



DEPARTMENT OF THE NAVY

COMMANDER
UNITED STATES PACIFIC FLEET
250 MAKALAPA DRIVE
PEARL HARBOR, HAWAII 96860-3131

5090
Ser N465/1197
5 Nov 15

From: Commander, U.S. Pacific Fleet (N465)
To: Sanctuary Superintendent, Olympic Coast National Marine
Sanctuary, National Oceanic and Atmospheric Administration
Via: (1) Office of Protected Resources, National Marine Fisheries
Service

Subj: REPLY TO OCNMS LETTER FOR THE NAVY'S NORTHWEST TRAINING AND
TESTING CONSULTATION

Encl: (1) Navy-NMFS technical response
(2) Navy-NMFS BIA analysis
(3) Navy NWTTC FEIS Chapter 5 Mitigations

1. Pursuant to section 304(d) of the National Marine Sanctuaries Act (NMSA), Navy and NMFS respond to the Olympic Coast National Marine Sanctuary's (OCNMS) letter dated October 23, 2015 regarding the Navy's Northwest Training and Testing (NWTTC) consultation.

2. The Navy wishes to reiterate that continued naval training and testing is compatible with the Sanctuary. The Sanctuary letter expressed desire to formalize "exclusion" from OCNMS waters. Navy activity within the Sanctuary is lawful. Natural resource conservation within the Sanctuary and Navy activity are not mutually exclusive. There is no science to support Navy activities have been detrimental to any Sanctuary resource. One of the many purposes meant to be considered with the primary objective of the NMSA of resource protection is to facilitate compatible public and private uses not otherwise prohibited (Section 301 (b)(6)).

3. The Navy recognizes that permanent threshold shifts (Level A harassment) involve some tissue damage and a permanent reduction in hearing sensitivity and agrees that these affects should be considered injurious to an individual marine mammal. However, the Navy's position remains that Level B harassment takes should not be characterized as an injury to sanctuary resources as they do not constitute physical injuries to the species.

4. The Navy continues to appreciate a dialogue with the Sanctuary on how to continue multi-use of the sanctuary for purposes of ensuring Navy capabilities in areas of vital bathymetry which are important to realistic training and testing are maintained, as these activities are authorized under the law and regulations that designated the Sanctuary.

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Navy is appreciative of the thoroughness of the response. Navy staff was surprised by some of the discourse on acoustic and biological sciences, since our annual discussions with the Sanctuary staff have not addressed some of these issues to date. We welcome this level of continued dialogue in our routine annual discussions in person.

5. Since the focus of the injury assessment by OCNMS was the potential for incidental harassment of marine mammals by impulsive and non-impulsive acoustic sources, the Navy wishes to provide, as part of the response, further mitigation and monitoring information which the Navy committed to through discussion with the National Marine Fisheries Service (NMFS) associated with the NWTT Final Rule and finalization of the Environmental Impact Statement (EIS).

a. Enclosure 1 contains the Navy and NMFS's' responses to OCNMS recommendations.

b. Enclosure 2 contains an analysis of the overlap of Navy training and testing activities with the NMFS identified biologically important areas (BIAs) for humpback and gray whales feeding and/or migration. This analysis was excerpted from information provided by the Navy to NMFS during the NWTT MMPA consultation. Since some of the BIAs overlap with the OCNMS, and are referred to in the OCNMS letter response, enclosure 2 demonstrates the Navy's full consideration of these areas and why there is likely no potential for injury to marine mammals feeding or migrating through these areas.

c. Enclosure 3 contains the Chapter 5 Mitigation section of the NWTT FEIS/OEIS. Some adjustments to mitigations are contained in Chapter 5 based on related discussions with NMFS that occurred after the submittal of the Navy's and NMFS' Sanctuary Resource Statement. The full FEIS/OEIS is now publically available at: <http://nwtteis.com/>

6. The Navy and NMFS appreciate your attention to this important project. If you have additional questions, points of contact for this information are Ms. Andrea Balla-Holden at (360) 710-0221 or andrea.ballaholden@navy.mil and John Fiorentino at (301) 427-8477 or john.fiorentino@noaa.gov.



L. M. Foster
Director, Environmental Readiness
By direction



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Liam Antrim, Sanctuary Superintendent,
Olympic Coast National Marine Sanctuary
115 East Railroad Avenue, Suite 301
Port Angeles, WA 98362-2925

NOV 09 2015

Subject: Response to OCNMS Letter regarding Marine Mammal Protection Act
Authorization for Navy's Northwest Training and Testing

Dear Liam,

Thank you for the additional information and recommendations provided in the Olympic Coast National Marine Sanctuary's (OCNMS) letter dated October 23, 2015 regarding the Navy's Northwest Training and Testing (NWTT) activities and the National Marine Fisheries Service's (NMFS) Marine Mammal Protection Act (MMPA) Authorization for those activities.

NMFS' Office of Protected Resources (OPR) conducted an independent assessment of the recommendations provided by the OCNMS pursuant to Section 304(d) of the National Marine Sanctuaries Act. NMFS staff met with Navy staff to ensure that we had all of the operational and technical information needed to address the OCNMS letter. Through discussion with the Navy of NMFS's evaluation and responses, we determined that it would be appropriate to reply jointly to the recommendations provided by the OCNMS. Therefore, with this letter, we are indicating our concurrence with the enclosures attached to the Navy's reply to the OCNMS letter.

NMFS fully considered the OCNMS recommendations within the context of our authority pursuant to the MMPA. As described in the enclosed, we determined that the final suite of mitigation measures included in the MMPA final rule will effect the least practicable adverse impact on the affected species or stocks and their habitat. However, we also provide clarification here that NMFS will be adding a reporting measure to the Navy's Letter of Authorization that requires they provide information in their annual classified exercise report indicating the amount of hull-mounted mid-frequency and high frequency active sonar used in the OCNMS. Further, we would like to clearly affirm that we will be including Sanctuary staff and consideration of Sanctuary concerns in the Navy adaptive management process.

If you have additional questions, please contact John Fiorentino, Office of Protected Resources, National Marine Fisheries Service, at 301-427-8477 or john.fiorentino@noaa.gov.

Sincerely,

Donna S. Wieting, Director
Office of Protected Resources



NMFS-Navy Technical Response

Before responding to OCNMS' recommended alternatives, Navy would like to address some technical points raised in the OCNMS response to provide correction or clarity. Those points are as follows:

1. Statement found on page 6. *"Balancing this estimate of low spatial overlap with OCNMS, however, is the fact that training activities include some of the highest intensity (dB) sources used in NWTT activities."*

Navy Response. That statement is an over-statement of the effects of Navy activities. Only three of the six training event types use the higher powered mid-frequency hull-mounted sonar [Table 2 of SRS, "Anti-Submarine Warfare Tracking Exercise - Surface (TRACKEX - Surface ship)"; "Surface Ship Sonar Maintenance", "Submarine Sonar Maintenance"]. The other three events use limited duration, lower power sonobuoys in the mid-frequency range whose sound would not propagate as far as hull-mounted sonar. In reality, any offshore use of sonobuoys from "Anti-Submarine Warfare Tracking Exercise - Maritime Patrol Aircraft (TRACKEX - MPA/MMA)" and Anti-Submarine Warfare Tracking Exercise - Maritime Patrol Aircraft (TRACKEX - MPA/MMA MAC) would be much less likely to propagate into the Sanctuary. There would be limited to almost no active sonar used during "Anti-Submarine Warfare Tracking Exercise - Submarine (TRACKEX - Sub)" which are mostly done with passive sonar.

Therefore, of the total offshore training events in NWTT (n=524), in reality only 19% would include higher powered mid-frequency hull mounted sonar. That estimate percentage is possibly an over-estimate because most ship and submarine maintenance could occur pierside and would never propagate into the sanctuary. It remains unlikely that 19% of the total events would occur within or close to the 2% of the range that overlaps Sanctuary because of other factors considered when selecting locations to conduct these types of training events.

2. Statement on Page 10. *"However, we are concerned that potential for take of these species [humpback whale, gray whale] within these areas [BIAs] is not being accurately reflected in the take quantification for OCNMS."*

Navy Response. The Navy estimated what portion of marine mammal exposures would occur in the Sanctuary using a simple method that made best use of the available data. As noted in the Sanctuary's letter, the Navy's effects model was never designed to account for effects to small discrete ocean areas, but designed to provide an overall estimated exposure throughout the offshore NWT area given all the model constraints listed in the NWT EIS/OEIS.

The Navy disagrees that the apportionment method under estimated training takes within the OCNMS. In fact, it is more probable the apportionment method either overestimated takes or serves as a close appropriate surrogate for takes given how modeling was conducted in the NWT analysis (i.e., distance of training model boxes from shore, limited number of training events, conservative model assumption, implementation of mitigation, etc.).

A different approach might have led to slight individual take variation by species, but total cumulative exposures would likely be the same as currently in the Navy's and NMFS' SRS. For two species, humpback whales and gray whales, NWT training (all activities, all areas including the majority outside of OCNMS) was estimated to only result in a total of 12 and 6 predicted annual exposures, a very small number overall in terms of previous Navy MMPA consultations. It would therefore be understandable that only a small subset, if any, of these takes would occur within the OCNMS.

3. Statement on Page 11. *"In addition, the head of Quinault Canyon...."*

Navy Response. The Navy would caution drawing conclusions about "hot spots" and assumptions of importance based on limited and focused studies without review of the best available science. Mere detection of an animal within an area is not an indication that the animal preferentially uses the area. The Navy is familiar with the studies referred to in this paragraph. Most were conducted under Navy funding. These studies mainly suggest the occurrence or use of an area by some species, not high concentrations or specific biological activities that would lead to biologically meaningful impacts. Additionally, using data from single Navy funded passive acoustic monitoring device is inappropriate to determine if one particular ocean area is more important than another, when in fact beaked whales and other species are likely to occur at multiple locations on the shelf, along slopes, in canyons, and offshore at various times of the year depending on species.

More complete visual or passive acoustic coverage at other U.S West Coast locations would likely document just as much occurrence of beaked whales as those locations in and outside of the sanctuary. Nor is the important concept of residence time discussed. Reviewing the Navy funded passive acoustic monitoring reports confirms the presence of three species of beaked whales, but in looking at the time series of detections, there were not a lot of detections (as compared to other Navy studied sites), and several species showed patterns of seasonal occurrence. The Navy funded work cited in Hanson et al. 2015 for Southern Resident killer whales should also be viewed in the context of the animal's overall movement, which for Southern Residents is very coastally focused. As would be expected for a species focused on salmon prey, highest concentration of Southern Residents is associated with the Columbia River mouth and Westport, with declining occurrence further onto the shelf, including Quinault Canyon. This of course does not preclude short-term occurrence of any species, including Southern Residents in closer proximity to the Quinault Canyon. Since 2004, Navy funded passive acoustic monitoring, which includes killer whale detections, have consistently shown a higher killer whale detection/occurrence at a shelf site within OCNMS vice at an off shelf site at the head of Quinault Canyon (Rice et al. 2015). Rice et al. (2015) documented for the period January 2011-April 2014 only three days (one in March, May, and June) of Resident killer whale detections at the Quinault Canyon site (Figure 1).

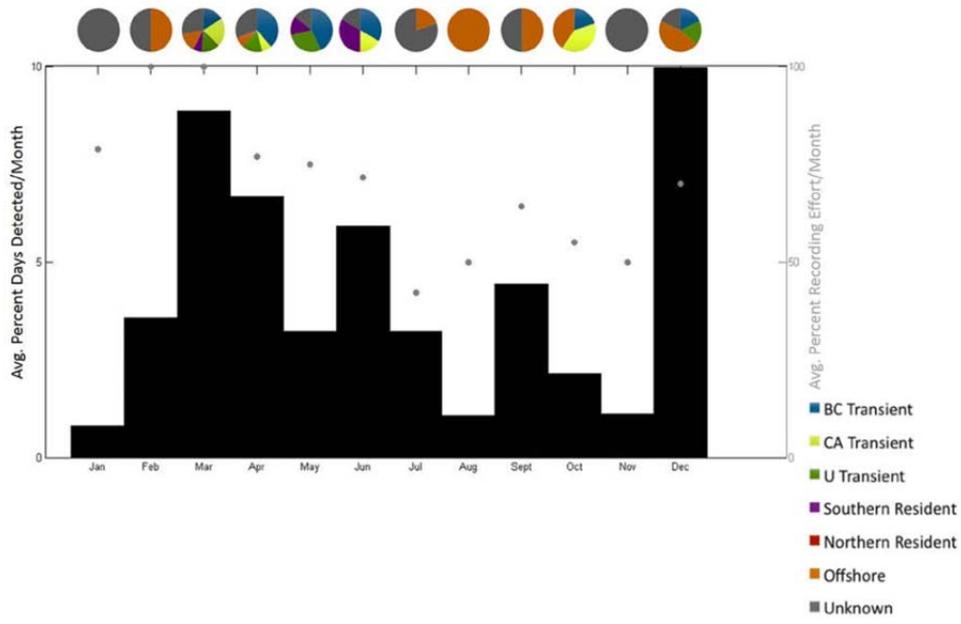


Figure 1. Presence of killer whale ecotypes at site QC from January 2011 – April 2014 (top) (Rice et al. 2015)

Rice, A., V. Deecke, J. Ford, J. Pilkington, S. Baumann-Pickering, A. Debich, J. Hildebrand, A. Sirovic. 2015. Seasonality of killer whale (*Orcinus orca*) ecotypes in the Northwest Training Range Complex. Marine Physical Laboratory, Scripps Institution of Oceanography, University of California San Diego. MPL TM-558. June 2015.

4. Statement on Page 12. Within the second paragraph: "*There is more take of harbor porpoises and beaked whales in OCNMS estimated for Navy training than testing activities...*"

Navy Response. The opening part of this sentence is only partially correct. There are more annual training takes to harbor porpoise than testing based on the conservative (i.e., the over estimation) of takes used to populate the SRS training incidental take table (700 training vs. 498 testing).

But there is more annual testing incidental takes to beaked whales (cumulatively to 2 species and 1 species guild; 59 testing vs. cumulatively 47 training).

OCNMS Recommendations Response

In the October 23, 2015 letter, OCNMS outlined five recommended alternatives. The OCNMS recommendations are shown below followed by the Navy's and NMFS' response to each.

1. [OCNMS]. *"Navy training activities should be modified to reduce, and when possible, to eliminate likely injury to sanctuary resources in the form of incidental harassments of marine mammals. Exclusion of OCNMS waters from training events would formalize the Navy's apparent avoidance of sanctuary waters, including biologically important areas (BIA) for baleen whales that overlap the sanctuary waters, ensuring the Navy's protection of acoustically sensitive humpback whales as well as other marine mammals within the sanctuary."*

Navy Response. The Navy has committed not to conduct any in-water explosive exercises within the OCNMS. The Navy's training activities within sanctuary waters already occur at the minimum levels required to meet necessary training requirements and with sufficient mitigation to reduce and eliminate any potential for injury (Level A take). Navy activity within the Sanctuary is lawful. Natural resource conservation within the Sanctuary and Navy activity are not mutually exclusive but are compatible. As detailed in Enclosure 2, very few incidental harassment takes are expected to result from activities within BIAs, and the nature of the Navy's activities in these areas along with the mitigation measures that will be implemented would result in the least practicable adverse impacts on the species and their habitat under the MMPA. The regulations implementing the OCNMS prohibit the taking of marine mammals except as authorized by the MMPA and the ESA. The Navy has consulted with NMFS under the MMPA and ESA and will conduct its activities in accordance with all relevant incidental take authorizations. Further, the Navy, to the extent practical, considers sanctuary proximity in planning at-sea training activities.

Complete avoidance of acoustic training activity within important feeding and migrating areas or the entire Sanctuary is not practicable, as the OCNMS overlays the entire littoral waters area of the northern Washington coast. Given the location of the Sanctuary outside the Strait of Juan de Fuca, complete training avoidance could create safety concerns by forcing the Navy to delay maintenance and systems checks until ships are farther from shore and homeport infrastructure that could have assisted in addressing potential technical issues. To reiterate, the Navy already takes Sanctuary location into account and minimizes acoustic training activities to the maximum extent practicable.

2. [OCNMS]. "The Navy and NMFS should designate a stand-off distance for OCNMS water for training activities that achieves a meaningful reduction* in harbor porpoise and beaked whale takes, and eliminates all takes of other species including killer whales, to the maximum degree possible.(for the purposes of these recommendations, a meaningful reduction minimizes, to the degree possible, the total number of takes and the number of takes categorized as level A verses level B, as predicted through exposure modeling conducted and applied by the Navy and NMFS in their assessment of likely impacts to sanctuary resources)."

