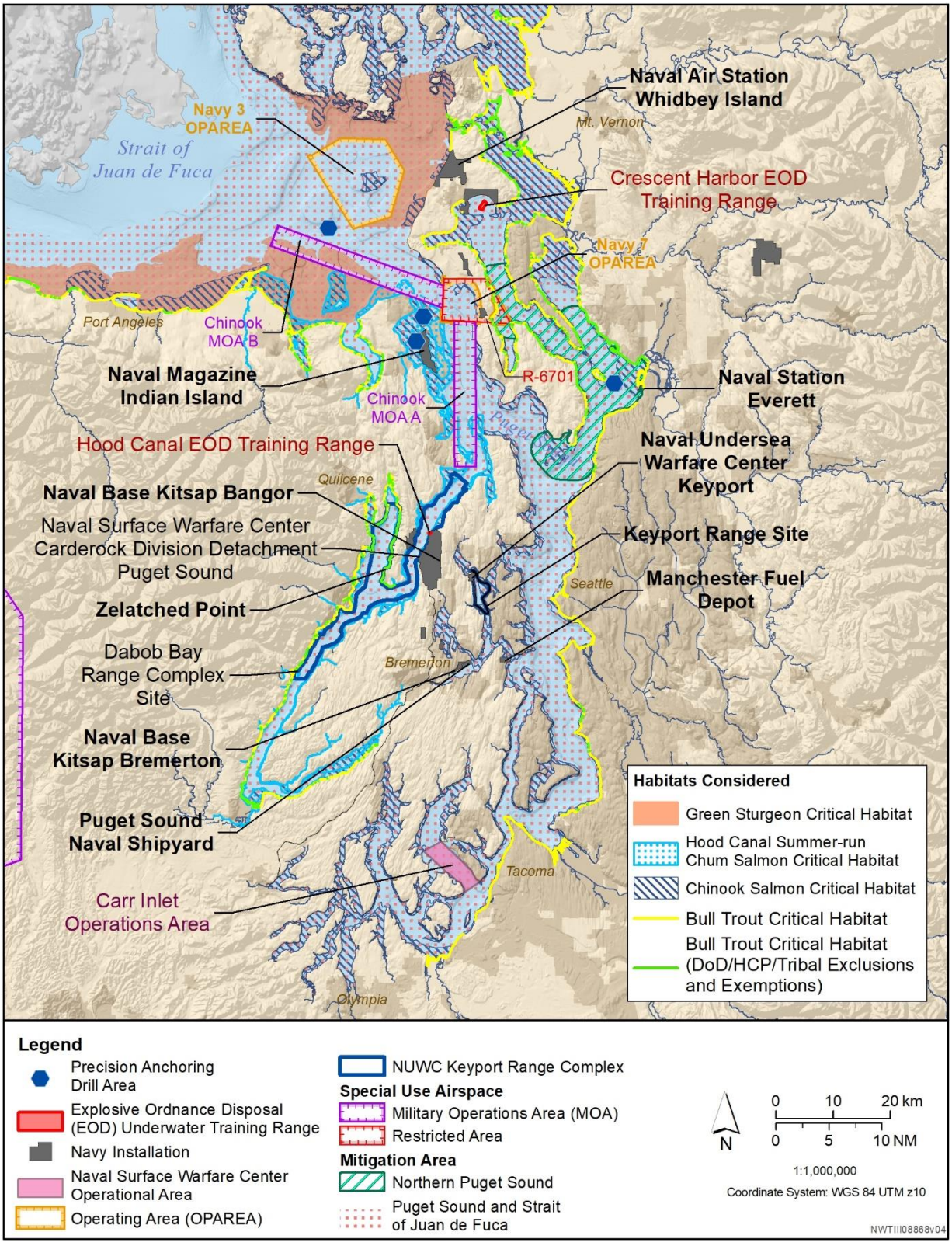

Figure K-7: Marine Species Mitigation Areas and Bull Trout, Salmon, and Green Sturgeon Habitats Considered in NWTT Inland Waters

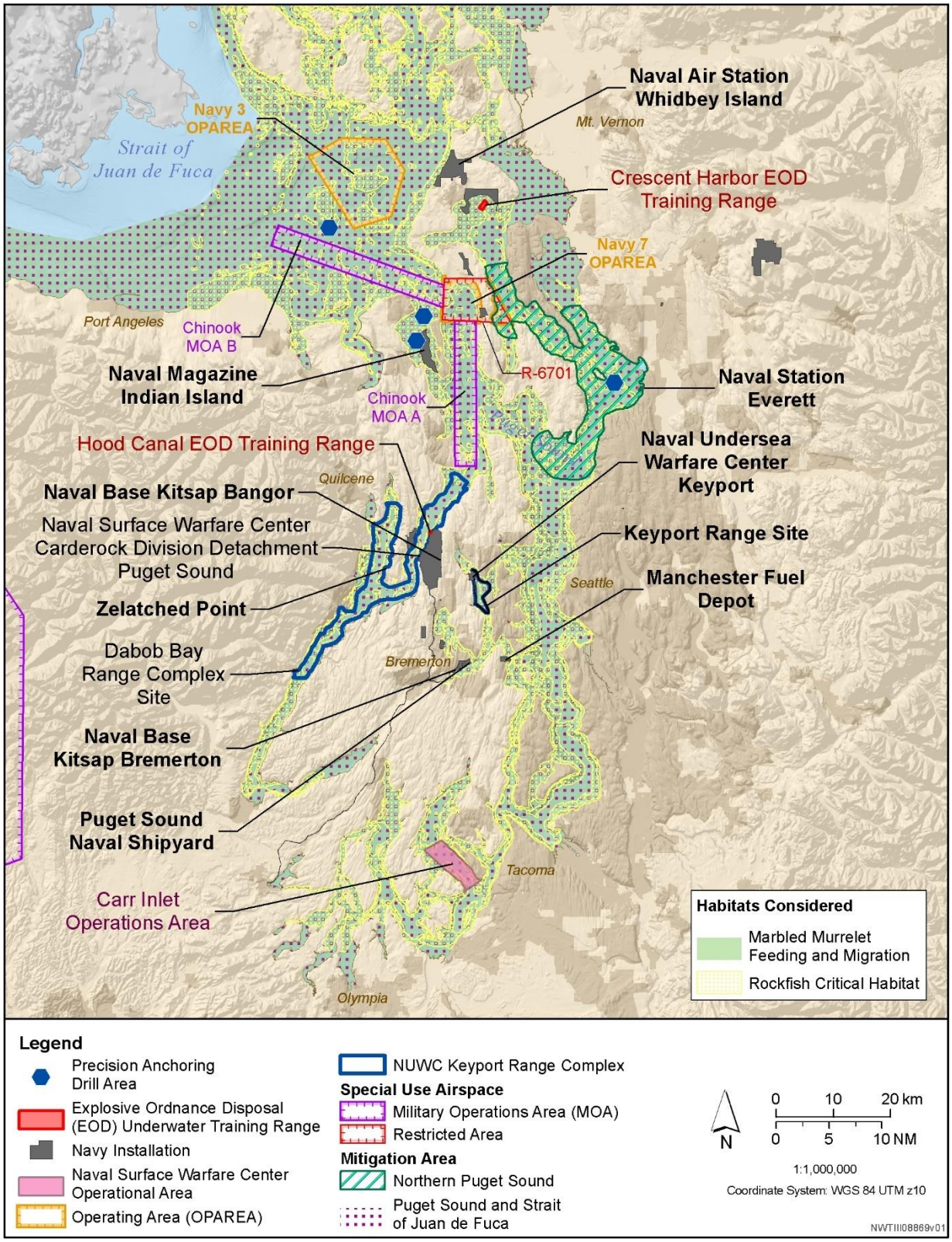

Figure K-8: Marine Species Mitigation Areas and Rockfish and Marbled Murrelet Habitats Considered in NWTT Inland Waters

K.3.3.1 Resource Description

The Navy conducted a comprehensive assessment of NWTT Inland Waters to identify habitats that serve as key areas of importance for biological life processes (i.e., foraging, migration, reproduction) for marine species. These key habitat areas, which include areas established by NMFS or the USFWS as critical habitat, identified by Calambokidis et al. (2015) as biologically important areas for marine mammals, or otherwise identified through the best available science are described in the sections below (organized by species). The portions of the habitats that overlap NWTT Inland Waters are shown in Figure K-6, Figure K-7, and Figure K-8. A map of Marine Protected Areas in NWTT Inland Waters is presented in Section 6.1.2 (Marine Protected Areas).