Navy Response. The Navy recognizes that permanent threshold shifts (Level A harassment) involve some tissue damage and a permanent reduction in hearing sensitivity, therefore, the Navy agrees that these affects should be considered injurious to an individual marine mammal. However, the Navy's position remains that Level B harassment takes should not be characterized as an injury to sanctuary resources as they do not constitute physical injuries to the species. The Navy reiterates the SRS conclusions that any marine mammal behavioral reactions (Level B takes) to NWT training activities would be transitory, infrequent, non-cumulative, and impacts are not expected to decrease overall individual fitness or result in long-term population-level impacts on any given population.

The Navy's and NMFS' Sanctuary Resource Statement (SRS) already states in Table 5 there are no predicted Level A incidental takes from Navy training activities near the OCNMS to any marine mammal species. Therefore, Level A takes are already minimized/eliminated. The amount of Level B take by species/guild ranges from zero to 10s of takes for all species, except harbor porpoise. The estimated amount of Level B take to harbor porpoise is ~ 700 exposures.

Given the lack of scientific data on harbor porpoise reactions to sonar, a conservative 120 dB step function threshold was used in the Navy's acoustic impact modeling for harbor porpoises. Unlike more refined risk function curves for other species, the 120 dB step function means that mathematically any exposure greater than 120 dB results in a take under the Marine Mammal Protection Act. However, as stated in the NWT Final Environmental Impact Statement/Overseas Environmental Impact Statement (FEIS) and in the NWT Final Rule, the majority of these takes from a distant source would occur in the very lowest levels that exceed the threshold, and would be biologically insignificant in context of individual animal fitness and the overall fitness of the population.

As OCNMS noted, the low threshold results in very wide areas being ensonified, greatly increasing the potential for harbor porpoise exposure. Given these wide areas, stand-offs from the OCNMS are impractical and would be ineffective in reducing exposure of harbor porpoises to Navy activity. On page 3.4-154 of the NWT FEIS, the Navy states the range to the 120 dB isopleth could be up to 100 nm. Because harbor porpoise occur some distance from shore which for modeling purposes was conservatively set as the 200 m contour, this would require moving training activities over 150-200 nm from the coast to "meaningfully" reduce harbor porpoise exposure, at least from a modeling perspective. Operating at this distance

from shore would adversely affect training, personnel safety, increase the amount of fuel burned (climate change impacts), and increase the amount of time needed to conduct routine brief training events. Specifically, moving further offshore during Navy training could create safety concerns by forcing the Navy to delay maintenance and systems checks associated with training until ships are farther from shore and homeport infrastructure that could have assisted in addressing potential technical issues.

Level B takes to beaked whales (2 species and one species guild) within or near the OCNMS are already relatively small, with an annual total of 47 predicted. Similar to harbor porpoises, the Navy uses a step function to predict behavioral takes to beaked whales. The threshold for this step function is 140 dB SPL re 1 μ Pa. A buffer zone of 10s of kilometers from the Sanctuary boundaries would be necessary to try to preclude any exposure of beaked whales within or near the OCNMS at this threshold level. As stated previously, moving further inshore would not provide the necessary bathymetry to conduct these training activities and moving further offshore could adversely affect training, and would result in significant safety concerns. Additionally, the use of buffers which result in training moving further offshore, while potentially reducing impacts to near shore sanctuary resources (i.e., harbor porpoise and gray whales) would likely increase overall impacts to species such as beaked whales (which prefer deeper waters). It would also increase takes to other offshore or deep water associated species, including the following endangered species: sperm whales, sei whales, fin whales, blue whales. Therefore, the use of buffers would not necessarily reduce the overall take but would just shift the locations and species in which take was occurring. Also, because marine mammals are dynamic species which can utilize large areas of the ocean environment exposures occurring to individuals further offshore may still be individuals that also use the OCNMS so the net exposure to the animals will remain the same.

Lastly, there are no predicted takes to killer whales within the OCNMS from Navy training activities (Table 5 of STS). Therefore, the Navy has already eliminated all takes to this species as requested by the OCNMS.

3. [OCNMS]. *"The Navy and NMFS should seek meaningful reduction of testing-associated takes within OCNMS, which could be accomplished through a variety of means. These means are best identified by the Navy due to their partly classified knowledge of the conditions required for specific testing activities and the specific source types used in testing activities. Meaningful reduction in takes in OCNMS resulting from testing could be achieved by (in isolation or in combination:*

a) Reducing the total number of testing activities within or in close proximity to OCNMS (theoretically focusing on those that are less dependent on OCNMS-specific conditions).

b) Reducing the total duration of all types of testing activities within or in close proximity to OCNMS (theoretically focusing on those that are less dependent on OCNMS-specific conditions).

c) Reducing or eliminating (when possible) the use of higher frequency and lower frequency source types associated with activities within or in close proximity to OCNMS.

d) Eliminating Level A and reducing Level B takes occurring within Quinault Canyon. Given the placement of the canyon within the Quinault Range Site and the possibility of beaked whale takes in the Quinault Canyon resulting from distant testing sources, OCNMS recommends a stand-off distance for Quinault Canyon for testing activities that achieves a meaningful reduction in beaked whale takes, and eliminates takes of other species to the maximum degree possible."

Navy Response. The testing community is already minimizing use of the OCNMS, including Quinault Canyon, to occasions when use is mission-essential. The parameters which define whether testing must be conducted in the specific ecozones of the Sanctuary are a function of test requirements to accurately evaluate the systems in specific field conditions similar to those where they are intended to operate. The duration of acoustic emissions during a test is defined by successfully collecting enough data to satisfy the test requirements.

The Navy does not transmit acoustic emissions in excess of that needed to determine if the system is able to meet performance and other specification requirements. The intensity and frequency of the acoustic sources used as part of a test are requisite to address specific engineering questions. Further reductions in the number, duration or intensity of testing events occurring within the Sanctuary is not feasible as part of the NWT action while still allowing the Navy to fulfill its Title 10 requirements.

The Navy is not able to establish a stand-off distance for Quinault Canyon for testing activities. The bathymetry of the canyon is required to conduct some tests; the Navy does not conduct testing in the canyon unless necessary to meet testing objectives.

Beaked whales are generally known to occur in the vicinity of canyons, slopes, and other bathymetric features; however, Navy monitoring data do not necessarily indicate a higher concentration of beaked whales in Quinault Canyon. Other areas along the Washington coast are likely to have similar beaked whale occurrence. Furthermore, Level B (mostly behavioral) incidental takes to beaked whales estimated within the OCNMS (2 species

Enclosure 1

and one species guild) are relatively small, less than a several dozen cumulatively (n=59 annually).

The Navy will manage its activities to not exceed an amount of modeled take from those activities that is higher than the authorized amount of take under the MMPA and ESA. The methodology used to assess the number of Level A and Level B incidental takes under MMPA includes a number of conservative factors, therefore, the number of potential takes is likely higher than may ever occur.

Through the Navy's integrated monitoring program in compliance with MMPA and Navy's general commitment to better understanding how sonar affects marine mammals and how marine mammals use their environment, the Navy continues to evaluate new ways to determine the effects of its activities in all environments where realistic training and testing is necessary.

4. [OCNMS] *"Monitoring and reporting should be further developed to ensure that future consultations have the benefit of information that can be applied at the scale of the sanctuary. Specifically, the Navy should collect and report more information regarding the number of testing and training events that are conducted within or in close proximity to OCNMS by year, such that predictions of annual take can provide assessments of actualized annual takes within OCNMS."*

Navy Response. The Navy, as required by existing MMPA authorizations and ESA Section 7 consultation documents, has provided annual classified exercise reports to NMFS since 2011. Any MMPA regulations and LOAs authorizing take of marine mammals incidental to the Navy's training and testing activities in the NWT Study Area from November 2015 to November 2020 would continue to require the submission of annual classified exercise reports. This report would describe the level of training and testing conducted and provide a summary of sound sources used. Pursuant to discussions with NMFS that occurred after the submission of the SRS, the report would also include the amount of hull-mounted mid-frequency and high-frequency active sonar use during training and testing activities in the months specified for the following three feeding areas (to the extent that active sonar training or testing does occur in these feeding areas): the Humpback Whale Northern Washington feeding area (May through November); the Stonewall and Heceta Bank feeding area (May through November) and the Gray Whale Northern Puget Sound Feeding Area (March through May). Of these three areas indicated above, only a portion of the Humpback Whale Northern Washington feeding area overlaps with the OCNMS. Please see Enclosure 2 which contains an analysis of the overlap of Navy training and testing activities with the NMFS identified biologically important areas (BIAs) for humpback and gray whales feeding and/or migration.

It is possible that the Navy can provide break out sections within the annual classified exercise reports indicating whether sonar was used within or in close proximity to the geographic boundaries of the Sanctuary. However, OCNMS staff must indicate interest in receiving these classified reports and provide a staff person willing and able to acquire clearance. Secure storage for any classified reports would also be required. Once clearance is able to be obtained, the Navy would provide that OCNMS representative with the same classified reports currently provided to NMFS. However, classified information will not be able to be further transmitted to people without need to know and adjudicated security clearance. While these reports would provide a broad assessment of if sonar use may have occurred within or near the Sanctuary, the data would not be able to provide the exact amount of acoustic energy propagated into the Sanctuary (since sound propagation is dependent upon very variable conditions) or whether there were actual marine mammal exposures within the Sanctuary (since perfect knowledge of marine mammal occurrence at the time of sonar use is not possible). Navy passive acoustic monitoring over the past five years has shown very little mid-frequency sonar propagated to the Sanctuary, and the limited amount that does is at low receive levels (on average <120 dB).

Enclosure 1

5. [OCNMS] *"Passive acoustic monitoring within the OCNMS should continue during the next five-year (2015-2020) NMFS authorization period. Associated with mitigative recommendations presented in this consultation, OCNMS recommends a stand-off for the sanctuary as a whole from training activities that would reduce exposures of coastal species in the sanctuary, as well as stand-off for testing in the Quinault Canyon specifically that would reduce exposures for populations using or with preference for that unique habitat. This monitoring should focus on:*

a) Continued information gathering to support the design of these stand-offs and to monitor their effectiveness via continuation of long term monitoring stations. We recommend that passive acoustic installation with higher frequency as well as lower frequency capacity continue to be maintained within or near the Quinault Canyon.

b) Inshore passive acoustic installations should be maintained in the northern sanctuary associated with the multiple baleen whale BIAs, the hot spot of marine mammal activity associated with the Western Strait of Juan de Fuca and movement of Southern Resident killer whales between the inshore and offshore portions of NWTRC. These installations should cover the frequency range necessary to monitor exposure in that area to Navy source activity as well as vocal behaviors/presence of low, mid and higher frequency cetacean species."

Navy Response.

As stated in the SRS, the Navy funded the deployment of two bottom-mounted passive acoustic recording devices within and adjacent to the sanctuary from 2004-2015. These devices have a low-to-high frequency recording capability (10 Hz-100 kHz). Therefore, low frequency cetaceans (ex. blue whale), mid-frequency cetaceans (ex. killer whale), high-frequency cetaceans (ex. harbor or Dall's porpoise), and mid- and high-frequency sonar can be detected. Anthropogenic broad band sounds from non-Navy civilian commercial shipping, and commercial and recreational fishing are also detected.

This project represented an approximately \$2.5 million investment on the Navy's part. After 10 years of monitoring, it was found that relatively little mid-frequency active sonar propagated into the sanctuary (a few minutes to a few hours cumulatively annually), and it was all at low received levels, often below 120 dB - well below a level of potential incidental take (Level B harassment).

At annual adaptive management meetings between NMFS (MMPA & ESA staff) and Navy in 2014 and 2015, Navy and NMFS agreed to restructure the Pacific Ocean basin monitoring program to focus on species-specific study questions instead of simple presence/absence data collection for all marine mammals and Navy sonar occurrence. Almost all anthropogenic sounds (ship noise, fathometers, explosions) detected by this monitoring has been associated with civilian activity (i.e., commercial shipping, commercial and recreational fisheries).

As part of this restructuring of Navy funded monitoring for NWTT, a decision was agreed upon between Navy and NMFS to end the existing passive acoustic data collection in these locations beyond 2015. This decision was made based on 1) the assessment that sufficient information had been collected on species occurrence, sonar detections, and baseline soundscape information within these areas in the previous 10 years of monitoring¹, and 2) allowed shifting of funding and resources toward new NWTT specific study questions. During this same time period, the overall process in which monitoring projects were selected for funding was re-vamped to ensure: 1) improved coordination amongst all the geographic monitoring areas; 2) reduce duplication of effort; and 3) improve the return on investment. As a result, regional monitoring investments have to be balanced against the backdrop of Navy-wide monitoring needs within all the geographic locations in which the Navy operates, as well as available annual budgets. The Navy annually determines monitoring investments in order to continually assess and evaluate our progress towards meeting the goals of the monitoring program as defined under the NMFS MMPA and ESA consultations. All monitoring decisions are coordinated with NMFS staff as part of our adaptive management process.

As a result, a unilateral obligation to continue funding static passive acoustic devices at multiple locations within the sanctuary does not align with current Navy commitments, and cannot be fiscally supported in the near future given other Navy monitoring commitments elsewhere. Additionally, further data collection in these locations would be unlikely to inform any stand-off or effects discussion given the previous 10 years' worth of efforts showing a lack of meaningful Navy sound propagation into the sanctuary. Lastly, the deployment of bottom-mounted devices along the shelf, to potentially sample Quinault Canyon, have been subject to continued deployment issues in the past including lost recording time due to high bottom current stress on sensors, and interaction with periodic bottom commercial fisheries. At least one device lost over the previous 10 years of monitoring effort was inadvertently dragged by bottom fishers to an inaccessible location. Therefore, any deployment of shelf-based devices can be problematic given the potential for data or device loss.

¹ By way of example, the 2015 technical report reported detections for the period from July 2013 to April 2014 of: "Three baleen whale species were detected: blue whales, fin whales, and humpback whales. Seasonal patterns for Northeast Pacific blue whale B calls, fin whale 20 Hz calls, and humpback whale calls were similar, all showing peaks during the winter months. In contrast, blue whale D calls were only detected in July 2013 at site CE... echolocation pulses from three beaked whale species were detected at the offshore site QC. Stejneger's beaked whale detections were more common than any other beaked whale signal recorded in this monitoring period and peaked in January 2014. Cuvier's beaked whales were infrequently detected during the winter months, while Baird's beaked whale detections occurred intermittently throughout the monitoring period. Killer whale detections predominantly occurred at [shelf] site CE and peaked in August 2013. Unidentified porpoises were detected in low numbers at site CE in July 2013.... Mid-frequency active (MFA) sonar was rare, with only a single detection occurring in January 2014 [at the offshore site QC]. Explosions, most likely from fishery-related seal bombs, were detected throughout the deployment at [the shelf] site CE, with a peak in detections in August 2013."

From: Trickey, J.S., S. Baumann-Pickering, A. Širović, J.A. Hildebrand, A. M. Brewer, A.J. Debich, S. Herbert, A.C. Rice, B. Thayre, S.M. Wiggins. 2015. Passive Acoustic Monitoring for Marine Mammals in the Northwest Training Range Complex July 2013 – April 2014. Marine Physical Laboratory, Scripps Institution of Oceanography, University of California San Diego. MPL TM-557. 44 p

As part of new monitoring going forward, the Navy has committed to funding coastal Southern Resident killer whale monitoring. The Navy has invested approximately \$800,000 in fiscal years 2014 and 2015 for continued leveraged work with NMFS on coastal Southern Killer whale passive acoustic detection and habitat modeling. However, the long-term effort of this project is under the direction of the NMFS and is part of their overall mission for this species. The Navy's participation with the project was designed to accelerate new data collection and analysis to inform the pending coastal water critical habitat designation for this species. In consideration of overall monitoring goals and in adaptive management collaboration with NMFS, the Navy may continue monitoring for this project throughout the entire pending NWTT authorization period, but that commitment is not finalized and subject to annual review. Long-term monitoring of Southern Residents remains a part of NMFS' core mission.

The Navy is also supporting surveys to document marine mammal occurrence and population data within Puget Sound. Additional details about the Navy's monitoring program can be found at www.usnavymarinespeciesmonitoring.us

In conclusion, the Navy cannot commit to extending the deployment of passive acoustic devices within the sanctuary at this time. However, the Navy is open to continued dialog with OCNMS about monitoring, which the Navy and NMFS could take into consideration the annual adaptive management meetings in 2017 and 2018 within our existing assessment framework for selecting monitoring projects. This time interval would also allow for the maturation of novel new passive acoustic technologies and sensors, call classifiers, and analytical protocols transitioning from the Navy funded research programs. For instance, demonstration/validation field tests of underwater gliders equipped with broad-band passive acoustic sensors have shown promise and could provide larger spatial coverage (something a static single passive device cannot provide) in the future.

BIA Analysis from Final Rule

The final products, including U.S. West Coast BIAs, from this mapping effort were completed and published in March 2015 (Aquatic Mammals, 2015; Calambokidis et al., 2015; Ferguson et al., 2015a, 2015b; Van Parijs, 2015). 131 BIAs for 24 marine mammal species, stocks, or populations in seven regions within U.S. waters were identified (Ferguson et al., 2015a). BIAs in the West Coast of the continental U.S. with the potential to overlap portions of the Study Area include the following feeding and migration areas: Northern Puget Sound Feeding Area for gray whales (March-May); Northwest Feeding Area for gray whales (May-November); Northbound Migration Phase A for gray whales (January-July); Northbound Migration Phase B for gray whales (March-July); Northern Washington Feeding Area for humpback whales (May-November); Stonewall and Heceta Bank Feeding Area for humpback whales (May-November); and Point St. George Feeding Area for humpback whales (July-November) (Calambokidis et al., 2015).

Upon request by NMFS the Navy prepared an assessment of these BIAs, including the degree of spatial overlap as well as an analysis of potential impacts or lack of impacts for each BIA. The Navy determined that there was some limited, to no direct spatial overlap with the marine mammal feeding and migration areas for the majority of the NWTT Study Area (as depicted in Figures 3.4-2 – 3.4-4 of the NWTT FEIS/OEIS). There is even less overlap with the actual activities based on historical training and testing profiles. The following paragraphs go into more detail on the spatial and activity overlap with marine mammal feeding and migration areas.

Spatial Overlap of NWTT Study Area and BIAs

Gray whale areas: There is no direct spatial overlap between the Study Area and four of the offshore gray whale feeding areas – Grays Harbor, WA; Depoe Bay, OR; Cape Blanco and Orford Reef, OR; and Pt. St. George, CA. The NWTT Study Area does overlap with the newly designated offshore Gray whale Northwest WA feeding area and the Northern Puget Sound gray whale feeding area. There is no overlap of the gray whale migrations corridor(s) and the NWTT Study Area, with the exception of a portion of the NW coast of Washington approximately from Pacific Beach (WA) and extending north to the Strait of Juan de Fuca.

Humpback whale areas: The offshore Northern WA humpback whale feeding area is located entirely within the Study Area boundaries. The humpback whale feeding area at Stonewall and Hecta Bank only partially overlaps with the Study Area, and at Pt. St. George has extremely limited overlap with the Study Area.

Training and Testing Activity Overlap

Gray whale areas: The Gray whale NW Washington feeding area abuts to the shoreline of the NW coast of WA and lies adjacent to the main shipping channel between the Strait of Juan de Fuca and the Pacific Ocean. There is a small likelihood of Navy vessel movement in the gray whale feeding area mapped along the northern coast of Washington as ships transit to the offshore training and testing areas. However, when the Navy reviewed the historic activity profiles, there would be no direct spatial overlap of any training or testing activities within this feeding area. The majority of activities occur greater than 12 nm offshore, thus significantly reducing the potential for overlap. Navy request describes mitigation measures that it will implement to avoid vessel strikes, such as

continuing to use extreme caution and a safe speed when transiting, maneuvering to keep at least 500 yards from whales observed in a vessel's path, and not approaching whales head-on, provided it is safe to do so. The Navy also plans to maintain the requirement to report any vessel strike. The Navy assessed that these mitigations in addition to historical training and testing profiles indicate that additional mitigations are not warranted for this feeding area.

Vessel movement associated with both training and testing activities is likely to occur within the gray whale feeding area in Northern Puget Sound. Figure 3.0-5 in the NWTT FEIS/OIES depicts average ship traffic density within the major shipping routes within the Pacific Northwest. Overall vessel traffic near Everett, whose port is within or adjacent to the Northern Puget Sound feeding area, is relatively low compared to other inland water areas. The Navy's proportion of the total vessel traffic is extremely minimal with only 6 surface ships homeported at Naval Station Everett. Therefore, while there is overlap, the potential for Navy vessels to interact with feeding gray whales within this area is low, especially given the short time period (March – May) that whales will be present. However, the ships cannot avoid transiting through this area in order to exit the Puget Sound. The following training and testing activities occur at Naval Station Everett which appears to be located within the Northern Puget Sound gray whale feeding area – annual pierside sonar maintenance training, annual life-cycle hull-mounted sonar testing, and Maritime Homeland Defense/Security Mine Countermeasure exercises which could occur once every other year (3 events out of 5 years). Acoustic emissions would propagate into this feeding area from these activities. However it's highly unlikely that gray whales would be within the vicinity of the piers or the shorelines around NAVSTA Everett based on historical data of their presence (Calambokidis et al. 2015). In addition, these acoustic emissions would be very infrequent, transitory, and happen with a high degree of temporal

variability. Based on the acoustic modeling potentially one gray whale take by TTS could occur from these activities at Naval Station Everett. However, since the scheduling of these activities is dependent upon deployment cycles and maintenance schedules the activities may not occur during periods when gray whales are present within this area for feeding. The Navy's request describes mitigation measures that it will implement to avoid vessel strikes, such as continuing to use extreme caution and a safe speed when transiting, maneuvering to keep at least 500 yards from whales observed in a vessel's path, and not approaching whales head-on, provided it is safe to do so. The Navy also plans to maintain the requirement to report any vessel strike. However, the Navy does not find vessel strikes likely to occur given there is no recorded occurrence of vessel strike of any species of marine mammal, including gray whales, by Navy ships during training or testing in the Northwest. Navy mitigation measures for acoustic activities also include avoiding the conduct of acoustic and explosive activities in the immediate vicinity of all marine mammals, including gray whale, and include power down and shutdown procedures to reduce the potential for exposures to whales from sonar events. Given this area's location in Puget Sound, the vast majority of sound and disturbance in the area will be the result of non-Navy vessel traffic. As such, precluding Navy activity at Naval Station Everett and in Northern Puget Sound would be of little to no biological benefit to the gray whales. Furthermore, given pending overseas deployment needs and individual ship readiness cycles to support those deployments, the time of year when maintenance occurs cannot be proscribed. As for the homeland defense exercise, the location in which it would occur provides realistic conditions necessary to effectively train personnel to protect a major port and the vital assets (ships, cargo) and shipping channels near those ports. This training event, which may include a pierside component, cannot be relocated without losing realism given the ships/cargo and transit lanes requiring

protection are in fixed locations. The Navy concludes that seasonal avoidance of the use of acoustic sources within this feeding area would negatively impact readiness in a significant manner and is unlikely to further reduce impacts to gray whales in this area which are already estimated to be extremely low (i.e. one Level B TTS take).

The Navy acknowledges that gray whales migrate along the entire western coast of the United States, typically within 15 nautical miles (NM) of the shore in the NWTT Study Area, but possibly anywhere over the continental shelf, and that a small subset of the gray whale population may enter Puget Sound during their migrations. Vessel movement associated with virtually all of the training and testing activities proposed in the NWTT FEIS/OEIS will occur and have been occurring in areas potentially used by migrating gray whales for decades; however, the majority of our vessel traffic and training and testing occur outside the 12 nautical mile line, thus significantly reducing the overlap, since the gray whale migration areas only extend 10 NM offshore. Navy vessels are not the only vessel traffic that these migrating whales may encounter as Navy vessels represent a small fraction of total vessel traffic within the Greater Puget Sound and offshore areas (see Figure 3.0-5 of the NWTT FEIS/OIS). The Figure shows little correlation of impedance or interference to gray whale migration in areas where Navy vessels transit and training and testing activities occur in the NWTT Study Area. In fact, with the shipping density data overlapped, it is evident that while shipping traffic is heavy into the Strait of Juan de Fuca, as well as within the shipping lanes of Puget Sound, this traffic does not restrict or interfere with the annual north and south bound migration of gray whales nor their movements in Puget Sound. Some training and most testing activities will include acoustic emissions within or propagating into areas potentially used by migrating gray whales. However, these activities may not always be timed during periods in which the gray whales are present. The Navy has

requested a small number of Level B (behavioral) gray whale takes for all activities occurring within the offshore NWTT Study Area. As described in the Navy's LOA application and this Final Rule, the Navy is seeking authorization for 17 Level B (temporary threshold shifts) takes of gray whales annually (6 from training activities and 11 from testing activities) from activities occurring throughout the offshore Study Area. The Navy's request describes mitigation measures that it will implement to avoid vessel strikes, such as continuing to use extreme caution and a safe speed when transiting, maneuvering to keep at least 500 yards from whales observed in a vessel's path, and not approaching whales head-on, provided it is safe to do so. The Navy also plans to maintain the requirement to report any vessel strike. However, the Navy does not find vessel strikes likely to occur given there is no recorded occurrence of vessel strike of any species of marine mammal, including gray whales, by Navy ships during training or testing in the Northwest. Navy mitigation measures for acoustic activities also include avoiding the conduct of acoustic and explosive activities in the immediate vicinity of all marine mammals, including gray whales. The Navy assessed that based on the mitigations in place, historical training and testing profiles, limited estimated effects, and no evidence of ship strikes to migrating gray whales within the Study area that no additional mitigations are warranted in the gray whale migration areas.

Humpback whale areas: Vessel movement is likely to occur in at least some of these areas, including the designated humpback whale feeding area mapped at the mouth of the Strait of Juan de Fuca. In fact, historical ship density (majority of which is non-Navy vessels) depicted in Figure 3.0-5 of the NWTT FEIS/OEIS is high in the Northern Washington humpback whale feeding area. However, Navy vessel traffic is extremely minimal in comparison to commercial ship traffic, with typically only 20 ships and submarines homeported in the Puget Sound region. Therefore, Navy vessel traffic still

remains low within this feeding area. There is an extremely low likelihood of any Navy vessel movements occurring within the two southern humpback whale feeding areas, especially given that the Pt. St. George feeding area only overlaps the very eastern boundary of the Study Area. The NWTT proposed action includes mitigation measures to avoid vessel strikes, minimize contact with marine mammals and transit using extreme caution and safe speed as required by Rule #6 in the International Regulations for Preventing Collisions at Sea of 1972 (COLREG 6). Furthermore, additional mitigation for vessel movement in specific feeding areas is not practical or necessary because there is no historical record of Navy vessel strike during training or testing in any of these offshore feeding areas. Lastly, the Navy is obligated to report any vessel strike up the chain of command and to NMFS immediately, so there is little chance of unreported takes.

The Navy reviewed the historic activity profiles and there would be no direct spatial overlap of training activities with any designated feeding areas for humpbacks in the offshore portion of the NWTT Study Area. There is a generally low probability of potential acoustic overlap with the specifically identified feeding areas. Any propagation of sound from training activities into the Northern Washington humpback whale feeding area would mostly likely result from hull-mounted sonar maintenance or systems checks as vessels are transiting to other areas within and outside of the NWTT Study Area. The Navy estimates very low impacts to humpback whales from offshore training activities involving sonar, and no impacts from any explosive events. Only 12 Level B (7 behavioral, 5 TTS) takes of humpback whales are anticipated annually from all training activities occurring within the offshore Study Area, not just those areas overlapping with the feeding areas. Forcing Navy vessels to avoid this feeding area and utilize acoustic systems further offshore would position ships into higher dense traffic waters based on commercial shipping density data in that

Enclosure 2

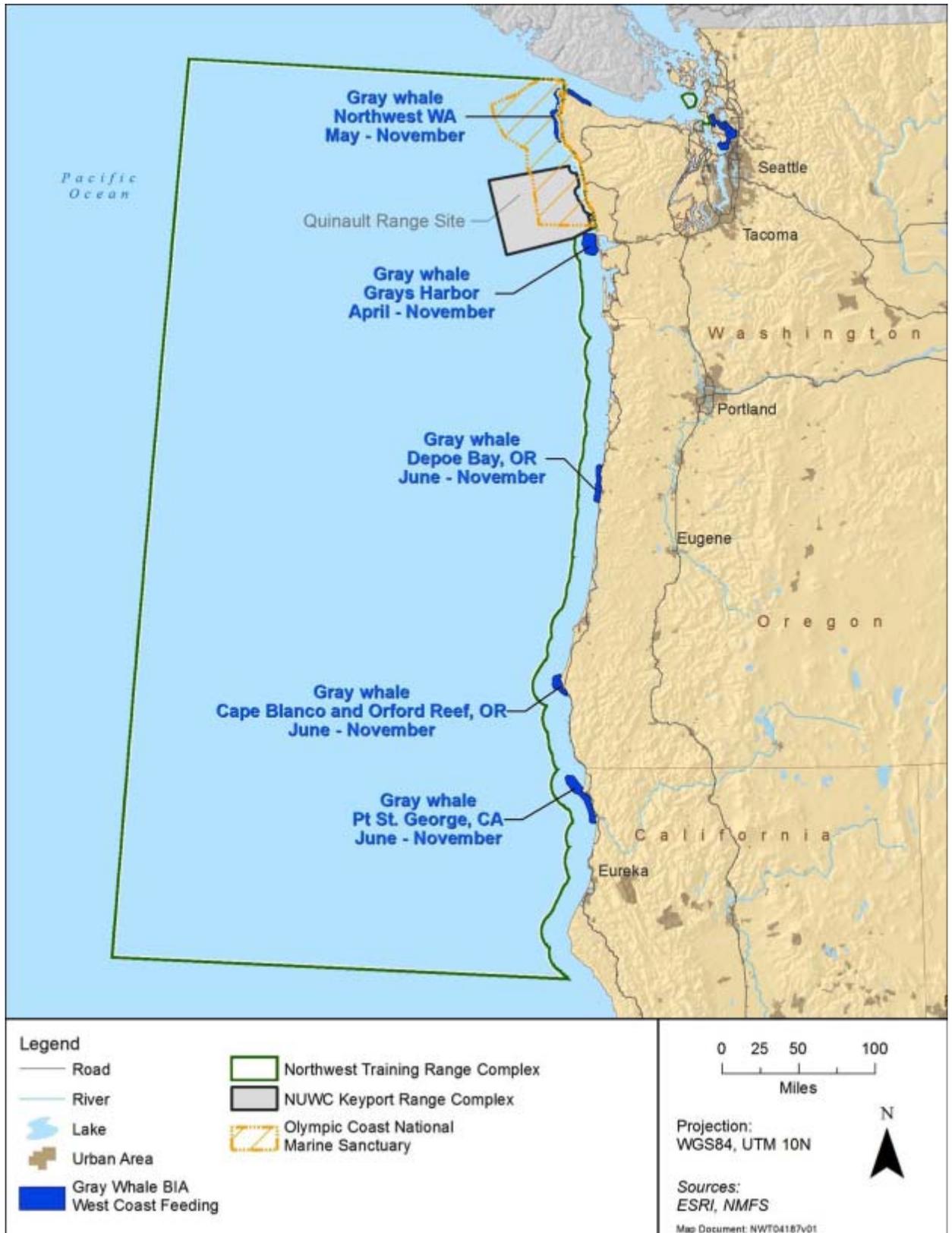
area. Avoidance of these feeding areas during Navy training could create safety concerns by forcing the Navy to delay maintenance and systems checks until ships are farther from shore and homeport infrastructure that could have assisted in addressing potential technical issues.

For testing activities, there is a chance that countermeasure testing could propagate non-impulsive sound into the Northern Washington humpback whale feeding area adjacent to the Strait of Juan de Fuca. These testing activities would be transitory, last from three to eight hours, and are conducted sporadically in any given geographic location. These countermeasure testing activities may be scheduled for any time of year based upon the availability of assets (ships and/or aircraft) needed to support the tests. Though the Navy does not expect to conduct tests within this feeding area, it would be difficult to ensure that all countermeasure testing was conducted far enough from the site to avoid sound propagation into it since some countermeasure devices propagate mid-frequency sound a long distance. Conducting this testing further from port and from support facilities would increase event costs, time, and fuel required to complete them, as well as limit available sites suitable to support the testing requirements and limit Navy's use of the existing Quinault Range Site. Avoidance of this area would negatively impact readiness. Occasional shallow water testing with sonobuoys would overlap the Stonewall and Heceta Bank humpback whale feeding area offshore of Oregon. The shallow water features in the area affect bottom reflecting, scattering, and absorption of the sound and typically create a more challenging environment to test sonobuoys in due to other surface sound sources (commercial/recreational boats). These conditions allow aircrews to gain understanding of how noise from other sources will impact underwater signal detection. However, these sonobuoy testing events are infrequent (fewer than 50 per year) and of short-duration (less than a day). These events occur sporadically throughout the year and will not necessarily occur

during time periods of humpback whale feeding. It is unlikely that this limited testing of sonobuoys would have any biologically meaningful effect on humpback whale feeding behavior in this area; however, avoidance of this area would negatively impact readiness. The Navy estimates very low impacts to humpback whales from offshore testing activities involving sonar and no impacts from explosive testing. Only 45 Level B (6 behavioral, 39 TTS) takes of humpback whales are anticipated annually from all testing activities occurring within the offshore Study Area, not just those areas overlapping with the feeding areas. Based on the Navy's existing mitigation measures for these activities, the low numbers of potential take to all humpback whales not just those within the feeding areas, the lack of prior ship strikes of humpback whales within the Study Area, and the impacts to readiness from avoiding or relocating activities the Navy concludes that further mitigation within the humpback whale feeding areas is not warranted.