Because the purpose of developing mitigation areas is to avoid or reduce potential impacts on marine species within key areas of biological importance, the sections below focus on areas identified as important foraging, migration, and reproduction habitats. Therefore, not all species or areas with known marine species occurrence are discussed in the sections below. For example, although humpback whales are seasonally present, harbor porpoise are known to occur year-round, and leatherback sea turtles have been sighted in NWTT Inland Waters on rare occasion, the best available science does not indicate that any particular area within NWTT Inland Waters serves as a key area of biological importance for these species.

K.3.3.1.1 Gray Whale

A general discussion of gray whale migration throughout the North Pacific, Arctic, and United States West Coast is presented in Section K.3.2.1.2 (Gray Whale). Most gray whales use migration habitat within 10 km, 8 km, and 5 km from shore off the United States West Coast during their various phases of migration. Some gray whales have also been observed migrating within NWTT Inland Waters. To account for this, a biologically important area for potential presence of migration habitat was identified by Calambokidis et al. (2015) within Puget Sound and the Strait of Juan de Fuca from January to July and October to December, as shown in Figure K-6. Gray whales migrating in this area are thought to be predominately from the Eastern North Pacific population, which is not ESA-listed (Carretta et al., 2017). Data from tagging, photo-identification, and genetic surveys also indicate a potential for migrating gray whales to be from the Western North Pacific population, which is listed under the ESA as endangered (Mate et al., 2015; Muir et al., 2016; Weller et al., 2013; Weller et al., 2002; Weller et al., 2012).

In addition to the potential presence of migration habitat, Calambokidis et al. (2015) identified a biologically important gray whale feeding habitat within NWTT Inland Waters. From March to May, gray whales feed in an area within northern Puget Sound around the south end of Whidbey Island and Camano Island. Some individuals that feed in northern Puget Sound demonstrate high interannual site fidelity during the feeding season. Gray whales feeding in this area are thought to be from the Eastern North Pacific population, but are not thought to be part of the Pacific Coast Feeding Group subpopulation (Calambokidis et al., 2015). The potential presence of migration and feeding areas were substantiated through long-term data obtained through vessel, aerial, and land-based surveys; photo-identification; genetic and tagging studies; opportunistic sightings from whale watching and fishing vessels; and expert judgment.

In summary, gray whales feed in and migrate through habitats throughout the North Pacific, Arctic, and along the United States West Coast, both within and outside of NWTT Inland Waters. Within NWTT Inland Waters, the best available science indicates that feeding (from March to May) and migration (from January to July and October to December) occur primarily within the biologically important areas

identified by Calambokidis et al. (2015); therefore, these habitat areas can be considered particularly important to gray whales relative to other locations in NWTT Inland Waters. For additional information about gray whales and their habitat use and geographic range, see Section 3.4.1.14.3 (Distribution) of this Final Supplemental EIS/OEIS.

K.3.3.1.2 Southern Resident Killer Whale

The Southern Resident killer whale is a trans-boundary population with seasonal shifts in distribution within inland waters of Washington and southern British Columbia (Carretta et al., 2018; National Marine Fisheries Service, 2016). As shown in Figure K-6, NWTT Inland Waters overlap critical habitat designated by NMFS for Southern Resident killer whales, which are listed as endangered under the ESA. The critical habitat extends throughout Puget Sound and the Strait of Juan de Fuca, except in Hood Canal and locations where the water depth is less than 6.1 m (National Marine Fisheries Service, 2016; National Marine Fisheries Service: Northwest Region, 2006; National Oceanic and Atmospheric Administration, 2014b). Essential features for this critical habitat include the occurrence of important fish prey species and passage conditions to allow for migration, resting, and foraging (71 FR 69054).

Long-term photo-identification studies of individual Southern Resident killer whales has resulted in a substantial understanding of this population's structure, behaviors, and movements in NWTT Inland Waters (Wiles, 2016; Wright et al., 2017). In spring and summer months, the Southern Resident stock is most frequently seen in the San Juan Islands region with intermittent sightings in Puget Sound (Olson & Osborne, 2017; Olson et al., 2018; Shields et al., 2018), which is consistent with the "summer core area" identified during the establishment of the critical habitat. During the summer months, Southern Resident killer whales preferentially consume Chinook salmon, and may also prey on chum, coho, steelhead, sockeye, and various non-salmonids such as Pacific herring and quillback rockfish (National Oceanic and Atmospheric Administration, 2014a). In the fall and early winter months, the Southern Resident killer whales are seen more frequently in Puget Sound, where returning chum, steelhead, and Chinook salmon are concentrated; Chinook are targeted preferentially when available (Ford et al., 2009; Ford et al., 2016; Hanson et al., 2018). By winter, they spend progressively less time in NWTT Inland Waters and more time off the coast of Washington, Oregon, and California (Black, 2011; Cogan, 2015; Hanson et al., 2017; National Marine Fisheries Service, 2016; Olson & Osborne, 2017). Additional information about Southern Resident killer whale prey species is included in the sections below.

While Southern Resident killer whales are frequently sighted in the main basin of Puget Sound, their presence near Navy installations varies from not present at all to infrequent sightings, depending on the season (Olson & Osborne, 2017; Olson et al., 2018). Southern Resident killer whales have not been reported in Hood Canal or Dabob Bay since 1995 (National Marine Fisheries Service: Northwest Region, 2006). Near Naval Base Kitsap Bremerton and Keyport, the Southern Resident killer whale is also rare, with the last confirmed sighting in Dyes Inlet in 1997 (the Navy has assumed transients will occasionally be present in these areas). Southern Resident killer whales have been observed in Saratoga Passage and Possession Sound near Naval Air Station Whidbey Island and Naval Station Everett, respectively, and have also been observed in southern Puget Sound in the Carr Inlet area.

In summary, Southern Resident killer whales feed in areas throughout the North Pacific, both within and outside of NWTT Inland Waters. Within NWTT Inland Waters, the best available science indicates that foraging occurs throughout the critical habitat designated by NMFS; therefore, the critical habitat (i.e., the entire extent of NWTT Inland Waters) can be considered particularly important to Southern Resident killer whales. For additional information about Southern Resident killer whales and their habitat use and geographic range, see Section 3.4.1.16.3 (Distribution) of this Final Supplemental EIS/OEIS.

K.3.3.1.3 Bull Trout

The Coastal-Puget Sound Distinct Population Segment of bull trout encompasses all Pacific Coast drainages within the United States north of the Columbia River in Washington, including those flowing into Puget Sound. This population is thought to contain the only anadromous form of bull trout in the United States. As shown in Figure K-7, one area that overlaps NWTT Inland Waters has been designated by the USFWS as critical habitat for the Coastal-Puget Sound Distinct Population Segment of bull trout, which is listed as threatened under the ESA. Essential features for the critical habitat include foraging and migration habitats (75 FR 63898).