The analysis indicates that there is generally low use of the areas and the modeling supports that there are limited impacts to gray whales and humpbacks throughout the entire NWTT study area. There is the potential for the most overlap between Navy activities within the following three feeding areas – the Humpback Whale Northern Washington feeding area, Stonewall Heceta Bank feeding area, and the Gray Whale Northern Puget Sound feeding area. As a result, the Navy has agreed to provide NMFS with reports of hull-mounted mid-frequency and high frequency active sonar use during training and testing in the months specified in the following three feeding areas to the extent that active sonar training or testing does occur in these feeding areas: Humpback Whale Northern Washington feeding area (May through November); Stonewall and Heceta Bank feeding area (May through November) and Gray Whale Northern Puget Sound Feeding Area (March through May). The Navy will provide this information annually in the classified exercise report to the extent

sonar use in those areas can be distinguished from data retrieved in Navy's system. The intent would be to inform future adaptive management discussions about future mitigation adjustments should sonar use increase above the existing low use/low overlap description provided by the Navy or if new science provides a biological basis for increased protective measures.







5 Standard Operating Procedures, Mitigation, and Monitoring

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5 STANDARD OPERATING PROCEDURES, MITIGATION, AND MONITORING

This chapter describes the United States (U.S.) Department of the Navy (Navy) standard operating procedures, mitigation measures, and marine species monitoring and reporting efforts. Standard operating procedures are essential to maintaining safety and mission success, and in many cases have the added benefit of reducing potential environmental impacts. Mitigation measures are designed to reduce or avoid potential impacts on marine resources. Marine species monitoring efforts are designed to track compliance with take authorizations, evaluate the effectiveness of mitigation measures, and improve understanding of the impacts of training and testing activities on marine resources within the Northwest Training and Testing (NWTT) Study Area (Study Area).

5.1 STANDARD OPERATING PROCEDURES

Effective training, maintenance, research, development, testing, and evaluation (hereafter referred to collectively as the Proposed Action) require that participants utilize their sensors and weapon systems to their optimum capabilities as required by the activity objectives. The Navy currently employs standard practices to provide for the safety of personnel and equipment, including vessels and aircraft, as well as the success of the training and testing activities. For the purpose of this document, standard practices are referred to as standard operating procedures. Because of their importance for maintaining safety and mission success, standard operating procedures have been considered as part of the Proposed Action under each alternative, and therefore are included in the Chapter 3 (Affected Environment and Environmental Consequences) environmental analyses for each resource.

Navy standard operating procedures have been developed and refined over years of experience, and are broadcast via numerous naval instructions and manuals, including the following sources:

- Navy Range User's Manuals
- Ship, Submarine and Aircraft Safety Manuals
- Ship, Submarine and Aircraft Standard Operating Manuals
- Fleet Area Control and Surveillance Facility Range Operating Instructions
- Fleet Exercise Publications and Instructions
- Naval Sea Systems Command Test Range Safety and Standard Operating Instructions
- Navy Instrumented Range Operating Procedures
- Research, Development, Test and Evaluation Plans
- Naval Gunfire Safety Instructions
- Navy Planned Maintenance System Instructions and Requirements
- Federal Aviation Administration Regulations

In many cases, there are incidental environmental, socioeconomic, and cultural benefits resulting from standard operating procedures. Standard operating procedures serve the primary purpose of providing for safety and mission success, and are implemented regardless of their secondary benefits. This is what distinguishes standard operating procedures, which are a component of the Proposed Action, from mitigation measures, which are designed entirely for the purpose of reducing environmental impacts resulting from the Proposed Action. Because standard operating procedures are crucial to safety and mission success, the Navy will not modify them as a way to further reduce effects to environmental resources. Rather, mitigation measures will be used as the tool for avoiding and reducing potential environmental impacts. Standard operating procedures are internal documents and are under the

cognizance of the individual commands. Standard operating procedures that are recognized as providing a potential secondary benefit are provided below.

5.1.1 GENERAL SAFETY

In the development of standard operating procedures and measures to protect the safety of its people, the Navy follows the guidance set forth in the Chief of Naval Operations Instructions (OPNAVINST) 5100.19 (Navy Safety and Occupational Health Program Manual for Forces Afloat) and 5100.23 (Navy Safety and Occupational Health Program Manual). These instructions provide minimum requirements under which organizations may develop procedures that delineate additional organizational specific requirements. These two instructions include policies for public safety; laser procedures; weapons firing procedures; and unmanned aircraft, surface, and underwater vehicle activities.

Unless otherwise noted, the following general procedures and practices are paralleled between the training community and the testing community. Some minor differences in terminology and requirements exist that tailor the procedure either for uniformed Navy personnel (training) or civilian science and technical personnel (testing). The same goals apply to both communities.

5.1.2 VESSEL SAFETY

For the purposes of this chapter, the term “ship” is inclusive of surface ships and surfaced submarines. The term “vessel” is inclusive of ships and small boats (e.g., rigid-hull inflatable boats or commercially available boats used to support test operations).

Ships operated by or for the Navy have personnel assigned to stand watch at all times, day and night, when moving through the water (underway). Watch personnel undertake extensive training in accordance with the U.S. Navy Lookout Training Handbook or civilian equivalent, including on-the-job instruction and a formal Personal Qualification Standard Program (or equivalent program for supporting contractors or civilians), to certify that they have demonstrated all necessary skills (such as detection and reporting of floating or partially submerged objects). Watch personnel are composed of officers, enlisted men and women, and civilian equivalents. Their duties may be performed in conjunction with other job responsibilities, such as navigating the ship or supervising other personnel. While on watch, personnel employ visual search techniques, including the use of binoculars, using a scanning method in accordance with the U.S. Navy Lookout Training Handbook or civilian equivalent. After sunset and prior to sunrise, watch personnel employ night visual search techniques, which could include the use of night vision devices.

A primary duty of watch personnel is to detect and report all objects and disturbances sighted in the water that may be indicative of a threat to the ship and its crew, such as debris, a periscope, surfaced submarine, or surface disturbance. Per safety requirements, watch personnel also report any marine mammals sighted that have the potential to be in the direct path of the ship as a standard collision avoidance procedure. Because watch personnel are primarily posted for safety of navigation, range clearance, and man-overboard precautions, they are not normally posted while ships are moored to a pier. When anchored or moored to a buoy, a watch team is still maintained but with fewer personnel than when underway. When moored or at anchor, watch personnel may maintain security and safety of the ship by scanning the water for any indications of a threat (as described above).

While underway, Navy ships (with the exception of submarines) greater than 65 feet (ft.) (20 meters [m]) in length have at least two personnel standing watch; Navy ships less than 65 ft. (20 m) in length, submarines, and contractor vessels have at least one person standing watch. While underway,

personnel standing watch are alert at all times and have access to binoculars. Due to limited manning and space limitations, small boats do not have dedicated personnel standing watch, and the boat crew is responsible for maintaining the safety of the boat and surrounding environment.

All vessels use appropriate caution and proceed at a “safe speed” so they can take proper and effective action to avoid a collision with any sighted object or disturbance, and can be stopped within a distance appropriate to the prevailing circumstances and conditions.

5.1.3 AIRCRAFT SAFETY

Pilots of Navy aircraft make every attempt to avoid large flocks of birds in order to reduce the safety risk involved with a potential bird strike. The Department of Defense (DoD) continually implements and improves aviation safety programs in an effort to provide the safest flying conditions possible. One of these programs is the Bird/Wildlife Aircraft Strike Hazard prevention program. Throughout the military, air operations, aviation safety, and natural resources personnel work together to reduce the risk of bird and wildlife strikes through the Operational Risk Management process.

5.1.4 LASER PROCEDURES

As described in Section 3.0.5.3.2.2 (Lasers), only low energy lasers, some of which could be hazardous to human eyes, are proposed for use. The following procedures are applicable to lasers of sufficient intensity to cause human eye damage.

5.1.4.1 Laser Operators

Only properly trained and authorized personnel operate lasers.

5.1.4.2 Laser Activity Clearance

Prior to commencing activities involving lasers, the operator ensures that the area is clear of unprotected or unauthorized personnel in the laser impact area by performing a visual inspection or a flyover. The operator also ensures that any personnel within the area are aware of laser activities and are properly protected.

5.1.5 WEAPONS FIRING PROCEDURES

When the Navy conducts any potentially hazardous training or testing activity, such as weapons firing, personnel are assigned to fulfill critical safety functions. A Range Safety Officer is responsible for the safe conduct of all activities on the range on which activities are being conducted. For activities conducted off of designated ranges, an officer (or civilian equivalent) on a ship or aircraft engaged in the activity or within visual range of the activity may function as the Range Safety Officer. Either the Officer Conducting the Exercise or the Range Safety Officer assigned to the event can terminate activities if unsafe conditions exist.

5.1.5.1 Notice to Mariners

A Notice to Mariners (NTM) is routinely issued in advance of missile firing activities or explosive bombing activities. For activities involving gunnery, the Navy evaluates the need to publish a NTM based on the scale, location, and timing of the activity. More information on the NTM is found in Chapter 3, Section 3.13 (Public Health and Safety).

5.1.5.2 Weapons Firing Range Clearance

The weapons firing hazard range must be clear of non-participating vessels and aircraft before firing activities will commence. The size of the firing hazard range is based on the farthest firing range capability of the weapon being used. All missile and rocket firing activities are carefully planned in advance and conducted under strict procedures that place the ultimate responsibility for range safety on the officer conducting the exercise or civilian equivalent. All weapons firing is secured when cease fire orders are received from the Range Safety Officer or when the line of fire is endangering any object other than the designated target.

Pilots of Navy aircraft are not authorized to expend ordnance, fire missiles, or drop other airborne devices through any cloud cover where visual clearance of the air and surface area is not possible. The two exceptions to this requirement are: (1) when operating in the open ocean, air, and surface clearance through visual means or radar surveillance is acceptable; and (2) when the officer conducting the exercise accepts responsibility for the safeguarding of airborne and surface traffic.

During activities that involve recoverable targets, (e.g., aerial drones), the Navy recovers the target and any associated parachutes to the maximum extent practicable consistent with operational requirements and personnel safety.

5.1.6 SWIMMER DEFENSE TESTING PROCEDURES

A daily in situ calibration of the source levels is used to establish a clearance area to the 145 decibels (dB) referenced to (re) 1 micropascal (μPa) sound pressure level threshold for non-participant personnel safety. A hydrophone is stationed during the calibration sequences in order to confirm the clearance area. Small boats patrol the 145 dB re 1 μPa sound pressure level area during all test activities. Boat crews are equipped with binoculars and remain vigilant for non-participant divers and boats, swimmers, snorkelers, and dive flags. If a non-participating swimmer, snorkeler, or diver is observed entering into the area of the swimmer defense system, the power levels of the defense system are reduced. An additional 100-yard (yd.) (91 m) buffer is applied to the initial sighting location of the non-participant as an additional precaution. If the area cannot be maintained free of non-participating swimmers, snorkelers, and divers, testing will cease until the non-participant has moved outside the area.

5.1.7 UNMANNED AIRCRAFT SYSTEM PROCEDURES

The Navy operates unmanned aircraft systems in accordance with Federal Aviation Administration regulations.

5.1.8 UNMANNED SURFACE VEHICLE AND UNMANNED UNDERWATER VEHICLE PROCEDURES

Standard safety requirements and operational restrictions apply for all types of unmanned underwater vehicles (UUVs) during training and testing activities including, but not limited to, torpedoes, mobile anti-submarine warfare (ASW) targets, inert mines, and research and development vehicles.

5.1.9 TOWED IN-WATER DEVICE PROCEDURES

Prior to deploying a towed device from a manned platform, there is a standard operating procedure to search the intended path of the device for any floating debris (e.g., driftwood) or other potential obstructions (e.g., animals), since they have the potential to cause damage to the device.

5.1.10 BEST MANAGEMENT PRACTICES

Best management practices include measures that regulate operations to ensure compliance with pollution emission requirements and general resource conservation goals. In the development of best management practices, the Navy will utilize and implement all applicable sections of OPNAV M-5090.1 (Environmental Readiness Program Manual). This instruction provides minimum requirements, under which organizations may develop procedures that delineate additional organizational specific requirements. Some standard operating procedures also provide best management practices value.

In Chapter 3 of this Environmental Impact Statement (EIS)/Overseas EIS (OEIS), the Navy analyzed environmental resources for potential impacts resulting from the Navy's Proposed Action. All of the Navy's best management practices provide protection to environmental resources. For example, Navy policies and procedures identified in Navy instructions such as the Environmental Readiness Program Manual, include directives regarding waste management, pollution prevention, and recycling, all of which benefit sediments and water quality in the ocean. Any procedures or practices that benefit ocean sediments and water quality in turn benefit all marine life in the ocean, from plants and invertebrates, to fish and marine mammals.

Some examples of standard operating procedures that also contribute to best management practices are pollution control programs. The Navy's compliance with the Clean Air Act and its implementing regulations has resulted in comprehensive air quality management programs, helping to ensure minimum impacts to air quality.

Many of the Navy's standard operating procedures are directed at enhancing safety, both for the Sailors involved in the activities as well as non-participant members of the public. As an example, the Navy's Bird/Wildlife Aircraft Strike Hazard prevention program was intended as a safety procedure and has the added benefit of reducing bird injuries and fatalities. This program has resulted in reduced incidents of aircraft striking birds.

These examples illustrate common Navy procedures and practices that can often reduce impacts to environmental resources. The following section will describe procedures implemented specifically to mitigate environmental impacts.

5.2 INTRODUCTION TO MITIGATION

The Navy recognizes that the Proposed Action has the potential to impact the environment. Mitigation measures are modifications to the Proposed Action that are implemented for the sole purpose of reducing a specific potential environmental impact on a particular resource. The procedures discussed in this chapter, most of which are currently or were previously implemented as a result of past environmental compliance documents, Endangered Species Act (ESA) biological opinions, Marine Mammal Protection Act (MMPA) Letters of Authorization, or other formal or informal consultations with regulatory agencies, are being coordinated with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) through the consultation and permitting process.

In order to make the findings necessary to issue an MMPA letter of authorization, it may be necessary for NMFS to require additional mitigation measures or monitoring beyond those contained in this Final EIS/OEIS. These could include measures considered, but eliminated in this EIS/OEIS, or as yet undeveloped measures. The public will have an opportunity to provide information to NMFS through the MMPA process, both during the comment period following NMFS' notice of receipt of the

application for a letter of authorization, and during the comment period following publication of the proposed rule. NMFS may propose additional mitigation measures or monitoring in the proposed rule.

Additionally, the Navy is engaging in consultation processes under the ESA with regard to listed species that may be affected by the Proposed Action described in this EIS/OEIS. For the purposes of the ESA Section 7 consultation, the mitigation measures proposed here may be considered by NMFS or USFWS as beneficial actions taken by the Federal agency or applicant (50 Code of Federal Regulations 402.14(g)(8)). If required to satisfy requirements of the ESA, NMFS or USFWS may develop an additional set of measures contained in terms and conditions, reasonable and prudent measures, or conservation recommendations in any biological opinion issued for the Proposed Action.

The Navy also considered public comments and government to government negotiations on proposed mitigation measures described in the Draft EIS/OEIS. Many public comments addressed issues already explained in the Draft EIS/OEIS, often those described in Section 5.3.4 (Mitigation Measures Considered but Eliminated). A number of comments also questioned the mitigation zones used by the Navy (see Section 5.3.2, Mitigation Zone Procedural Measures). Each of these comments have been responded to in Appendix I (Public Participation). Several comments led the Navy to make improvements in the description or explanation of the measures.

5.2.1 REGULATORY REQUIREMENTS FOR MITIGATION

An EIS must analyze the affected environment, discuss the environmental impacts of the Proposed Action and each alternative, and assess the significance of the impacts to the environment. Mitigation measures are designed to help reduce the severity or intensity of impacts of the Proposed Action and can occur early in the planning process. An agency may choose not to take the action or to move the location of the action. Mitigation measure development also occurs throughout the analysis process whenever an impact is minimized by limiting the degree or magnitude of the action or its implementation. Mitigation measures can also include actions that repair, rehabilitate, or restore the affected environment or reduce impacts over time through constant monitoring and corrective adjustments.

In accordance with the National Environmental Policy Act (NEPA) requirement, the environmental benefit of all Navy recommended proposed mitigation measures will apply to all alternatives analyzed in this EIS, and according to Navy policy, will also apply to the OEIS where applicable and appropriate. Additionally, the White House Council on Environmental Quality (CEQ) issued guidance for mitigation and monitoring on 14 January 2011. This guidance affirms that federal agencies, including the Navy, should:

- commit to mitigation in decision documents when they have based environmental analysis upon such mitigation (by including appropriate conditions on grants, permits, or other agency approvals, and making funding or approvals for implementing the Proposed Action contingent on implementation of the mitigation commitments);
- monitor the implementation and effectiveness of mitigation commitments;
- make information on mitigation and monitoring available to the public, preferably through agency web sites; and
- remedy ineffective mitigation when the federal action is not yet complete.

The CEQ guidance encourages federal agencies to develop internal processes for post-decision monitoring to ensure the implementation and effectiveness of the mitigation. It also states that federal

agencies may use adaptive management as part of an agency's action. Adaptive management, when included in the NEPA analysis, allows for the agency to take alternate mitigation actions if mitigation commitments originally made in the planning and decision documents fail to achieve projected environmental outcomes. Adaptive management generally involves four phases: plan, act, monitor, and evaluate. This process allows the use of the results to update knowledge and adjust future management actions accordingly. Through implementing mitigation measures from the Navy's previous planning, consultations, permits, and monitoring of those efforts, the Navy has collected data to further refine proposed mitigation measures.

Through the planning, consultation, and permitting processes, federal regulatory agencies may also suggest that the Navy analyze additional mitigation measures for inclusion in Final EIS/OEISs and associated consultation and permitting documents. Any proposals for additional mitigation measures should be based on the federal agency's assessment of the likelihood that such measures will contribute to a notable reduction of the environmental impact. If additional measures are identified, the Navy will apply the effectiveness and operational assessment protocol discussed in Section 5.3 (Mitigation Assessment) to determine whether the additional measure will be proposed for implementation. This additional analysis will be presented in the Final EIS/OEIS, and, the final suite of mitigations resulting from the ongoing planning, consultation, and permitting processes will be documented in the Record of Decision (ROD).

5.2.2 OVERVIEW OF MITIGATION APPROACH

This section describes the approach that the Navy took to develop its recommended mitigation measures. The Navy's overall approach to assessing potential mitigation measures was based on two principles: (1) mitigations will be effective at reducing potential impacts on the resource; and (2) from a military perspective, the mitigations are practical to implement, executable, and personnel safety and readiness will not be impacted. The assessment process involved using information directly from Chapter 3 (Affected Environment and Environmental Consequences) and assessing all existing mitigation and proposals for new or modified mitigation in order to determine if recommending a mitigation measure for implementation would be appropriate.

This document organized, and where appropriate, analyzed training and testing activities separately. This separation was needed because the training and testing communities perform activities for differing purposes, and in some cases, with different personnel and in different locations. For example, there is a fundamental difference between the testing of a new antisubmarine warfare system with civilian scientists and engineers, and the eventual training of sailors and aviators with that same system. As such, mitigations that the Navy recommends for both training and testing activities are presented together, while mitigations that are designed for and executable only by the training or testing community are presented separately based on location.

5.2.2.1 Lessons Learned from Previous Environmental Impact Statements/Overseas Environmental Impact Statements

In an effort to improve upon past processes, the Navy considered all mitigations previously implemented and adapted its mitigation assessment approach based on lessons learned from previous EISs, ESA biological opinions, MMPA Letters of Authorization, and other formal or informal consultations with regulatory agencies. For example, during the development of the Northwest Training Range Complex EIS/OEIS the Navy determined that relocation of activities to another range complex was not possible due to a number of factors. The Navy considered reduction or elimination of training in the Northwest Training Range Complex, but determined that the amount and cost of travel to other range

complexes to fulfill training requirements would result in an unacceptable increase in time away from the homeport. While some Pacific-Northwest-based units do travel to other ranges for certain training activities, all locally based units must continue to train locally for most routine activities.

Navy planners, scientists, and the operational community assessed the effectiveness of a full suite of potential mitigation measures (a portion of which were specific mitigation areas) on a case-by-case basis, using information and lessons learned from the Navy's internal adaptive management process. The resulting assemblage of recommended measures is comprised of currently implemented measures, modifications of currently implemented measures, and newly proposed measures. Details on the assessment methods are provided in Section 5.2.3 (Assessment Method). The rationale for recommending, modifying, adding, or discontinuing each measure is provided in Section 5.3 (Mitigation Assessment).

5.2.2.2 Protective Measures Assessment Protocol

The Protective Measures Assessment Protocol is a decision support and situational awareness software tool that the Navy uses to facilitate compliance with mitigation measures during the conduct of certain training and testing activities at sea. The Navy runs the Protective Measures Assessment Protocol program during the event planning process to ensure that personnel involved in the activity are aware of the mitigation requirements and to help ensure that all mitigations are implemented appropriately. In addition to providing notification of the required mitigation, the tool also provides a visual display of the exercise area, unit's position in relation to the target area, and any relevant environmental data. The final suite of mitigation measures contained in the ROD will be integrated into the Protective Measures Assessment Protocol.

Section 5.3.1.1.1.1 (United States Navy Afloat Environmental Compliance Training Series) contains information about the newly developed Protective Measures Assessment Protocol training module.

5.2.3 ASSESSMENT METHOD

As shown in Figure 5-1, the Navy undertook an effectiveness assessment and operational assessment for each potential mitigation measure to ensure its compatibility with Section 5.2.2 (Overview of Mitigation Approach). The Navy used information from published and readily available sources, as well as Navy after-action and monitoring reports. When available, these data were used when they represented the best available science and if they were generally accepted by the scientific community, to ensure that they were applicable and contributed to the analysis.

5.2.3.1 Effectiveness Assessment

5.2.3.1.1 Procedural Measures

Procedural measures could involve employing techniques or technology to modify an activity in order to avoid or reduce a potential impact on a particular resource. For the purposes of organization, procedural measures are discussed within two subcategories: Lookouts and mitigation zones.

A procedural measure was deemed effective if implementing the measure was likely to result in avoidance or reduction of an impact on a resource. The level of avoidance or reduction of the impact gained from implementing a procedural measure was weighed against the potential for a shift in impacts resulting from the activity modification. For example, if predictive modeling results indicate that the use of underwater explosives could cause unacceptable impacts on a particular resource, those impacts could possibly be reduced by substituting non-explosive activities for explosive activities.

However, if the increased use of non-explosive activities would consequently produce an unacceptable impact on habitats due to an associated physical disturbance or strike risk from military expended materials, the measure would not necessarily be justifiable.

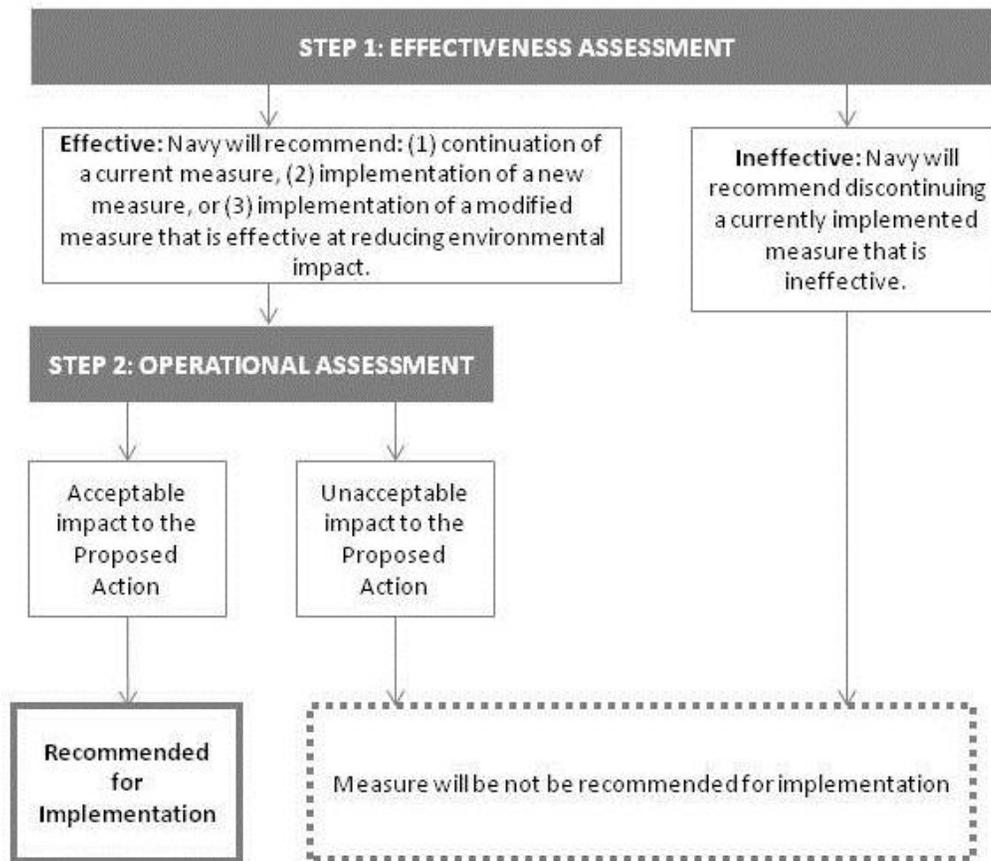


Figure 5-1: Flowchart of Process for Determining Proposed Mitigation Measures

A procedural measure was deemed ineffective if its implementation would not result in avoidance or reduction of an impact on a resource, or if an unacceptable impact will simply be shifted from one resource to another. For ineffective procedural measures that are currently being implemented, the rationale for terminating, modifying, or continuing to carry out the measure is included in the discussion.

5.2.3.1.2 Proposed Mitigation Areas

In order to avoid or reduce a potential impact on a particular resource, the Navy would either limit the time of day or duration in which a particular activity could take place, or move or relocate a particular activity outside of a specific geographic area, yet still within the Study Area. Within mitigation areas, the measures would only apply to the specific activity that resulted in the requirement for mitigation, and would not prevent or restrict other activities from occurring during that time or in that area.

A proposed mitigation area was deemed effective if implementing the measure may be likely to result in avoidance or reduction of the impact on the resource. The specific season, time of day, or geographic area must be important to the resource. In determining importance, special consideration was given to

time periods or geographic areas having characteristics such as especially high overall density or percent population use, seasonal bottlenecks for a migration corridor, and identifiable key foraging and reproduction areas.

Avoidance or reduction of the impact in the specific time period or geographic area was weighed against the potential for causing new impacts in alternative time periods or geographic areas. For example, if the proposed training or test event predicted to cause unacceptable impacts to a particular resource in a known foraging location, those impacts could possibly be reduced by relocating those activities to a new location. However, if the proposed training or test event at the new location would consequently produce an unacceptable impact to the same or a different resource at the new location, the measure would not necessarily be justifiable.

A proposed mitigation area was deemed ineffective if implementing the measure would not result in avoidance or reduction of an impact to a resource, or if an unacceptable impact would simply be shifted from one time period or location to another. For ineffective mitigation areas that are currently being implemented, the rationale for terminating, modifying, or continuing to carry out the measure is included in the discussion.

5.2.3.2 Operational Assessment

The Navy conducted the operational assessment for procedural measures and proposed mitigation areas using the criteria described below. The Navy deemed procedural and mitigation area measures to have acceptable operational impacts to a particular proposed activity if the following conclusions were reached:

1. Implementation of the measure will not increase safety risks to Navy personnel and equipment.
2. Implementation of the measure is practical. Practicality was defined by the following factors:
 - The measure does not result in an unacceptable increase in resource requirements (e.g., wear and tear on equipment, additional fuel, additional personnel, increased training or testing requirements, or additional reporting requirements).
 - The measure does not result in an unacceptable increase in time away from homeport for Navy personnel.
 - The measure does not result in national security concerns. Should national security require conducting more than the designated number of activities, or a change in how the Navy conducts those activities, the Navy reserves the right to provide the regulatory federal agency with prior notification and include the information in any associated exercise or monitoring reports.
 - The measure is consistent with Navy policy.
3. Implementation of the measure will not result in an unacceptable impact on readiness. A primary factor that was considered for all mitigation measures is that the measure must not modify the activity in a way that no longer allows the activity to meet the intended objectives, and ultimately must not interfere with the Navy meeting all of its military readiness requirements. Specifically, for mitigation area measures, the following additional factors were considered:

- The activity is not dependent on a specific range or range support structure within the mitigation area, and there are alternate areas with the necessary environmental conditions (e.g., oceanographic conditions).
- The mitigation area does not hold any current or foreseeable future readiness value. This assessment will be revisited if Navy operations or national security interests conclude that training or testing needs to occur within the mitigation area.
- Implementation of the measure will not prohibit conducting shipboard maintenance, repair, and testing pierside prior to at-sea operations.

4. The Navy has legal authority to implement the measure.

If all four of the above conditions were not able to be reached, the Navy deemed the procedural or proposed mitigation area measure to have unacceptable impacts on the Proposed Action, and did not recommend those unacceptable measures for implementation.

5.3 MITIGATION ASSESSMENT

The effectiveness and operational assessments resulted in potential mitigation measures being organized into the following four sections:

- Section 5.3.1 (Lookout Procedural Measures) includes recommended measures specific to the use of Lookouts or trained marine species observers.
- Section 5.3.2 (Mitigation Zone Procedural Measures) includes recommended measures specific to visual observations with a mitigation zone.
- Section 5.3.3 (Mitigation Areas) includes recommended measures specific to particular locations.
- Section 5.3.4 (Mitigation Measures Considered but Eliminated) includes measures that the Navy does not recommend for implementation due to the measure being ineffective at reducing environmental impacts, having an unacceptable operational impact, or being incompatible with Section 5.2.2 (Overview of Mitigation Approach).

A summary of the Navy recommended measures is provided in Table 5.4-1.

5.3.1 LOOKOUT PROCEDURAL MEASURES

As described in Section 5.1 (Standard Operating Procedures), ships have personnel assigned to stand watch at all times while underway. Standard watch personnel may perform watch duties in conjunction with job responsibilities that extend beyond looking at the water or air (such as supervision of other personnel). This section will introduce Lookouts, who perform similar duties to standard personnel standing watch and whose duties satisfy safety of navigation and mitigation requirements.

The Navy will have two types of Lookouts for the purposes of conducting visual observations: those positioned on ships; and those positioned ashore, in aircraft, or on small boats. Lookouts positioned on ships will diligently observe the air and surface of the water. They will have multiple observation objectives, which include but are not limited to detecting the presence of biological resources and recreational or fishing boats, observing the mitigation zones described in Section 5.3.1.2 (Lookouts), and monitoring for vessel and personnel safety concerns.

Due to manning and space restrictions on aircraft, small boats, and some Navy ships, Lookouts for these platforms may be supplemented by the aircraft crew or pilot, boat crew, range site personnel, or shore-side personnel. Lookouts positioned in minimally manned platforms may be responsible for tasks in addition to observing the air or surface of the water (e.g., navigation of a helicopter or small boat). However, all Lookouts will, considering personnel safety, practicality of implementation, and impact on the effectiveness of the activity, comply with the observation objectives described above for Lookouts positioned on ships.

Some testing activities are conducted close enough to shore that observers located at shore sites have a clear view of the activities as they are conducted, and benefit from advanced systems (improved optics, acoustic detection) available for detection of animals. The procedural measures described below primarily consist of having Lookouts during specific training and testing activities.

5.3.1.1 Specialized Training

5.3.1.1.1 Training for Navy Personnel and Civilian Equivalents

5.3.1.1.1.1 United States Navy Afloat Environmental Compliance Training Series

Recommended Mitigation and Comparison to Current Mitigation

The Navy is proposing to continue implementing the Marine Species Awareness Training for watch personnel and Lookouts, and to add the requirement for additional Navy personnel and civilian equivalents to complete one or more environmental training modules.

The Navy has developed the United States Navy Afloat Environmental Compliance Training Series to help ensure Navy-wide compliance with environmental requirements, and to help Navy personnel gain a better understanding of their personal roles and responsibilities. The training series contains four interactive multimedia training modules. Personnel will be required to complete all modules identified in their career path training plan.

The first module is the Introduction to the U.S. Navy Afloat Environmental Compliance Training Series. The introduction module provides information on environmental laws (e.g., ESA and MMPA) and responsibilities relevant to Navy training and testing activities. The material is put into context of why environmental compliance is important to the Navy, from the most junior sailor to Commanding Officers.

The second module is the U.S. Navy Marine Species Awareness Training. Consistent with current requirements, all personnel standing watch on the bridge, Commanding Officers, Executive Officers, maritime patrol aircraft aircrews, anti-submarine warfare helicopter crews, civilian equivalents, and Lookouts will successfully complete the Marine Species Awareness Training prior to standing watch or serving as a Lookout. The module contained within the U.S. Navy Environmental Compliance Training Series is an update to the current Marine Species Awareness Training version 3.1. The updated training is designed to improve the effectiveness of visual observations for marine resources, including marine mammals and sea turtles. The Marine Species Awareness Training provides information on sighting cues, visual observation tools and techniques, and sighting notification procedures.