Bull trout in marine waters are shoreline-oriented (Goetz, 2016) and enter marine water for the primary purpose of foraging on smaller fish in the intertidal and subtidal zones of the photic zone, primarily in water less than 10 m deep. Although bull trout in marine water will occasionally use areas deeper than 10 m, they do not maintain position and soon return to shallower water. In NWTT Inland Waters, anadromous bull trout enter marine waters in early spring, with residence time in salt water averaging two months, with a maximum of four months (Goetz, 2016). Marine nearshore and estuarine habitats are highly productive due to the complexity of habitats and nutrient inputs, providing important foraging habitat including eelgrass and kelp for prey species such as juvenile salmon, Pacific herring, surf smelt, and sand lance. Skagit Bay contains shallow water at low tide enabling larger juvenile, sub-adult, and adult bull trout from the Skagit River to migrate to the nearshore of Whidbey Island and Crescent Harbor. This nearshore marine environment provides a year-round migratory corridor for bull trout from their natal streams to other locations within Puget Sound or nearby watersheds to forage and overwinter (U.S. Fish and Wildlife Service, 2016).

In summary, the Coastal-Puget Sound Distinct Population Segment of bull trout feeds in and migrates through habitats off the United States West Coast, both within and outside NWTT Inland Waters. Within NWTT Inland Waters, the best available science indicates that migration and foraging occur primarily within the critical habitat designated by the USFWS and other nearshore areas throughout parts of Puget Sound, including Skagit Bay; therefore, these habitats can be considered particularly important to bull trout relative to other locations in NWTT Inland Waters. For additional information about bull trout and their habitat use and geographic range, see Section 3.9.2.4.1.6 (Bull Trout [*Salvelinus confluentus*]) of this Final Supplemental EIS/OEIS.

K.3.3.1.4 Puget Sound Chinook Salmon

NWTT Inland Waters overlap critical habitat designated by NMFS for Puget Sound Chinook salmon, which are listed as threatened under the ESA. As shown in Figure K-7, the critical habitat extends throughout nearshore waters of Puget Sound, Hood Canal, and the Strait of Juan de Fuca from the line of extreme high tide out to a depth of 30 m. Essential features for this critical habitat include areas that support growth, maturation, and foraging (70 FR 52685).

Juvenile Chinook salmon rear throughout the nearshore regions of Puget Sound before leaving the Sound (Fresh, 2006). Some of these fish use small stream mouths or “pocket estuaries” along the shore of Puget Sound (Beamer et al., 2003). Juvenile chinook salmon in Puget Sound are widely distributed and may be found along all stretches of shoreline at some point during the year (Fresh, 2006). However, about a third of Puget Sound Chinook salmon remain all year in the Sound instead of migrating to the ocean. These are called resident or “blackmouth” Chinook salmon (Puget Sound Partnership, 2017; Simenstad et al., 1982). In general, south Puget Sound tends to produce more resident Chinook salmon than areas to the north. Studies of fish implanted with acoustic transmitters have shown that resident

Chinook demonstrate high site fidelity within their home areas, rather than moving widely about Puget Sound (Dunagan, 2016).

Hood Canal has extant populations of Puget Sound Chinook in the Skokomish River watershed and mid-Hood Canal region (including spawning populations in the Hamma Hamma, Duckabush, and Dosewallips watersheds) (Ford et al., 2011). All juvenile Chinook salmon emigrating from or adults immigrating to these watersheds migrate through Hood Canal (e.g., Puget Sound Chinook migration near the Hood Canal EOD Range generally occurs from August through October)(National Marine Fisheries Service, 2015). Additionally, some Puget Sound Chinook that mature solely in the Salish Sea and do not migrate into the North Pacific Ocean are likely to spend at least a portion of their time foraging in proximity to the Hood Canal EOD range (National Marine Fisheries Service, 2015).

In summary, Puget Sound Chinook salmon feed in and migrate through habitats throughout Puget Sound and the United States West Coast, both within and outside of NWTT Inland Waters. Within NWTT Inland Waters, the best available science indicates that foraging and migration occur primarily within critical habitat designated by NMFS and other nearshore areas including Hood Canal; therefore, these habitats can be considered as particularly important to Chinook salmon relative to other locations in NWTT Inland Waters. For additional information about Chinook salmon and their habitat use and geographic range, see Section 3.9.2.4.1.1 (Chinook Salmon [*Oncorhynchus tshawytscha*]) of this Final Supplemental EIS/OEIS.

K.3.3.1.5 Hood Canal Summer-Run Chum Salmon

NWTT Inland Waters overlap critical habitat designated by NMFS for the Hood Canal summer-run chum salmon Evolutionarily Significant Unit, which is listed as threatened under the ESA. As shown in Figure K-7, the critical habitat extends throughout nearshore waters of Hood Canal and the Strait of Juan de Fuca from the line of extreme high tide out to a depth of 30 m. Essential features for this critical habitat include areas that support growth, maturation, and foraging (70 FR 52685).

Hood Canal summer-run chum salmon may migrate between NWTT Inland Waters and the NWTT Offshore Area. Hood Canal summer-run chum juveniles migrate from freshwater into estuary habitat generally from the first week in February through the second week in April (Washington Department of Fish and Wildlife & Point No Point Treaty Tribes, 2000). Returning adults begin to arrive in Hood Canal in early August, and are thought to stage in front of their stream of origin for approximately 10–12 days (National Marine Fisheries Service, 2015). Migration into freshwater spawning grounds generally occurs from late August to late October (Washington Department of Fish and Wildlife & Point No Point Treaty Tribes, 2000).

In summary, Hood Canal summer-run chum salmon feed in and migrate through habitats throughout Puget Sound and the United States West Coast, both within and outside of NWTT Inland Waters. Within NWTT Inland Waters, the best available science indicates that foraging and migration occur primarily within critical habitat designated by NMFS, including the nearshore areas of Hood Canal; therefore, the critical habitat can be considered as particularly important to chum salmon relative to other locations in NWTT Inland Waters. For additional information about chum salmon and their habitat use and geographic range, see Section 3.9.2.4.1.3 (Chum Salmon [*Oncorhynchus keta*]) of this Final Supplemental EIS/OEIS.

K.3.3.1.6 Green Sturgeon

Green sturgeon forage in and migrate through estuaries and bays ranging from San Francisco Bay to British Columbia (Huff et al., 2012). NWTT Inland Waters contain critical habitat designated by NMFS for the Southern Distinct Population Segment of green sturgeon, which is listed as threatened under the ESA. As shown in Figure K-7, the critical habitat extends throughout several rivers and estuaries along the United States West Coast, including in the Strait of Juan de Fuca. Essential features for the critical habitat include foraging and migration habitats (74 FR 52300). Green sturgeon prefer marine areas with high seafloor complexity and boulder presence at depths of 20–60 m (Huff et al., 2011). Green sturgeon forage in coastal waters on benthic prey species.

In summary, the Southern Distinct Population Segment of green sturgeon feed in and migrate through habitats off the United States West Coast, both within and outside of NWTT Inland Waters. Within NWTT Inland Waters, the best available science indicates that migration and foraging occur primarily within the critical habitat designated by NMFS; therefore, this habitat can be considered particularly important to green sturgeon relative to other locations in NWTT Inland Waters. For additional information about green sturgeon and their habitat use and geographic range, see Section 3.9.2.4.3.2 (Green Sturgeon [*Acipenser medirostris*]) of this Final Supplemental EIS/OEIS.

K.3.3.1.7 Rockfish

NWTT Inland Waters overlap critical habitat designated by NMFS for the Puget Sound/Georgia Basin Distinct Population Segments of bocaccio (which are listed as endangered under the ESA) and yelloweye rockfish (which are listed as threatened under the ESA). As shown in Figure K-8, the critical habitat extends throughout nearshore waters of Hood Canal and the Strait of Juan de Fuca from the line of extreme high tide out to a depth of 30 m. Essential features for this critical habitat include areas that support growth, maturation, and foraging (79 FR 68041). These populations of rockfish only occur in the NWTT Inland Waters portion of the Study Area.