The third module is on the U.S. Navy Protective Measures Assessment Protocol. Protective Measures Assessment Protocol is a decision support and situational awareness software tool that the Navy uses to facilitate compliance with worldwide mitigation measures during the conduct of training and testing activities at sea. The module provides instruction for generating and reviewing Protective Measures

Assessment Protocol reports. Section 5.2.2.2 (Protective Measures Assessment Protocol) contains additional information on the benefits of the software tool.

The fourth module is on the U.S. Navy Sonar Positional Reporting System and marine mammal incident reporting. The Navy developed the Sonar Positional Reporting System as its official record of underwater sound sources used under its MMPA permits. Marine mammal incidents include vessel strikes and animal strandings. The module provides instruction on the reporting requirements and procedures.

Effectiveness and Operational Assessment

Navy personnel undergo extensive training in order to stand watch on the bridge. Standard training includes on-the-job instruction under the supervision of experienced personnel, followed by completion of the Personal Qualification Standard program. The Personal Qualification Standard program certifies that personnel have demonstrated the skills needed to stand watch, such as detecting and reporting floating or partially submerged objects.

The United States Navy Afloat Environmental Compliance Training Series, including the updated Marine Species Awareness Training, is a specialized multimedia training program designed to help Navy operational and test communities best avoid potentially harmful interactions with marine species. The program provides training on how to sight marine species, focusing on marine mammals. The training also includes instruction for visually identifying sea turtles, concentrations of floating vegetation (kelp paddies), jellyfish aggregations, and flocks of seabirds, which are often indicators of marine mammal or sea turtle presence. The Marine Species Awareness Training also addresses the role that watchstanders and Lookouts play in helping the Navy maintain compliance with environmental protection requirements, as well as supporting Navy stewardship commitments.

In summary, the Navy believes that the U.S. Navy Afloat Environmental Compliance Training Series, including the updated Marine Species Awareness Training, is the best and most appropriate forum for teaching watch personnel and Lookouts about their responsibilities for helping reduce impacts on the marine environment. The Marine Species Awareness Training provides the Navy with invaluable training for a relatively large number of personnel. Constantly shifting personnel assignments presents a real challenge; however, the format and structure of the U.S. Navy Afloat Environmental Compliance Training Series will help the Navy reduce costs during fiscally constrained periods and provide constant access to training. Overall, the Marine Species Awareness Training is an effective tool for improving the potential for Lookouts to detect marine species while on duty.

Implementation of the Marine Species Awareness Training is considered to be an acceptable program with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.1.2 Lookouts

The Navy proposes to use one or more Lookouts during the training and testing activities described below, which are organized by stressor category. A comparison of the currently implemented mitigation measures and recommended mitigation measures are provided where applicable. The effectiveness and operational assessments are discussed for all Lookout measures collectively in Section 5.3.1.2.5 (Effectiveness Assessment for Lookouts) and Section 5.3.1.2.6 (Operational Assessment for Lookouts).

5.3.1.2.1 Acoustic Stressors – Non-Impulse Sound

5.3.1.2.1.1 Low-Frequency and Hull-Mounted Mid-Frequency Active Sonar

Under the Proposed Action, low-frequency active sonar would be used only during testing activities conducted in the Offshore Area and in the Inland Waters of the Study Area, and not during any proposed training activities. Therefore, mitigation measures for low-frequency active sonar sources currently exist only for these testing activities.

Training

The Navy's current Lookout mitigation measures during training activities involving hull-mounted mid-frequency active sonar include requirements such as the number of personnel on watch and the manner in which personnel are to visually search the area in the vicinity of the ongoing activity.

The Navy is proposing to maintain the number of Lookouts currently implemented for ships using hull-mounted mid-frequency active sonar. Ships using hull-mounted mid-frequency active sonar sources associated with ASW and mine warfare activities at sea (with the exception of ships less than 65 ft. [20 m] in length, which are minimally manned) will have two Lookouts at the forward position. For the purposes of this document, low-frequency active sonar does not include surface towed array surveillance system low frequency active sonar, which is not a part of this Proposed Action.

While using hull-mounted mid-frequency active sonar sources underway, vessels less than 65 ft. in length, and ships that are minimally manned will have one Lookout at the forward position due to space and manning restrictions.

Ships conducting active sonar activities while moored or at anchor (including pierside testing or maintenance) will maintain one Lookout.

Testing

There are no current mitigation measures for hull-mounted mid-frequency sonar testing activities in the Study Area. The Navy's current Lookout mitigation measures during low-frequency sonar testing activities are:

- Vessels on a range shall use Lookouts during all hours of range activities. Lookout duties include looking for marine mammals. All sightings of marine mammals shall be reported to the Range Officer in charge of overseeing the activity.
- Visual surveillance shall be conducted just prior to all in-water exercises. Surveillance shall include, as a minimum, monitoring from all participating surface craft and, where available, adjacent shore sites.
- When cetaceans have been sighted in the vicinity of the operation, all range participants increase vigilance and take reasonable and practicable actions to avoid collisions and activities that may result in close interaction of naval assets and marine mammals. Actions may include changing speed and/or direction, subject to environmental and other conditions (e.g., safety, weather).

The Navy's Proposed Action includes newly assessed hull-mounted mid-frequency active sonar testing activities as well as low-frequency active sonar testing. The Navy proposes to apply the existing testing mitigation measures to both low-frequency and hull-mounted mid-frequency testing. Any appropriately trained member of the test support staff may serve as a Lookout at any time during an event so long as the observation and reporting is carried out as identified in existing measures. Testing conducted at sea

on a maximally manned vessel over 65 ft. will employ two Lookouts. Testing conducted pierside or shore-based testing will employ one Lookout. Testing conducted from small boats, minimally manned vessels, or aircraft will employ one Lookout.

5.3.1.2.1.2 High-Frequency and Non-Hull-Mounted Mid-Frequency Active Sonar

Training

The Navy currently conducts high-frequency and non-hull-mounted mid-frequency active sonar training in the Study Area. Non-hull-mounted mid-frequency active sonar training activities include the use of aircraft deployed sonobuoys and helicopter dipping sonar. During those activities, the Navy employs the following mitigation measure regarding Lookout procedures:

- Navy aircraft participating in exercises at sea shall conduct and maintain, when operationally feasible and safe, surveillance for marine species of concern as long as it does not violate safety constraints or interfere with the accomplishment of primary operational duties.
- Helicopters shall observe/survey the vicinity of an ASW training event for 10 minutes before the first deployment of active (dipping) sonar in the water.

The Navy is proposing to continue using the number of Lookouts currently implemented for aircraft conducting non-hull-mounted mid-frequency active sonar activities.

Mitigation measures do not currently exist for other high-frequency active sonar activities associated with ASW and mine warfare training, or for new platforms; therefore, the Navy is proposing to add a new Lookout and other measures for these activities and on these platforms when conducted in the Study Area. The recommended measure is provided below.

The Navy will have one Lookout on ships conducting high-frequency or non-hull-mounted mid-frequency active sonar activities associated with ASW and mine warfare activities at sea.

Prior to Maritime Homeland Defense/Security Mine Countermeasure Integrated Exercises, the Navy will conduct pre-event planning and training to ensure environmental awareness of all exercise participants. When this event is proposed to be conducted in Puget Sound, Navy event planners will consult with Navy biologists who will contact NMFS during the planning process in order to determine likelihood of gray whale or southern resident killer whale presence in the proposed exercise area as planners consider specifics of the event.

Testing

The Navy currently conducts high-frequency and non-hull-mounted mid-frequency active sonar testing activities in the Study Area. These activities include the use of aircraft deployed sonobuoys, countermeasure testing, unmanned vehicle testing, system and component testing, and non-explosive torpedo testing. Mitigation measures for high-frequency active sonar sources currently exist only for some NAVSEA testing activities conducted in the Offshore Area and Inland Waters of the Study Area. These mitigation measures are the same as described above for testing in Section 5.3.1.2.1.1 (Low-Frequency and Hull-Mounted Mid-Frequency Active Sonar). The Navy is proposing to apply the same Lookout requirements to all NAVSEA testing activities in the Proposed Action.

The Navy's proposed mitigation measures for Naval Air Systems Command testing activities are consistent with Navy training mitigation measures described above.

5.3.1.2.2 Acoustic Stressors – Explosives and Impulse Sound

5.3.1.2.2.1 Improved Extended Echo Ranging Sonobuoys

Training

The Navy has historically conducted Improved Extended Echo Ranging (IEER) training in the Study Area and has completed environmental planning documents analyzing this training in the past. Mitigation applied to this event includes the following procedures:

- Crews shall conduct visual reconnaissance of the drop area prior to laying their intended sonobuoy pattern. This search shall be conducted at an altitude below 1,500 ft. (457 m) at a slow speed, if operationally feasible and weather conditions permit. In dual aircraft operations, crews are allowed to conduct area clearances utilizing more than one aircraft.
- Crews shall conduct a minimum of 30 minutes of visual and passive acoustic monitoring of the search area prior to commanding the first post detonation. This 30-minute observation period may include pattern deployment time.
- When operationally feasible, Navy crews shall conduct continuous visual and passive acoustic monitoring of marine mammal activity. This shall include monitoring of aircraft sensors from the time of the first sensor placement until the aircraft have left the area and are out of range of these sensors.
- Passive Acoustic Detection – If the presence of marine mammals is detected aurally, then that shall cue the Navy aircrew to increase the vigilance of their visual surveillance. Subsequently, if no marine mammals are visually detected, then the crew may continue multi-static active search.
- Mammal monitoring shall continue until out of own-aircraft sensor range.

IEER sonobuoy training is included under the No Action Alternative, as part of the Navy's baseline of activities. However, the Navy is transitioning from the IEER sonobuoy to the multistatic active coherent (MAC) sonobuoy. Sonobuoy technology is evolving, and the IEER sonobuoys are being phased out due to improved capabilities in the MAC sonobuoys. Therefore, the IEER sonobuoys are no longer proposed for training activities under Alternative 1 or Alternative 2.

Testing

The Navy will have one Lookout in aircraft conducting improved extended echo ranging sonobuoy activities. The Navy is proposing to continue the Lookout procedural measures currently implemented for this activity, as described below:

- Crews shall conduct visual reconnaissance of the drop area prior to laying their intended sonobuoy pattern. This search shall be conducted at an altitude below 1,500 ft. (457 m) at a slow speed, if operationally feasible and weather conditions permit. In dual aircraft operations, crews are allowed to conduct area clearances utilizing more than one aircraft.
- Crews shall conduct a minimum of 30 minutes of visual and passive acoustic monitoring of the search area prior to commanding the first post detonation. This 30-minute observation period may include pattern deployment time.
- When operationally feasible, Navy crews shall conduct continuous visual and passive acoustic monitoring of marine mammal activity. This shall include monitoring of aircraft sensors from the time of the first sensor placement until the aircraft have left the area and are out of range of these sensors.

- Passive Acoustic Detection – If the presence of marine mammals is detected aurally, then that shall cue the Navy aircrew to increase the vigilance of their visual surveillance. Subsequently, if no marine mammals are visually detected, then the crew may continue multi-static active search.
- Mammal monitoring shall continue until out of own-aircraft sensor range.

5.3.1.2.2.2 Explosive Signal Underwater Sound Buoys Using >0.5–2.5 Pound Net Explosive Weight

Lookout measures do not currently exist for explosive Signal Underwater Sound (SUS) buoy exercises using >0.5–2.5 pound (lb.) net explosive weight.

Training

The Navy is proposing to add this measure. Aircraft conducting explosive sonobuoy exercises using >0.5–2.5 lb. net explosive weight will have one Lookout.

Testing

The Navy's proposed mitigation measures for testing activities are consistent with Navy training mitigation measures described above.

5.3.1.2.2.3 Mine Countermeasure and Neutralization Activities Using Positive Control Firing Devices

Training

Mine countermeasure and neutralization activities in the Study Area involve the use of diver-placed charges that typically occur close to shore. When these activities are conducted using a positive control firing device, the detonation is controlled by the personnel conducting the activity and is not authorized until the area is clear at the time of detonation.

Currently, the Navy employs the following Lookout procedures during mine countermeasure and neutralization activities using positive control firing devices:

- Two survey boats will be used to conduct seabird and marine mammal surveys within a 700 yd. (640 m) radius of 2.5 lb. (1.1 kilograms [kg]) net explosive weight training activities, within a 330 yd. (300 m) radius for the 1.5 lb. (0.7 kg) net explosive weight training charge, and within a 110 yd. (100 m) radius for a 1-ounce (31-gram) net explosive weight charge.
- Transect lines will be no more than 110 yd. (100 m) apart and beginning at the outside radius.
- Pre-exercise surveys shall be conducted within 30 minutes prior to commencement of the scheduled explosive event.
- The two survey boats will approach from the opposite direction and move toward the center (or explosive charge placement area) and work their way to the outside of the radius.
- Survey boats will maintain speed equal to or less than 10 knots.
- Each boat will have a minimum of two surveyors using aid of binoculars.
- In case of fog or reduced visibility, the surveyors must be able to see a minimum of 55 yd. (50 m) or the training event cannot be conducted.

A combination of factors has led to a change in the proposed procedures. For example, marine mammal and fish effects criteria have changed, resulting in the area required to be surveyed being smaller than previously assessed. By reducing the area, the Lookout effectiveness is improved. The Navy, along with the regulatory agencies, believes this is the appropriate zone for protection of species and minimize

impacts. The Navy is proposing to change the Lookout procedural measures for explosive charges of >0.5-2.5 lb. net explosive weight:

- Two survey boats will be used to conduct marbled murrelet and marine mammal surveys.
- Each survey boat will have two Lookouts onboard, one dedicated Lookout and one boat operator.

The above protocol will be reduced to one boat for the 1-ounce (31-gram) net explosive weight charge.

The divers and Lookouts will report all marine mammal, sea turtle, and marbled murrelet sightings to their dive support vessel.

Testing

The Navy's Proposed Action does not include mine countermeasure and neutralization testing activities.

5.3.1.2.2.4 Gunnery Exercises – Small-, Medium-, and Large-Caliber Using a Surface Target

Training

Currently, the Navy employs the following Lookout procedures during gunnery exercises:

- From the intended firing position, trained Lookouts shall survey the mitigation zone for marine mammals prior to commencement and during the exercise as long as practicable.
- If applicable, target towing vessels shall maintain a Lookout. If a marine mammal is sighted in the vicinity of the exercise, the tow vessel shall immediately notify the firing vessel in order to secure gunnery firing until the area is clear.

The Navy is proposing to continue using the Lookout procedures currently implemented for this activity. The Navy will have one Lookout on the vessel or aircraft conducting small-, medium-, or large-caliber gunnery exercises against a surface target. Towing vessels, if applicable, shall also maintain one Lookout.

One gunnery exercise, Small Boat Attack, involves only blank rounds and no targets. However, because of the exercise location in Puget Sound, prior to Small Boat Attack training, the Navy will conduct pre-event planning and training to ensure environmental awareness of all exercise participants. When this event is proposed to be conducted in and around Naval Station Everett, Naval Base Kitsap Bangor, or Naval Base Kitsap Bremerton in Puget Sound, Navy event planners will consult with Navy biologists who will contact NMFS early in the planning process in order to determine the extent marine mammals may be present in the immediate vicinity of proposed exercise area as planners consider the specifics of the event.

Testing

The Navy's Proposed Action does not include gunnery testing activities.

5.3.1.2.2.5 Missile Exercises Using a Surface Target

Training

Currently, the Navy employs the following Lookout procedures during missile exercises:

- Aircraft shall visually survey the target area for marine mammals. Visual inspection of the target area shall be made by flying at 1,500 ft. (457 m) or lower, if safe to do so, and at slowest safe speed.

- Firing or range clearance aircraft must be able to actually see ordnance impact areas.

The Navy is proposing to continue using the Lookout procedures currently implemented for this activity. When aircraft are conducting missile exercises against a surface target, the Navy will have one Lookout positioned in an aircraft.

Historically, Navy missile exercises are very infrequent and have occurred greater than 50 nm from shore in order to avoid other users of the area and for marine safety purposes. Conducting these exercises greater than 50 nm from shore has the practical effect of affording environmental protections to certain species such as southern resident killer whale, salmonids, and harbor porpoise. For various reasons, therefore, the Navy proposes to conduct no missile exercises utilizing high explosives within 50 nm of the shore in the NWTT Offshore Area.

Testing

The Navy's Proposed Action does not include missile testing activities.

5.3.1.2.2.6 Bombing Exercises (Explosive)

Training

Currently, the Navy employs the following Lookout procedures during bombing exercises:

- If surface vessels are involved, Lookouts shall survey for floating kelp and marine mammals.
- Aircraft shall visually survey the target and buffer zone for marine mammals prior to and during the exercise. The survey of the impact area shall be made by flying at 1,500 ft. (457 m) or lower, if safe to do so, and at the slowest safe speed. Release of ordnance through cloud cover is prohibited: aircraft must be able to actually see ordnance impact areas. Survey aircraft should employ most effective search tactics and capabilities.

The Navy is proposing to (1) continue implementing the current measures for bombing exercises, and (2) clarify the number of Lookouts currently implemented for this activity. The Navy will have one Lookout positioned in an aircraft conducting bombing exercises.

Historically, Navy bombing exercises are very infrequent and have occurred greater than 50 nm from shore in order to avoid other users of the area and for marine safety purposes. Conducting these exercises greater than 50 nm from shore has the practical effect of affording environmental protections to certain species such as southern resident killer whale, salmonids, and harbor porpoise. For various reasons, therefore, the Navy proposes to conduct no bombing exercises utilizing high explosives within 50 nm of the shore in the NWTT Offshore Area.

Testing

The Navy's Proposed Action does not include bomb testing activities.

5.3.1.2.2.7 Torpedo Testing (Explosive)

The Navy currently has no Lookout procedures for this activity in the Study Area.

Training

The Navy does not include training with explosive torpedoes in the Proposed Action.

Testing

For explosive torpedoes tested from a surface ship, the Navy is proposing to use the Lookout procedures currently implemented for hull-mounted mid-frequency active sonar activities. For explosive torpedo tests with low-altitude aircraft present, the Navy will have one Lookout positioned in an aircraft. There will be safety spotters for all explosive torpedo testing, on a submarine or on a high-altitude aircraft. There will also be a low-altitude non-participant aircraft checking that the target zone is clear during all explosive torpedo testing activities.

5.3.1.2.2.8 Weapons Firing Noise During Gunnery Exercises**Training**

The Navy is proposing to continue using the number of Lookouts currently implemented for gunnery exercises. The Navy will have one Lookout on the ship conducting explosive and non-explosive large-caliber gunnery exercises. This may be the same Lookout described in Section 5.3.1.2.2.4 (Gunnery Exercises – Small-, Medium-, and Large-Caliber Using a Surface Target) when that activity is conducted from a ship against a surface target.

Testing

The Navy's Proposed Action does not include gun testing activities.

5.3.1.2.2.9 Sinking Exercises

The Navy has historically conducted sinking exercises in the Study Area, and has completed environmental planning documents analyzing up to two sinking exercises per year. During sinking exercises, the Navy will have two lookouts (one positioned in an aircraft and one on a surface vessel).

Because of this prior analysis, sinking exercises are included under the No Action Alternative, as part of the Navy's baseline of activities. However, sinking exercises are not proposed under Alternative 1 or Alternative 2.

5.3.1.2.3 Physical Disturbance and Strike**5.3.1.2.3.1 Vessels****Training**

Currently, the Navy employs the following Lookout procedures to avoid physical disturbance and strike of marine mammals during at-sea training:

- While underway, surface vessels shall have at least two Lookouts with binoculars; surfaced submarines shall have at least one Lookout with binoculars. Lookouts already posted for safety of navigation and man-overboard precautions may be used to fill this requirement. As part of their regular duties, Lookouts will watch for and report to the Officer of the Deck the presence of marine mammals.

The Navy is proposing to revise the mitigation measures for this activity as follows: while underway, vessels will have a minimum of one Lookout.

Testing

The Navy's current mitigation measures for testing activities are consistent with Navy training mitigation measures described for avoiding physical disturbance and strike of marine mammals during at-sea training (Section 5.3.1.2.3.1, Vessels – Training) above.

5.3.1.2.3.2 Towed In-Water Devices

The Navy currently has no Lookout procedures for this activity in the Study Area.

Training

The Navy is proposing to have one Lookout during activities using towed in-water devices when towed from a manned platform.

Testing

The Navy's proposed mitigation measures for testing activities from manned platforms are consistent with Navy training mitigation measures described above. During testing in which in-water devices are towed by unmanned platforms, a manned escort vessel will be included and one Lookout will be employed.

5.3.1.2.4 Non-Explosive Practice Munitions

5.3.1.2.4.1 Gunnery Exercises – Small-, Medium-, and Large-Caliber Using a Surface Target

Currently, the Navy employs the same mitigation measures for non-explosive gunnery exercises as described above in Section 5.3.1.2.2.4 (Gunnery Exercises – Small-, Medium-, and Large-Caliber Using a Surface Target).

Training

The Navy is proposing to continue using the number of Lookouts currently implemented for these activities. The Navy will have one Lookout during activities involving non-explosive practice munitions (e.g., small-, medium-, and large-caliber gunnery exercises) against a surface target.

Testing

The Navy's Proposed Action does not include gunnery testing activities.

5.3.1.2.4.2 Bombing Exercises

Currently, the Navy employs the same mitigation measures for non-explosive bombing exercises as described above in Section 5.3.1.2.2.6 (Bombing Exercises [Explosive]).

Training

The Navy is proposing to continue using the same Lookout procedures currently implemented for these activities. The Navy will have one Lookout positioned in an aircraft during non-explosive bombing exercises.

BOMBEX events using non-explosive practice munitions may occur in areas greater than 20 nm from shore, but will not occur within the Olympic Coast National Marine Sanctuary (OCNMS).

Testing

The Navy's Proposed Action does not include bomb testing activities.

5.3.1.2.5 Effectiveness Assessment for Lookouts

Personnel standing watch in accordance with Navy standard operating procedures have multiple job responsibilities. While on duty, these standard personnel standing watch often conduct marine species observation in addition to their primary job duties (e.g., aiding in the navigation of the vessel). By having one or more Lookouts observing the air and surface of the water during certain training and testing

activities, the Navy increases the likelihood that marine species will be detected. It is also important to note that a number of training and testing activities involve multiple vessels and aircraft, thereby increasing the cumulative number of Lookouts or watch personnel that could be present during a given activity.

Although using Lookouts is expected to increase the likelihood that marine species will be detected at the surface of the water, it is unlikely that using Lookouts will be able to help avoid impacts to all species entirely due to the inherent limitations of visually detecting marine mammals. The probability of visually detecting a marine animal is dependent upon two things. An animal must be present in an area to be seen (known as the availability bias), and an animal that is present in the area of observation must be positioned or behaving in a way that will allow for a visual detection. For example, an animal may not be visually detectable if it is swimming entirely under the water at a relatively far distance from a boat. Second, the observer must perceive the animal when the animal is in a position to be detected (Marsh and Sinclair 1989).

Pursuant to Phase I (e.g., Northwest Training Range Complex EIS/OEIS) and in cooperation with NMFS, the Navy has undertaken monitoring efforts to track compliance with take authorizations, help evaluate the effectiveness of implemented mitigation measures, and gain a better understanding of the impacts of the Navy activities on marine resources. In 2010, the Navy initiated a study designed to evaluate the effectiveness of the Navy Lookout team. The University of St. Andrews, Scotland, under contract to the U.S. Navy, developed an initial data collection protocol for use during the study. Between 2010 and 2012, trained Navy marine mammal observers collected data during nine field trials as part of a “proof of concept” phase. The goal of the proof of concept phase was to develop a statistically valid protocol for quantitatively analyzing the effectiveness of Lookouts during Navy training exercises. Field trials were conducted in the Hawaii Range Complex, Southern California Range Complex, and Jacksonville Range Complex onboard one frigate, one cruiser, and seven destroyers. After final assessment of the proof of concept and necessary revisions to the methodology were completed, the data collection phase began in 2012. Eight embarks have been conducted from 2012 through March 2015. Data collection is ongoing, and analysis will be conducted when the data set is large enough to produce statistically significant results. The Navy plans to conduct four embarks per year until the data set is sufficient, which is currently estimated to take 4–8 more years of effort¹.

5.3.1.2.5.1 Detection Probabilities of Marine Mammals in the Study Area

Until the results of the Navy’s Lookout effectiveness study are available, the Navy must rely on the best available science to determine detection probabilities of marine mammals by Navy Lookouts. To do so, the Navy has compiled the results of available literature on line-transect analyses, which are typically used to estimate cetacean abundance. In line-transect analyses, the factors affecting the detection of an animal or group of animals directly on the transect line may be probabilistically quantified as $g(0)$. As a reference, a $g(0)$ value of 1 indicates that animals on the transect line are always detected. Table 5.3-1 provides detection probabilities for cetacean species based largely on $g(0)$ values derived from shipboard and aerial surveys in the Study Area, which vary widely based on $g(0)$ derivation factors (e.g., species, sighting platforms, group size, and sea state conditions). Refer to Section 3.4.3.1.16 (Implementing Mitigation to Reduce Sound Exposures) for additional background on $g(0)$ and a discussion of how the Navy used $g(0)$ to quantitatively assess the effectiveness of Lookouts during sound-producing activities.

¹ Collection of a large enough data set to be statistical significant will partially be a function of the number of marine mammals in a given area available for sighting at the time of any embark. Therefore, the length of time needed to complete this study cannot be more precisely determined.

Several variables that play into how easily a marine mammal may be detected by a dedicated observer are directly related to the animal, including its external appearance and size; surface, diving and social behavior; and life history. The following is a generalized discussion of the behavior and external appearance of the marine mammals with the potential to occur in the Study Area as these characters relate to the detectability of each species. The species are grouped loosely based on either taxonomic relatedness or commonalities in size and behavior, and include large whales, cryptic species delphinids, beluga whales, and pinnipeds. Not all statements may hold true for all species in a grouping and exceptions are mentioned where applicable. The information presented in this section may be found in Jefferson et al. (2008) and sources within unless otherwise noted.

Table 5.3-1: Sightability Based on g(0) Values for Marine Mammal Species in the Study Area

Species/Stocks	Family	Vessel Sightability	Aircraft Sightability
Baird's Beaked Whale	Ziphiidae	0.96	0.18
Blue Whale, Fin Whale, Sei Whale	Balaenopteridae	0.921	0.407
Bottlenose Dolphin	Delphinidae	0.76	0.67
California Sea Lion	Otariidae	0.299	0.299
Cuvier's Beaked Whale	Ziphiidae	0.23	0.074
Dall's Porpoise	Phocoenidae	0.822	0.221
Dwarf Sperm Whale, Pygmy Sperm Whale, <i>Kogia</i> spp.	Kogiidae	0.35	0.074
Gray Whale	Eschrichtiidae	0.921	0.482
Harbor Porpoise	Phocoenidae	0.769	0.292
Harbor Seal	Phocidae	0.281	0.281
Humpback Whale	Balaenopteridae	0.921	0.495
Killer Whale	Delphinidae	0.921	0.95
<i>Mesoplodon</i> spp.	Ziphiidae	0.45	0.11
Minke Whale	Balaenopteridae	0.856	0.386
North Pacific Right Whale	Balaenidae	0.645	0.41
Northern Elephant Seal	Phocidae	0.105	0.105
Northern Fur Seal	Otariidae	0.299	0.299
Northern Right Whale Dolphin, Pacific White-Sided Dolphin	Delphinidae	0.856	0.67
Risso's Dolphin, Striped Dolphin	Delphinidae	0.76	0.67
Short-Beaked Common Dolphin	Delphinidae	0.856	0.67
Short-finned Pilot Whale	Delphinidae	0.76	0.67
Sperm Whale	Physeteridae	0.87	0.32
Steller Sea Lion	Otariidae	0.299	0.299

Note: For species having no data, the g(0) for Cuvier's aircraft value (where g(0)=0.074) was used; or in cases where there was no value for vessels, the g(0) for aircraft was used as a conservative underestimate of sightability following the assumption that the availability bias from a slower moving vessel should result in a higher g(0).

Sources: Barlow 2006; Barlow et al. 2006; Barlow and Forney 2007; Carretta et al. 2000; Forney and Barlow 1998; Laake et al. 1997; Palka 2005. The published California Sea Lion aircraft g(0) is used for Steller Sea Lion, Guadalupe Fur Seal, and Northern Fur Seal since all are in the otariidae family and there is no g(0) data for these other species. Pinniped g(0) are not available for vessels so the aircraft value has been used as a conservative under estimate of sightability.

Large Whales

Species of large whales found in the Study Area include all the baleen whales and the sperm whale. Baleen whales are generally large, with adults ranging in size from 30 to 89 ft. (9 to 27 m), often making

them immediately detectable. Many species of baleen whales have a prominent blow ranging from 10 ft. (3 m) to as much as 39 ft. (12 m) above the surface. However, at least one species (common minke whale) often have no visible blow. Baleen whales tend to travel singly or in small groups ranging from pairs to groups of five. The exception to this is the fin whale, which is known to travel in pods of seven or more individuals. All species of baleen whales are known to form larger-scale aggregations in areas of high localized productivity or on breeding grounds. Baleen whales may or may not fluke at the surface before they dive; some species fluke regularly (humpback whale), some fluke variably (blue whale, fin whale) and some rarely fluke (sei whale and common minke whale). Baleen whales may remain at the surface for extended periods of time as they forage or socialize. Humpback whales are known to corral prey at the surface. Dive behavior varies amongst species, as well. Many species will dive and remain at depth for as long as 30 minutes. Some will adjust their diving behavior according to the presence of vessels (humpback whale, fin whale). Sei whales are known to sink just below the surface and remain there between breaths. Baleen whale $g(0)$ values are shown in Table 5.3-1.

Adult gray whales, included among the large whales, range in size from 38 to 46 ft. (11 to 14 m). When viewed in windless conditions, their blow is heart-shaped, up to 15 ft. (5 m) in height. They typically breathe 3–5 times in a row, about 10–20 seconds apart, then dive for 3–7 minutes. Gray whales occur within a narrow coastal band and their populations are generally assessed using focused (single-species) count data made from shore stations; $g(0)$ values from vessels are not available for this species and thus estimates from other large baleen whales were used.

Sperm whales are also considered large whales, with adult males reaching as much as 50 ft. (18 m) in total length. Sperm whales at the surface would likely be easy to detect. They are large, have a prominent, 16 ft. (5 m) blow, and may remain at the surface for long periods of time. They are known to raft (i.e., loll at the surface) and to form surface-active groups when socializing. Sperm whales may travel or congregate in large groups of as many as 50 individuals. Although sperm whales engage in conspicuous surface behavior such as fluking, breaching and tail-slapping, they are long, deep divers and may remain submerged for over 1 hour. Sperm whale $g(0)$ values are shown in Table 5.3-1.

Cryptic Species

Cryptic and deep-diving species are those that do not surface for long periods of time and are often difficult to see when they surface, which ultimately limits the ability of Lookouts to detect them even in good sighting conditions (Barlow et al. 2006). Cryptic species include beaked whales (family Ziphiidae), dwarf and pygmy sperm whales (*Kogia* species), and harbor porpoises. Beaked whales are notoriously difficult to detect at sea. In the Study Area, beaked whales may occur in a variety of group sizes, ranging from single individuals to groups of as many as 22 individuals (MacLeod and D'Amico 2006). Beaked whale diving behavior in general consists of long, deep dives that may last for nearly 90 minutes followed by a series of shallower dives and intermittent surfacings (Tyack et al. 2006, Baird et al. 2007). Some individuals remain at the surface for an extended period of time (perhaps 1 hour or more) or make shorter dives (MacLeod and D'Amico 2006). Beaked whale detection is further complicated because they often dive and surface in a synchronous pattern and often travel below the surface of the water (MacLeod and D'Amico 2006). Cryptic beaked whale $g(0)$ values are shown in Table 5.3-1. (Baird's beaked whale is not considered a cryptic species as it is large and relatively easy to detect in comparison to other beaked whale species.)

Dwarf and pygmy sperm whales (referred to broadly as *Kogia* species) are small cetaceans (10–13 ft. [3–4 m] adult length) that are not seen commonly at sea. *Kogia* species $g(0)$ values are shown in Table 5.3-1. *Kogia* species are some of the most commonly stranded species in some areas, which suggests

that sightings are not indicative of their overall abundance. This supports the idea that they are cryptic, perhaps engaging in inconspicuous surface behavior or actively avoiding vessels. When *Kogia* species are sighted, they are seen in groups of no more than five to six individuals. They have no visible blow, do not fluke when they dive, and are known to log (i.e., lie motionless) at the surface. When they do dive, they often will sink out of sight with no prominent behavioral display.

Harbor porpoises are difficult to detect in all but the best of conditions (i.e., no swell, no whitecaps). Harbor porpoise g(0) are shown in Table 5.3-1. Harbor porpoises travel singly or in small groups of less than six individuals, but may aggregate into groups of several hundred. They are inconspicuous at the surface, rarely lifting their heads above the surface and often lying motionless. They are small and may actively avoid vessels.