Preferred bocaccio habitat is largely dependent upon the life stage of an individual. Benthic habitats or sites deeper than 30 m that possess or are adjacent to areas of complex bathymetry consisting of rock and or highly rugose habitat are essential to conservation because these features support growth, survival, reproduction, and feeding opportunities by providing the structure for rockfishes to avoid predation, seek food and persist for decades. Juvenile settlement habitats located in the nearshore with substrates such as sand, rock, or cobble compositions that also support kelp are essential for conservation because these features enable forage opportunities and refuge from predators and enable behavioral and physiological changes needed for juveniles to occupy deeper adult habitats (Love et al., 2002).

Oceanographic conditions within Puget Sound likely result in the larvae staying within the basin where they are born rather than being broadly dispersed by tidal action or currents (Drake et al., 2010). Once bocaccio reach 1–3.5 inches, they move into shallow nearshore waters, with rocky or cobble substrates, preferably with kelp (Love et al., 2002). As juveniles mature into adults (around 7 years), they move offshore to greater depths. As adults, bocaccio tend to prefer rocky habitats (hard substrate), but they have also been documented along areas of high relief and non-rocky substrates such as sand, mud, and other unconsolidated substrates (Miller & Borton, 1980). Rocky habitats are limited in the Puget Sound, with only 10 square km of such habitat in Puget Sound proper, and 207 square km in north Puget Sound (Palsson et al., 2009).

Recent research has found evidence for two subpopulations of yelloweye rockfish within the population: one in Hood Canal and one in the rest of the Puget Sound/Georgia Basin (National Marine Fisheries Service, 2017). Unlike bocaccio, juvenile yelloweye rockfish do not occupy intertidal habitat, but are observed in deeper, offshore waters greater than 30 m (Studebaker et al., 2009). They are typically associated with shallow high relief rocky or sponge garden habitats (Love, 2011). As adults, yelloweye rockfish move in to deeper rocky, high relief habitats greater than 30 m, particularly associated with caves and crevices, pinnacles, and boulder fields (Carlson & Straty, 1981; Love et al., 1991; O'Connell & Carlile, 1993; Richards, 1986; Yoklavich et al., 2000). Adults are most commonly found between 40 m and 250 m (Love et al. 2002; Orr et al. 2000). Yelloweyes generally occur as individuals, with loose, residential aggregations infrequently found (Coombs, 1978; DeMott, 1982; Love et al., 2002).

In summary, Puget Sound/Georgia Basin Distinct Population Segments of bocaccio and yelloweye rockfish feed in and migrate through habitats throughout the United States West Coast, both within and outside of NWTT Inland Waters. The best available science indicates that foraging and migration occur primarily within critical habitat designated by NMFS; therefore, the critical habitat can be considered as particularly important to bocaccio and yelloweye rockfish relative to other locations in NWTT Inland Waters. For additional information about bocaccio and yelloweye rockfish, their habitat usage, and geographic range, see Section 3.9.2.4.2.1 (Bocaccio [*Sebastes paucispinis*]) and Section 3.9.2.4.2.3 (Yelloweye Rockfish [*Sebastes ruberrimus*]) of this Final Supplemental EIS/OEIS.

K.3.3.1.8 Marbled Murrelet

The marbled murrelet is listed as threatened under the ESA in Washington, Oregon, and California (57 FR 45328). Critical habitat has not been designated in the marine environment for marbled murrelets but does occur in the terrestrial mature and old growth forests within 48 km of the Washington, Oregon, and California coasts. The U.S. Fish and Wildlife Service (1997) recovery plan established six marbled murrelet conservation zones that extend 2 km (1.1 NM) seaward from shore to assist the design of management actions and evaluation of impacts. NWTT Inland Waters overlap a portion of marbled murrelet Conservation Zone 1. Marbled murrelet Conservation Zones 3, 4, 5, and 6 are located outside of or adjacent to the Study Area, however, individual marbled murrelets from these zones could occur in Conservation Area 1 due to the transient nature of this species. For information on Conservation Zone 2, which overlaps a portion of the NWTT Offshore Area, see Section K.3.2.1.13 (Marbled Murrelet).

As shown in Figure K-8, marbled murrelets occur year-round in inland marine waters of the Strait of Juan de Fuca and Puget Sound. In the summer breeding season from April through September, marbled murrelets primarily forage in the nearshore waters of the San Juan Islands, Rosario Strait, the Strait of Juan de Fuca, Admiralty Inlet, Puget Sound, and Hood Canal. During the winter non-breeding season from October through March, some marbled murrelets disperse to forage farther from shore, while other marbled murrelets transit into Puget Sound from Canada and concentrate near the southern and eastern end of Strait of Juan de Fuca, San Juan Islands, and Puget Sound (Piatt et al., 2007; U.S. Fish and Wildlife Service, 2016).

In summary, marbled murrelets feed in and migrate through (e.g., transit from foraging areas to inland nesting habitat) marine waters in Washington, Oregon, and California, both within and outside of NWTT Inland Waters. The best available science indicates that NWTT Inland Waters are particularly important feeding and migration habitat for marbled murrelets year-round. For additional information about marbled murrelets and their habitat use and geographic range, see Section 3.6.1.7 (Marbled Murrelet [*Brachyramphus marmoratus*]) of this Final Supplemental EIS/OEIS.

K.3.3.2 Mitigation Area Assessment

K.3.3.2.1 Biological Effectiveness

As shown in Figure K-6, Figure K-7, and Figure K-8, each habitat considered in NWTT Inland Waters either partially overlaps or is fully contained within one or both mitigation areas. To demonstrate the level of overlap, Table K-5 identifies the percent of each habitat considered that is contained within each mitigation area in NWTT Inland Waters. These percentages factor in only the portions of each habitat located inside the Study Area. A qualitative discussion of the biological effectiveness of mitigation areas in NWTT Inland Waters is provided in the sections below.

Table K-5: Percent of Habitat Considered Contained Within Mitigation Areas in NWTT Inland Waters

Habitat Considered	*Northern Puget Sound Gray Whale Mitigation Area*	*Puget Sound and Strait of Juan de Fuca Mitigation Area*
Gray Whale Northern Puget Sound Feeding Biologically Important Area	100%	100%
Southern Resident Killer Whale Critical Habitat	5%	100%
Bull Trout Critical Habitat	16%	100%
Puget Sound Chinook Salmon Critical Habitat	4%	100%
Hood Canal Summer-Run Chum Salmon Critical Habitat	-	100%
Green Sturgeon Critical Habitat	-	100%
Rockfish Critical Habitat	6%	100%
Marbled Murrelet Habitat	5%	100%

K.3.3.2.1.1 Northern Puget Sound Gray Whale Mitigation Area

The Northern Puget Sound Gray Whale Mitigation Area fully overlaps the biologically important gray whale feeding habitat identified by Calambokidis et al. (2015), and a portion of the biologically important area for potential presence of gray whale migration. Within this mitigation area, the Navy will not conduct Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises from March 1 to May 31, which is the gray whale feeding season at this location. Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises are multi-day events that involve aircraft, surface vessels, and unmanned underwater vehicles using high-frequency active sonar and other systems to train to detect non-explosive underwater mine shapes. By not conducting this activity in the Northern Puget Sound Gray Whale Mitigation Area during the feeding season, the Navy will avoid potential impacts from vessel movements, towed-in water devices, and active sonar on gray whales in their important feeding area.

The Northern Puget Sound Gray Whale Mitigation Area is located entirely within the Puget Sound and Strait of Juan de Fuca Mitigation Area. As described in the section below, mitigation in the Strait of Juan de Fuca Mitigation Area will further help the Navy avoid potential impacts on gray whale feeding in this location. For example, the Navy will not conduct any training or testing activities using explosives or non-explosive live fire ordnance (except firing blank weapons) within this portion of the Puget Sound and Strait of Juan de Fuca Mitigation Area.

K.3.3.2.1.2 Puget Sound and Strait of Juan de Fuca Mitigation Area

The Navy established the boundaries of the Puget Sound and Strait of Juan de Fuca Mitigation Area to encompass the full extent of NWTT Inland Waters, for the purpose of maximizing mitigation benefits within key marine mammal, marbled murrelet, and ESA-listed fish habitat areas. The mitigation area fully overlaps every important feeding and migration habitat described in Section K.3.3.1 (Resource Description) in NWTT Inland Waters. This includes feeding and potential presence of migration habitat for gray whales, feeding and migration habitat (e.g., transiting from foraging areas to inland nesting habitat) for marbled murrelets, and critical habitat for Southern Resident killer whales, bull trout, Puget Sound Chinook salmon, Hood Canal summer-run chum salmon, green sturgeon, bocaccio rockfish, and yelloweye rockfish. Collectively, mitigation in the Puget Sound and Strait of Juan de Fuca Mitigation Area is designed to help the Navy avoid any potential impacts on Southern Resident killer whales in NWTT Inland Waters, and to avoid or reduce potential impacts on the other previously mentioned ESA-listed species, as described below.

Requirements for naval units to obtain approval from the appropriate designated Command authority prior to conducting active sonar pierside maintenance or testing with hull-mounted mid-frequency active sonar is intended to elevate the situational and environmental awareness of respective Command authorities during the event planning process. Requiring designated Command authority approval provides an increased level of assurance that mid-frequency active sonar is a required element for each event. Such authorizations are typically based on the unique characteristics of the area from a military readiness perspective, taking into account the importance of the area for marine species and the need to mitigate potential impacts on Southern Resident killer whales (and other marine mammals, such as gray whales) to the maximum extent practicable.

Mitigation measures to only use low-frequency, mid-frequency, or high-frequency active sonar when a required element necessitates that the activity be conducted in NWTT Inland Waters effectively reduces the types of active sonar activities, and therefore the overall amount of active sonar (i.e., number of hours) conducted in the mitigation area. As described in Section K.3.3.2.2 (Operational Assessment), some training and testing activities have elements that necessitate events be conducted in NWTT Inland Waters. The Navy will implement additional mitigation during those activities. For example, mitigation to use the lowest active sonar source levels practical will help reduce the overall potential for exposure while allowing the Navy to successfully accomplish events that require the use of active sonar in designated locations. These mitigation measures are primarily designed to avoid or reduce potential impacts on Southern Resident killer whales and gray whales. Based on seasonal density data, Southern Resident killer whale occurrence is either not anticipated or is expected to be infrequent at Naval Sea Systems Command testing sites and in the locations where pierside maintenance and testing are designated to occur. These areas offer a controlled static and sheltered environment, which increases the likelihood that any Southern Resident killer whales or gray whales would be observed by Navy Lookouts, as described in Section 5.3.2.1 (Active Sonar). The mitigation will also help avoid or reduce potential impacts on marbled murrelets and ESA-listed fish.

The Navy will issue annual seasonal awareness notification messages to further help avoid potential impacts from vessel strikes and training and testing activities on Southern Resident killer whales and gray whales. The awareness notification messages will coincide with the seasons in which Southern Resident killer whales and gray whales are most likely to be observed in concentrations in the mitigation area (July 1 to November 30). Southern Resident killer whales are most likely to be observed in spring and summer in the Strait of Juan de Fuca and San Juan Islands region, and in fall and early winter in

Puget Sound, which correlates with periods of Southern Resident killer whale prey availability. Gray whales are most likely to be observed from March 1 to May 31 in the Strait of Juan de Fuca and northern Puget Sound, which correlates to feeding in, and migration to and from, the biologically important gray whale feeding area.

Navy biologists will initiate communication with the appropriate marine mammal detection networks to help the Navy plan explosive mine neutralization activities involving the use of Navy divers, Unmanned Underwater Vehicle Training, Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises, and Small Boat Attack Exercises in a way that minimizes the potential exposure of Southern Resident killer whales or gray whales to these activities in applicable locations. The Navy will not implement this mitigation in locations where Southern Resident killer whale or gray whale presence (and associated potential impacts) are not expected. For example, the Navy will not obtain marine mammal detection network sightings information or coordinate with NMFS during Unmanned Underwater Vehicle Training event planning at the Dabob Bay Range Complex. The Dabob Bay Range Complex is located outside of Southern Resident killer whale critical habitat, and Southern Resident killer whales have not been reported there since 1995 (National Marine Fisheries Service: Northwest Region, 2006). Unmanned Underwater Vehicle Training events (and other activities that occur in the Dabob Bay Range Complex) are not expected to overlap with the occurrence of Southern Resident killer whales. The Navy will, however, limit the number of annual Unmanned Underwater Vehicle Training events in the locations with the highest probabilities of Southern Resident killer whale presence (the NAVY 3 OPAREA, NAVY 7 OPAREA, and Manchester Fuel Depot), based on seasonal density data. Seasonal awareness messages, in combination with obtaining marine mammal detection network sightings data and coordinating with NMFS biologists during the event planning phase, are expected to help the Navy avoid any potential impacts on Southern Resident killer whales during Unmanned Underwater Vehicle Training events.

Opportunistic sighting information is available for marine mammals in the Puget Sound and Strait of Juan de Fuca from non-governmental organizations, such as the Orca Network. The Orca Network manages a Whale Sighting Network website that archives past reports of visual observations of whales submitted by volunteers. The Orca Network focuses primarily on killer whales, but also features reports of other observed marine mammal species, such as gray whales. Another sighting network, the Whale Report Alert System, was established in 2018 by a conservation and research program known as the British Columbia Cetacean Sightings Network. The Whale Report Alert System relies on a network of volunteer observers to submit reports of cetacean sightings. Access to the Whale Report Alert System is granted to operators of ships, tugs, and ferries. Operators are alerted to the presence of whales with 10 NM of their vessel's location via text messages sent through the Whale Report Alert System app on their mobile devices, or by logging into a desktop version to obtain a map of recent sightings. Because the program is undertaken in partnership with the Government of Canada, reports have been predominately made in Canadian waters, but have also been made in some northern U.S. waters (typically near the northern San Juan Islands region). The program intends to extend its effective range southward in Puget Sound to strategically include U.S. waters as part of the dedicated observation area. A team of Navy Officers and biologists began participating with the Governor of Washington's Southern Resident Killer Whale Task Force in 2019, including the Vessels Working Group. As part of the Vessels Working Group, the Navy began investigating potential mechanisms for broadcasting Whale Report Alert System sightings of Southern Resident killer whales to Navy platforms conducting training or testing in NWTT Inland Waters. As the Whale Report Alert System continues to expand into U.S. waters,

the Navy will continue to explore the opportunity to engage with this sightings network as a future mitigation tool.

The Navy will also continue to assess the practicality of other available monitoring techniques as technologies advance. For example, there are limitations to the currently deployed hydrophone networks that would make implementing mitigation during Navy training and testing impractical (e.g., due to an inability to accurately geolocate acoustic detections); however, as part of the adaptive management process, the Navy will continue to assess these technologies as they mature. The Navy will provide information to NMFS about the status and findings of such assessments at the annual adaptive management meetings. Information about the Navy's adaptive management program is included in Section 5.1.2.2.1.1 (Adaptive Management).

The Navy will prohibit all explosive testing activities and all explosive training activities except explosive mine neutralization activities involving the use of Navy divers. The only locations where the Navy will allow the use of explosives in the mitigation area is the Hood Canal EOD Range and Crescent Harbor EOD Range. Mitigation to only use explosives during a single type of training at two designated locations and to prohibit explosives in bin E4 or above effectively reduces the locations, charge sizes, and overall annual number of detonations in the mitigation area. These mitigation measures are designed to avoid or reduce potential overlap of explosive activities within Southern Resident killer whale, gray whale, marbled murrelet, and ESA-listed fish habitat to the maximum extent practical.

Mitigation at the Hood Canal EOD Range to prohibit explosives in bin E3 in February, March, and April is designed to reduce potential exposures and level of impacts on juvenile Hood Canal summer-run chum salmon. As described in Section K.3.3.1.5 (Hood Canal Summer-Run Chum Salmon), this time period aligns with the juvenile migration period for Hood Canal summer-run chum. Mitigation to avoid using explosives in bin E3 to the maximum extent practical in August, September, and October is designed to reduce potential exposures and level of impacts on adult Puget Sound Chinook salmon and Hood Canal summer-run chum salmon. As described in Section K.3.3.1.4 (Puget Sound Chinook Salmon) and K.3.3.1.5 (Hood Canal Summer-Run Chum Salmon), this time period aligns with the adult migration periods for these species. Although charge size restrictions at the Hood Canal EOD Range are primarily designed to benefit Puget Sound Chinook salmon and Hood Canal summer-run chum salmon, they may also benefit other species, such as gray whales, rockfish, and marbled murrelets. Southern Resident killer whales have not been reported at the Hood Canal EOD Range since 1995 (National Marine Fisheries Service: Northwest Region, 2006).

Year-round mitigation at the Crescent Harbor EOD Range to not conduct explosive activities within 1,000 m of the closest point of land is primarily designed to avoid or reduce potential impacts on the Coastal-Puget Sound Distinct Population Segment of bull trout. As described in Section K.3.3.1.3 (Bull Trout), the nearshore waters in Skagit Bay, including waters at the Crescent Harbor EOD Range, provide a year-round migratory corridor for bull trout from their natal streams to other locations within Puget Sound or nearby watersheds to forage and overwinter (U.S. Fish and Wildlife Service, 2016). Although mitigation at the Crescent Harbor EOD Range is primarily designed to benefit bull trout, it may also benefit other species, such as Southern Resident killer whales (although they have not been observed regularly at the Crescent Harbor Explosive Disposal Range), gray whales, marbled murrelets, Puget Sound Chinook salmon, and rockfish.

Mitigation to prohibit all live fire training and testing activities in the mitigation area, including gunnery exercises, missile exercises, torpedo exercises, bombing exercises, and Kinetic Energy Weapon Testing,

will help the Navy avoid any impacts from explosives and non-explosive practice munitions on marine mammals, marbled murrelets, and ESA-listed fish throughout NWTT Inland Waters. The only firing activities that the Navy will conduct in the mitigation areas are those that involve firing blank small-caliber weapons. One of these activities, Small Boat Attack Exercises, will also implement mitigation to obtain marine mammal detection network data on Southern Resident killer whale sightings and coordinate with NMFS to determine the likelihood of Southern Resident killer whale and gray whale presence. Small Boat Attack Exercises involve high-speed Navy security force vessels that could overlap Southern Resident killer whale critical habitat and gray whale feeding or potential presence of migration habitat. While there is not a potential risk to these species from blank small-caliber weapons, mitigation for Small Boat Attack Exercises will help the Navy avoid potential impacts from high-speed vessel movements.

In addition to the resources described above, mitigation in the Puget Sound and Strait of Juan de Fuca Mitigation Area will also help the Navy avoid or reduce potential impacts on other resources within NWTT Inland Waters. For example, mitigation will help avoid impacts from active sonar, explosives, and physical disturbance and strike stressors in marine protected areas located within or along the shoreline of the Puget Sound and Strait of Juan de Fuca Mitigation Area, such as the San Juan Islands Marine Preserve, San Juan Island National Historical Park, San Juan County/Cypress Island Marine Biological Preserve, Ebey's Landing National Historical Reserve, Protection Island National Wildlife Refuge, Dungeness National Wildlife Refuge, Zella M. Schultz/Protection Island Seabird Sanctuary, and Nisqually National Wildlife Refuge. Additional information on marine protected areas is presented in Section 6.1.2 (Marine Protected Areas) of this Final Supplemental EIS/OEIS.

K.3.3.2.2 Operational Assessment

As described in Section K.3.3.2.1 (Biological Effectiveness), some training and testing elements necessitate that active sonar or explosive events be conducted in NWTT Inland Waters. For example, some events have mission requirements or testing program objectives that require access to facilities, test sites, established Navy ranges, safety infrastructure, or water depths and other environmental conditions that are only available in the Inland Waters portion of the Study Area. Therefore, these events cannot be shifted to (or replicated in) the NWTT Offshore Area. The Navy uses select locations in NWTT Inland Waters for these training and testing events because this portion of the Study Area provides valuable access to certain sea space and airspace conditions analogous to areas where the Navy operates or may need to operate in the future. For example, the Navy conducts Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises in conjunction with Department of Homeland Security units within NWTT Inland Waters because this portion of the Study Area provides the necessary environmental conditions for event realism. The Navy selects specific Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises locations and scenarios according to Department of Homeland Security strategic goals and evolving world events. It is critical for national security that the Navy maintain the flexibility to conduct this exercise in a variety of locations and seasons in NWTT Inland Waters. Mine Neutralization – EOD Training activities are conducted at the Crescent Harbor EOD Range and Hood Canal EOD Range because these locations provide the necessary conditions for water depth and other environmental parameters required for mission success and safe conditions for training Navy divers in the safe handling of explosive charges. The Navy chooses other training locations in NWTT Inland Waters based on proximity to training ranges (e.g., NAVY 3 OPAREA), available airspace (e.g., Chinook MOA A and B, avoiding airspace conflicts with major airports such as

Seattle-Tacoma International Airport), unobstructed sea space, and aircraft emergency landing fields (e.g., Naval Air Station Whidbey Island).

Testing locations are typically located near systems command support facilities, which provide critical safety, platform, and infrastructure support and technical expertise necessary to conduct testing (e.g., proximity to air squadrons). The testing community is required to install and test systems on platforms at the locations where those platforms are stationed. Naval Sea Systems Command testing sites and pierside locations offer a controlled static and sheltered environment that provides consistency for comparative data collection, which is critical for sonar maintenance and testing and for components of other critical testing activities. The Navy selects locations for acoustic and oceanographic research in NWTT Inland Waters based on areas that have ideal water depths for important research on shallow-water acoustic propagation. The Navy conducts activities at Naval Sea Systems Command testing sites in NWTT Inland Waters that cannot effectively or efficiently be conducted elsewhere in the Study Area or in other areas where the Navy trains and tests.

Training and testing schedules are based on national tasking, the number and duration of training cycles identified in the Optimized Fleet Response Plan and various training plans, forecasting of future testing requirements, and emerging requirements. When scheduling activities, the Navy also considers the need to minimize sea space and airspace conflicts throughout NWTT Inland Waters. The Navy schedules training and testing to minimize conflicts between its own activities and with consideration for public safety (e.g., safe distances from recreational boating activities). Daily fluctuations in training and testing schedules and objectives could mean that, on any given day, vessels or aircraft may depend on discrete locations of NWTT Inland Waters for discrete purposes. The Navy requires flexibility in the timing of its use of active sonar and explosives in order to meet individual training and testing schedules and deployment schedules. Navy vessels, aviation squadrons, and testing programs have a limited amount of time available for training and testing. The Navy must factor in variables such as maintenance and weather when scheduling event locations and timing. The schedules for testing events require flexibility because the testing community oftentimes has a need for rapid development to quickly resolve tactical deficiencies. Overall, training and testing schedules can be cyclical and are partially driven by geo-political situations, which precludes the Navy from implementing additional seasonal restrictions on the use of active sonar or explosives in NWTT Inland Waters.

Expanding geographic mitigation requirements in NWTT Inland Waters beyond what is described in Table K-4 would encroach upon critical water space where mission-essential training and testing activities are required to occur within this portion of the Study Area. For example, additional limitations on the use of active sonar and explosives would either entirely preclude the Navy from conducting certain activities (e.g., explosive mine neutralization activities) or would require the Navy to shift activities to alternative locations, such as to the NWTT Offshore Area. This would have significant impacts on safety, sustainability, and the ability to meet mission requirements within limited available timeframes. Likewise, requiring weapons system program managers and research, testing, and development program managers to use alternative areas within limited available timeframes would deny them the necessary flexibility to rapidly field or develop systems to meet testing program requirements and emerging requirements. Prohibiting explosive mine neutralization activities using Navy divers in NWTT Inland Waters would be impractical because such mitigation would prevent ready access to the only two EOD ranges where this activity can occur in the Study Area. Similarly, further restrictions on active sonar activities would prevent ready access to critical training and testing environments that are not available elsewhere in the Study Area or in other areas where the Navy trains

and tests. Such restrictions would diminish the ability for Navy Sailors to train and become proficient in using sensors and weapon systems as required in areas analogous to where the military operates (which would result in a significant risk to personnel safety during military missions and combat operations), would have a significant impact on the ability of units to meet their individual training and certification requirements (which would impact the ability to deploy with the required level of readiness necessary to accomplish any tasking by Combatant Commanders), and prevent program managers and weapons system acquisition programs from meeting testing requirements and required acquisition milestones.

In summary, the Navy developed the mitigation areas identified in Table K-4 to avoid or reduce potential impacts on marine mammals, ESA-listed fish, and ESA-listed seabirds in areas the best available science suggest are particularly important for foraging, migration, or reproduction in NWTT Inland Waters. Further restrictions on the level, number, or timing (seasonal or time of day) of training or testing activities in NWTT Inland Waters would be impractical due to implications for safety, sustainability, and mission requirements. The iterative and cumulative impact of mitigation measures that the Navy considered but eliminated, as described above and in Section K.3.4 (Geographic Measures Considered but Eliminated) and Section 5.5 (Measures Considered but Eliminated), would deny national Command authorities the flexibility to respond to national security challenges and for the Navy to effectively accomplish the training and testing necessary for deployment and maintaining military readiness.

K.3.4 Geographic Measures Considered but Eliminated

As described in Section K.3 (Geographic Mitigation to be Implemented), based on its ongoing analysis of the best available science and potential mitigation, the Navy developed additional geographic mitigation measures to supplement mitigation developed for the 2015 Final EIS/OEIS and the 2019 NWTT Draft Supplemental EIS/OEIS. Although the Navy was able to develop numerous additional mitigation measures for this Final Supplemental EIS/OEIS, the Navy eliminated some geographic measures recommended during scoping or public review of the 2019 NWTT Draft Supplemental EIS/OEIS and the consultation and permitting processes because they did not meet the appropriate balance between being both effective as well as practical to implement, as discussed in the sections below. Additional information on other measures considered but eliminated for the Proposed Action is presented in Section 5.5 (Measures Considered but Eliminated).

K.3.4.1 Developing Mitigation for Areas Outside the Study Area or the Scope of this Final Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement

The Navy develops mitigation measures specific to the Proposed Action for each of its environmental compliance documents. The Navy did not develop mitigation areas for activities outside the scope of this Final Supplemental EIS/OEIS, such as activities analyzed under separate environmental compliance documents and associated MMPA and ESA consultations. The Navy also did not develop mitigation areas outside the Study Area (e.g., in areas along the California coastline) because those areas would not overlap the locations where training and testing activities will occur under the Proposed Action; and therefore, would not be effective mitigation.

K.3.4.2 Developing Mitigation Outside the Navy's Legal Authority to Implement

The Navy did not develop mitigation areas that would be outside the Navy's legal authority to implement. For example, the Navy does not have legal authority to develop Marine Protected Areas to restrict commercial or recreational fishing.

K.3.4.3 Developing Mitigation Areas in Western Behm Canal

The Navy considered but did not develop mitigation areas in Western Behm Canal because further mitigation is not warranted based on the low potential for impacts from the types of activities conducted in that portion of the Study Area. For example, the Navy does not use explosives in Western Behm Canal. The limited use of active sonar is short-term, infrequent, and localized within the Southeast Alaska Acoustic Measurement Facility, which does not overlap key habitat areas of biological importance for marine species. Further analyses of potential impacts on marine species in this portion of the Study Area is presented in Section 3.3 (Marine Habitats), Section 3.4 (Marine Mammals), Section 3.7 (Marine Vegetation), Section 3.8 (Marine Invertebrates), Section 3.9 (Fishes), Section 3.10 (Cultural Resources), and Section 3.12 (Socioeconomic Resources and Environmental Justice).

K.3.4.4 Restricting All or Additional Active Sonar and Explosive Activities

The Navy developed a suite of geographic mitigation to avoid or reduce potential impacts on marine mammals, sea turtles, fish, birds, and seafloor resources from active sonar or explosives under the Proposed Action. The operational community determined that adopting additional geographic measures for active sonar and explosives would result in the unacceptable limitation of the Navy's utilization of sea space and airspace required to effectively support training and testing of naval forces in the NWTT Study Area. Prohibiting all or implementing additional restrictions on the use of active sonar or explosives would prevent the Navy from accessing its ranges, operating areas, facilities, or range support structures necessary to meet the purpose and need of the Proposed Action. For example, additional restrictions on the use of active sonar or explosives in NWTT Inland Waters would prevent the Navy from accessing areas vital to mission requirements, such as naval bases, operating areas, designated EOD Ranges, and testing facilities used for critical pierside sonar testing or maintenance and other training mission or testing program components. Similarly, additional restrictions on the use of active sonar in the NWTT Offshore Area (e.g., within 50 NM or other specified distances from shore), would prevent the Navy from accessing areas vital to mission requirements, such as the Quinault Range Site. Additional information is provided for the NWTT Offshore Area in Section K.3.2.2.2 (Operational Assessment) and for NWTT Inland Waters in Section K.3.3.2.2 (Operational Assessment).

K.3.4.5 Developing a Geographic Mitigation Alternative

As described in Section 2.4.1.4 (Alternatives Including Geographic Mitigation Measures Within the Study Area), the Navy considered but did not develop an action alternative for this Final Supplemental EIS/OEIS based solely on geographic mitigation that would impose geographic or temporal restrictions on specific areas in the Study Area, such as within the Olympic National Park or areas associated with the presence of specific species. As described in Section 5.1.1 (Benefits of Mitigation), the suite of mitigation measures included in this Final Supplemental EIS/OEIS represents the maximum level of mitigation that is practical for the Navy to implement when balanced against impacts to safety, sustainability, and the ability to continue meeting mission requirements. The Navy designed its alternatives development and mitigation development processes to ensure that the maximum level of mitigation that is practical to implement would be implemented, regardless of the action alternative selected. Developing geographic mitigation for both action alternatives is a more conservative (i.e., more environmentally protective) approach than developing geographic mitigation for one action alternative but not the other. Additional information about the Navy's alternatives development process is presented in Section 2.4 (Action Alternatives Development).

K.3.4.6 Developing Mitigation for Aircraft Overflights

The Navy considered but did not develop mitigation for aircraft overflights, such as shifting transit routes, relocating aircrew training activities, or modifying flight altitudes, because such mitigation would not be practical to implement due to implications for safety and mission requirements. The Federal Aviation Administration (FAA) controls the National Airspace System and routes that overlap the NWTT Study Area. The FAA designed the routes to efficiently manage air traffic in the region and to safely deconflict military traffic from commercial and general aviation aircraft, with consideration given to the presence of Canadian National Airspace and traffic to the north. The Navy assessed the viability of shifting the FAA-established transit route north (further over the waters of the Strait of Juan de Fuca) to increase the distance between populated areas and landmarks and military aircraft transiting to the Olympic MOA from Naval Air Station Whidbey Island. The potential benefit of such a shift would be a reduction of aircraft noise for communities and areas on the Olympic Peninsula located near the northern coast (e.g., Port Angeles, Olympic National Park, Olympic National Forest). The Navy communicated its interest in shifting the transit route to the FAA; however, the FAA determined that moving the transit route further north would have implications for safety, conflict with established U.S. and Canadian commercial air routes into several major regional airports as well as potentially encroach on Canadian airspace, and would shift aircraft noise to other communities and areas. Therefore, implementing mitigation to shift the transit route would be impractical due to increased safety risks and unacceptable impacts on the airspace systems in the U.S. and Canada.

The Navy also assessed the practicality relocating training to alternate locations outside the Olympic MOA. The Olympic MOA provides existing Special Use Airspace over the Olympic Peninsula that the Navy uses to meet training requirements by EA-18G squadrons home-based at Naval Air Station Whidbey Island. The EA-18G is a type of aircraft used for Electronic Warfare. Navy Electronic Warfare aircraft have been conducting training in the FAA-designated airspace over the Olympic Peninsula for over 40 years. The Navy's military readiness requirements necessitate the ability to train EA-18G aircrew for their primary mission within training areas in the Northwest. With the introduction of the more advanced EA-18G aircraft in 2008, augmenting the legacy Electronic Warfare transmitters to improve military readiness training has become a priority.

The Navy plans to use the Olympic MOA instead of other airspaces in the western United States for the NWTT Proposed Action because the Olympic MOA provides the closest existing Special Use Airspace that meets the Navy's requirement to enhance its basic Electronic Warfare training in the Pacific Northwest. The Olympic MOA is uniquely configured to support ground-based Electronic Warfare instrumentation needs. The volume of Olympic MOA airspace combined with the off-shore Warning Area provides sufficient airspace size to accommodate the Navy's training scenarios. The existing Navy facility at Pacific Beach is well-positioned in proximity to the Olympic MOA to accommodate placement of the fixed signal transmitter system and a location to host the mobile signal transmitter maintenance building. The Olympic MOA is a short (15 minute) flight from Naval Air Station Whidbey Island, enabling aircrew to maximize training time and minimize fuel burned transiting to and from their home base, while also reducing wear and tear on the airframes. The Olympic MOA is uniquely positioned because it offers access to off-shore sea-space to support integration with, and training requirements for, surface and subsurface naval units. National security requirements often necessitate naval operations that extend from sea to shore; therefore, the Olympic MOA offers a realistic training environment, in comparison to other land-locked training airspaces.

The Electronic Warfare signal equipment being used to support existing flight operations in the Olympic MOA is primarily intended to provide basic level training to aircrew in order to develop and maintain proficiency skills. This aircrew training does not involve the use of signal transmissions from the aircraft, commonly referred to as "jamming." The aircraft only train to find, localize, and identify signals. Advanced Electronic Warfare aircrew training will continue to be conducted in other established locations, such as Mountain Home Air Force Base, Naval Air Station Fallon, and Nellis Air Force Base, which offer more advanced instrumentation capabilities. However, the need to maintain basic proficiency requires regular training, and the frequency of this training cannot be efficiently maintained by routinely sending aircraft to these more distant locations for the reasons described above.

Additionally, the Navy considered establishing an altitude floor for flights in the Olympic MOA and adopting measures developed for other environmental compliance documents, such as adopting all or some of the noise abatement procedures developed for Growler aircraft under the EA-18G Growler Aircraft Operations Environmental Assessment (U.S. Department of the Navy, 2018c). That environmental assessment analyzed proposed activities for EA-18G at the Naval Air Station Whidbey Island complex. Activities involved takeoffs and landings (i.e., aircraft flying relatively low when crossing above residential or other sensitive areas close to an airport). Because aircraft produce their loudest noise during takeoff (when close to full power), the Navy developed a suite of noise limitation measures for the Naval Air Station Whidbey Island complex to reduce disturbance to residential or other sensitive areas situated close to the airport. In contrast to those activities, the Proposed Action of this Final Supplemental EIS/OEIS involves aircraft operating at altitudes of 12,000 to 18,000 ft. above mean sea level (MSL) when flying to and from the Olympic MOA. Within the Olympic MOA, approximately 95 percent of Navy training flight time occurs at or above 10,000 ft. MSL.

The remaining flights would operate at altitudes from 10,000 ft. MSL to a floor of 6,000 ft. MSL. The 6,000 ft. MSL floor within the Olympic MOA was established to adequately accommodate and provide maximum flexibility for the various types of military aviation training conducted under the Proposed Action. The volume of airspace down to 6,000 ft. MSL is critical in providing the necessary space, safety margin, and flexibility for aircraft to conduct maneuvering and other tactics requiring large altitude changes. The airspace is often divided horizontally or vertically to accommodate multiple aircraft activities. In the case of a vertical division, the volume of airspace below 10,000 ft. MSL will be utilized to provide sufficient volume to facilitate the training requirements of the lower assigned aircraft. Weather and cloud cover are also a significant factor in why the altitudes below 10,000 ft. MSL may be utilized and become necessary to conduct training missions within the Olympic MOA. Cloud coverage or weather may force aircraft to operate at lower altitudes to accomplish training requirements. Many training scenarios have specific weather and visibility separation requirements that must be adhered to meet training objectives or provide adequate safety of flight margins. This is especially important during winter months when weather on the Washington coast is fast-moving and unpredictable. As described in Appendix J (Airspace Noise Analysis for the Olympic Military Operations Area), Olympic National Park resources or visitors beneath the Olympic MOA might be able to detect infrequent noise from passing aircraft; however, the intensity of these intermittent noises would be relatively low, and disturbances from airborne acoustics on the Olympic MOA are expected to have a negligible impact on socioeconomic and biological resources.

K.3.4.7 Using Marine Mammal Detection Networks for Mitigation in the NWTT Offshore Area

As described in Section K.3.3 (Mitigation Areas for Marine Species in NWTT Inland Waters), the Navy developed new mitigation for this Final Supplemental EIS/OEIS that involves Navy biologists initiating

communication with the appropriate marine mammal detection networks prior to naval units conducting explosive mine neutralization activities involving the use of Navy divers, Unmanned Underwater Vehicle Training, Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises, and Small Boat Attack Exercises within the Puget Sound and Juan de Fuca Mitigation Area. Opportunistic near real-time sighting information is currently available for Southern Resident killer whales from a non-governmental organization known as the Orca Network. The Orca Network's Whale Sighting Network is limited to waters within the Puget Sound and Strait of Juan de Fuca (i.e., NWTT Inland Waters) and does not extend to waters offshore (i.e., the NWTT Offshore Area); therefore, at this time it is not possible for the Navy to use Orca Network sightings information for mitigation in the NWTT Offshore Area. As described in Section K.3.3.2.1 (Biological Effectiveness), the Navy is investigating the potential to coordinate with additional marine mammal detection networks for mitigation in NWTT Inland Waters, such as the British Columbia Cetacean Sightings Network's Whale Report Alert System and passive acoustic hydrophone networks, which are currently either not fully available in U.S. waters or are limited by current technological capabilities. As technologies advance, and if detection networks expand their coverage to waters, the Navy will continue to assess the practicality of engaging with marine mammal detection networks as a future mitigation tool in the NWTT Offshore Area. The Navy will provide information to NMFS about the status and findings of such assessments at the annual adaptive management meetings. Information about the Navy's adaptive management program is included in Section 5.1.2.2.1.1 (Adaptive Management).

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