Delphinids

Delphinids are some of the most likely species to be detected at sea by observers. Delphinid g(0) values are shown in Table 5.3-1. Many species having very high g(0) values, such as the killer whale with values ranging from 0.921 to 0.95 (see Table 5.3-1). Many species of delphinids engage in very conspicuous surface behavior, including leaping, spinning, bow riding, and traveling along the surface in large groups. Delphinid group sizes may range from 10 to 10,000 individuals, depending upon the species and the geographic region. Species such as Pacific white-sided dolphins, bottlenose dolphins, and common dolphins are known to either actively approach and investigate vessels, or bow ride along moving vessels. The physical profile of a killer whale is unmistakable and while at the surface they are easily detected. Common dolphins form huge groups that travel quickly along the surface, churning up the water and making them visible from a great distance. Delphinids may dive for as little as 1 minute to more than 30 minutes, depending upon the species.

Pinnipeds

Pinnipeds (seals and sea lions) are more difficult to detect at sea, but are plentiful in inland waters as compared to cetaceans. There is not a lot of information regarding pinniped behavior at sea, but pinnipeds have been described at length for inland waters. Pinnipeds are much smaller, are often solitary at sea, and they generally do not engage in conspicuous surface behavior. In inland waters they may congregate in large groups and engage in observable behaviors. Pinnipeds have a low profile, no dorsal appendage, and small body size in comparison with most cetaceans, limiting accurate visual detection to sea states of less than 2 on the Beaufort scale (Carretta et al. 2000) at sea. Some species, such as harbor seals, are known to approach and observe human activities in inland waterways, on land, or on stationary vessels.

5.3.1.2.5.2 Detection Probabilities of Sea Turtles in the Study Area

Sea turtles spend a majority of their time below the surface and are difficult to sight from a vessel until the animal is at close range (Hazel et al. 2007). Sea turtles often spend over 90 percent of their time underwater and are not visible more than 6.5 ft. (2 m) below the surface (Mansfield 2006). Sea turtles are generally much smaller than cetaceans, so while shipboard surveys designed for sighting marine mammals are adequate for detecting large sea turtles (e.g., adult leatherbacks), they are usually not adequate for detecting the smaller-sized turtles (e.g., juveniles). Juvenile sea turtles may be especially difficult to detect. Aerial detection may be more effective in spotting sea turtles on the surface, particularly in calm seas and clear water, but it is possible that the smallest age classes are not detected even in good conditions (Marsh and Saalfeld 1989). Visual detection of sea turtles, especially small turtles, is further complicated by their startle behavior in the presence of ships. Turtles on the surface may dive below the surface of the water in the presence of a vessel before it is detected by shipboard or

aerial observers (Kenney 2005). The detection probability of sea turtles is generally lower than that of cetaceans; however, there is no information available on specific $g(0)$ values for turtles. The use of Lookouts for visual detection of sea turtles is likely effective only at close range, and is thought to be less effective for small individuals than large individuals.

5.3.1.2.5.3 Summary of Lookout Effectiveness

Due to the various detection probabilities, levels of experience, and dependence on sighting conditions, Lookouts will not always be effective at avoiding impacts to all species. However, Lookouts are expected to increase the overall likelihood that certain marine mammal species will be detected at the surface of the water, when compared to the likelihood that these same species would be detected if Lookouts are not used. The Navy believes the continued use of Lookouts contributes to helping reduce potential impacts to these marine mammal species from training and testing activities.

5.3.1.2.6 Operational Assessment for Lookouts

As written, implementation of the mitigation measures recommended in Section 5.3.1.2 (Lookouts) is considered an acceptable program with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activities, and Navy policy. The number of Lookouts recommended for each measure often represents the maximum Lookout capacity based on limited resources (e.g., space and manning restrictions).

5.3.2 MITIGATION ZONE PROCEDURAL MEASURES

Safety zones described in Section 5.1 (Standard Operating Procedures) are zones designed for human safety, whereas this section will introduce mitigation zones. A mitigation zone is designed solely for the purpose of reducing potential impacts on marine mammals and sea turtles from training and testing activities. Mitigation zones are measured as the radius from a source. Unique to each activity category, each radius represents a distance that the Navy will visually observe to help reduce injury to marine species. Visual detections of applicable marine species will be communicated immediately to the appropriate watch station for information dissemination and appropriate action. If the presence of marine mammals is detected acoustically, Lookouts posted in aircraft and on surface vessels will increase the vigilance of their visual surveillance. As a reference, aerial surveys are typically made by flying at 1,500 ft. (457 m) altitude or lower at the slowest safe speed.

Many of the proposed activities have mitigation measures that are currently being implemented, as required by previous environmental documents or consultations. Most of the current Phase I (e.g., Northwest Training Range Complex EIS/OEIS) mitigation zones for activities that involve the use of impulse and non-impulse sources were originally designed to reduce the potential for onset of temporary threshold shift (TTS). For the NWTT EIS/OEIS, the Navy updated the acoustic propagation modeling to incorporate updated hearing threshold metrics (i.e., upper and lower frequency limits), updated density data for marine mammals, and factors such as an animal's likely presence at various depths. An explanation of the acoustic propagation modeling process can be found in the *Determination of Acoustic Effects on Marine Mammals and Sea Turtles for the Northwest Training and Testing Environmental Impact Statement/Overseas Environmental Impact Statement* technical report (Marine Species Modeling Team 2013).

As a result of the updates to the acoustic propagation modeling, in some cases the ranges to onset of TTS effects are much larger than those output by previous Phase I models. Due to the ineffectiveness and unacceptable operational impacts associated with mitigating these large areas, the Navy is unable to mitigate for onset of TTS for every activity. In this NWTT analysis, the Navy developed each

recommended mitigation zone to avoid or reduce the potential for onset of the lowest level of injury, permanent threshold shift (PTS), out to the predicted maximum range. In some cases where the ranges to effects are smaller than previous models estimated, the mitigation zones were adjusted accordingly to provide consistency across the measures. Mitigating to the predicted maximum range to PTS consequently also mitigates to the predicted maximum range to onset mortality (1 percent mortality), onset slight lung injury, and onset slight gastrointestinal tract injury, since the maximum range to effects for these criteria are shorter than for PTS. Furthermore, in most cases, the predicted maximum range to PTS also consequently covers the predicted average range to TTS. Table 5.3-2 summarizes the predicted average range to TTS, average range to PTS, maximum range to PTS, and recommended mitigation zone for each activity category, based on the Navy's acoustic propagation modeling results. The predicted ranges are based on local environmental conditions and are unique to the NWTT Study Area.

The activity-specific mitigation zones are based on the longest range for all the functional hearing groups (based on the hearing threshold metrics described in Section 3.4, Marine Mammals, and Section 3.5, Sea Turtles). The mitigation zone for a majority of activities is driven by either the high-frequency cetaceans or the sea turtles functional hearing groups. Therefore, the mitigation zones are even more protective for the remaining functional hearing groups (i.e., low-frequency cetaceans, mid-frequency cetaceans, and pinnipeds), and likely cover a larger portion of the potential range to onset of TTS.

The range to effects for activities using sonar and other active acoustic sources used in the Inland Waters differ from the ranges used in Table 5.3-2 based on Offshore Area activities. For pierside maintenance and testing of hull-mounted mid-frequency sources in the Inland Waters, modeling provides an overestimate of the range to effects because it cannot adequately account for the complex interactions of the sound energy into very shallow water and associated shorelines, the loss into dampening structures (i.e., such as adjacent pilings, jetties, or seawalls), or occasions when a ship or submarine is moored bow in so that the sonar is transmitted toward the nearby shoreline. Therefore, the ranges in Table 5.3-2 are even more protective for activities in the Inland Waters.

In addition to evaluating mitigation zones based on marine mammals and sea turtles, the Navy also evaluated ranges for specific effects to the marbled murrelet. This evaluation included explosive ranges to TTS and the onset of auditory injury, non-auditory injury, slight lung injury, and mortality. For every source proposed for use by the Navy, the recommended mitigation zones included in Table 5.3-2 exceed each of these ranges.

In some instances, the Navy recommends mitigation zones that are larger or smaller than the predicted maximum range to PTS based on the effectiveness and operational assessments. The recommended mitigation zones and their associated assessments are provided throughout the remainder of this section. The recommended measures are either currently implemented, are modifications of current measures, or are new measures.

For some activities specified throughout the remainder of this section, Lookouts may be required to observe for concentrations of detached floating vegetation (i.e., kelp paddies), which are indicators of potential marine mammal and sea turtle presence within the mitigation zone. Those specified activities will not commence if floating vegetation (i.e., kelp paddies) is observed within the mitigation zone prior to the initial start of the activity. If floating vegetation is observed prior to the initial start of the activity, the activity will be relocated to an area where no floating vegetation is observed. Training and testing will not cease as a result of indicators entering the mitigation zone after activities have commenced. This measure is intended only for floating vegetation detached from the seafloor.

Table 5.3-2: Predicted Range to Effects and Recommended Mitigation Zones for Marine Mammals and Sea Turtles

Activity Category	Representative Source (Bin) ¹	Predicted Average Range to TTS	Predicted Average Range to PTS	Predicted Maximum Range to PTS	Recommended Mitigation Zone
Sonar and Other Active Acoustic Sources					
Low-Frequency and Hull-Mounted Mid-Frequency Active Sonar	SQS-53 ASW hull-mounted sonar (MF1)	4,251 yd. (3,887 m) for one ping	100 yd. (91 m) for one ping	Not applicable	<u>Training</u> : 1,000 yd. (914 m) and 500 yd. (457 m) power downs and 200 yd. (183 m) shutdown for cetaceans and sea turtles, 100 yd. (91 m) mitigation zone for pinnipeds (excludes haulout areas) <u>Testing</u> : 1,000 yd. (914 m) and 500 yd. (457 m) power downs for sources that can be powered down, 200 yd. (183 m) shutdown for cetaceans, and 100 yd. (91 m) for pinnipeds (excludes haulout areas)
High-Frequency and Non-Hull-Mounted Mid-Frequency Active Sonar ²	AQS-22 ASW dipping sonar (MF4)	226 yd. (207 m) for one ping	20 yd. (18 m) for one ping	Not applicable	<u>Training</u> : 200 yd. (183 m) <u>Testing</u> : 200 yd. (183 m) for cetaceans, 100 yd. (91 m) for pinnipeds (excludes haulout areas)
Explosive and Impulse Sound					
Improved Extended Echo Ranging Sonobuoys	Explosive sonobuoy (E4)	237 yd. (217 m)	133 yd. (122 m)	235 yd. (215 m)	<u>Training</u> : 600 yd. (549 m) <u>Testing</u> : 600 yd. (549 m)
Signal Underwater Sound (SUS) buoys using > 0.5–2.5 lb. NEW	Explosive sonobuoy (E3)	178 yd. (163 m)	92 yd. (84 m)	214 yd. (196 m)	<u>Training</u> : 350 yd. (320 m) <u>Testing</u> : 350 yd. (320 m)
Mine Countermeasure and Neutralization Activities (Positive control)	>0.5-2.5 lb. NEW (E3)	495 yd. (453 m)	145 yd. (133 m)	373 yd. (341 m)	<u>Training</u> : 400 yd. (366 m) <u>Testing</u> : n/a
Gunnery Exercises – Small- and Medium-Caliber (Surface Target)	25 mm projectile (E1)	72 yd. (66 m)	48 yd. (44 m)	73 yd. (67 m)	<u>Training</u> : 200 yd. (183 m) <u>Testing</u> : n/a
Gunnery Exercises – Large-Caliber (Surface Target)	5 in. projectiles (E5 at the surface) ³	210 yd. (192 m)	110 yd. (101 m)	177 yd. (162 m)	<u>Training</u> : 600 yd. (549 m) <u>Testing</u> : n/a
Missile Exercises up to 500 lb. NEW (Surface Target)	Harpoon missile (E10)	1,164 yd. (1,065 m)	502 yd. (459 m)	955 yd. (873 m)	<u>Training</u> : 2,000 yd. (1.8 km) <u>Testing</u> : n/a
Bombing Exercises	MK-84 2,000 lb. bomb (E12)	1,374 yd. (1,256 m)	591 yd. (540 m)	1,368 yd. (1,251 m)	<u>Training</u> : 2,500 yd. (2.3 km) <u>Testing</u> : n/a

Table 5.3-2: Predicted Range to Effects and Recommended Mitigation Zones for Marine Mammals and Sea Turtles (continued)

Activity Category	Representative Source (Bin) ¹	Predicted Average Range to TTS	Predicted Average Range to PTS	Predicted Maximum Range to PTS	Recommended Mitigation Zone
Lightweight Torpedo (Explosive) Testing	MK-46 torpedo (E8)	497 yd. (454 m)	245 yd. (224 m)	465 yd. (425 m)	<u>Training:</u> n/a <u>Testing:</u> 2,100 yd. (1.9 km)
Heavyweight Torpedo (Explosive) Testing	MK-48 torpedo (E11)	1,012 yd. (926 m)	472 yd. (432 m)	885 yd. (809 m)	<u>Training:</u> n/a <u>Testing:</u> 2,100 yd. (1.9 km)
Sinking Exercises ⁴	Various up to MK-84 2,000 lb. bomb (E12)	1,374 yd. (1,256 m)	591 yd. (540 m)	1,368 yd. (1,251 m)	<u>Training:</u> 2.5 nm ² <u>Testing:</u> n/a

¹ This table does not provide an inclusive list of source bins; bins presented here represent the source bin with the largest range to effects within the given activity category.

² High-frequency and non-hull-mounted mid-frequency active sonar category includes unmanned underwater vehicle and torpedo testing activities.

³ The representative source bin E5 has different range to effects depending on the depth of activity occurrence (at the surface or at various depths).

⁴ Although included under the No Action Alternative, sinking exercises will no longer be conducted in the NWTT Study Area.

Notes: ASW = anti-submarine warfare, m = meter, n/a = Not Applicable, NEW = net explosive weight, PTS = permanent threshold shift, TTS = temporary threshold shift, yd. = yard

5.3.2.1 Acoustic Stressors

5.3.2.1.1 Non-Impulse Sound

5.3.2.1.1.1 Low-Frequency and Hull-Mounted Mid-Frequency Active Sonar

Recommended Mitigation and Comparison to Current Mitigation

Under the Proposed Action, low-frequency active sonar would be used only during a few testing activities conducted in the Offshore Area, the Inland Waters, and the Western Behm Canal, and not during any proposed training activities. Therefore, mitigation measures for low-frequency active sonar sources currently exist only for these testing activities conducted in the Study Area.

Training

The Navy is proposing to (1) continue implementing the current measures for mid-frequency active sonar, (2) clarify the conditions needed to recommence an activity after a sighting, and (3) implement mitigation measures for pinnipeds and for pierside sonar testing in the vicinity of hauled out pinnipeds.

For training activities, the recommended measures are provided below.

Activities that involve the use of hull-mounted mid-frequency active sonar (including pierside) will use Lookouts for visual observation from a ship immediately before and during the activity. Mitigation zones for these activities involve powering down the sonar by 6 dB when a marine mammal is sighted within 1,000 yd. (914 m) of the sonar dome, and by an additional 4 dB when sighted within 500 yd. (457 m) from the source, for a total reduction of 10 dB. Active transmissions will cease if a marine mammal or sea turtle is sighted within 200 yd. (183 m). Active transmission will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on its course and speed, (3) the mitigation zone has been clear from any additional sightings for a period of 30 minutes, (4) the ship has transited more than 2,000 yd. (1.8 kilometers [km]) beyond the location of the last sighting, or (5) the ship concludes that dolphins are deliberately closing in on the ship to ride the ship's bow wave (and there are no other marine mammal sightings within the mitigation zone). Active transmission may resume when dolphins are bow riding because they are out of the main transmission axis of the active sonar while in the shallow-wave area of the ship bow.

For pinnipeds, the Navy proposes a 100 yd. mitigation zone; active transmissions will cease if a pinniped is sighted within 100 yd. (91 m). The pinniped mitigation zone does not apply for pierside sonar maintenance in the vicinity of pinnipeds hauled out on or in the water near man-made structures and vessels. Within Puget Sound there are several locations where pinnipeds use Navy structures (e.g., submarines, security barriers) for haulouts in spite of the degree of activity surrounding these sites (Figure 5-2). Given that animals continue to choose these areas for their resting behavior, it would appear there are no long-term effects or consequences to those animals, whether in the water or hauled out, as a result of ongoing and routine Navy activities. The mitigation of removing them from a submarine and/or port security barrier is not considered viable as that action could be perceived as a greater harassment and would be difficult to implement because of the number of animals typically involved.

Testing

There are no current hull-mounted mid-frequency active sonar testing activities in the Study Area, and no mitigation procedures. However, the Navy's Proposed Action includes newly assessed hull-mounted mid frequency active sonar testing activities.



Figure 5-2: Sea Lions Hauled Out on: Naval Station Everett Port Security Barrier (Top), on Naval Base Kitsap, Bangor Port Security Barrier (Center), and on a Submarine at Naval Base Kitsap, Bangor (Bottom)

For testing with low-frequency or hull-mounted mid-frequency source activities, the recommended measures are provided below.

Activities that involve the use of low-frequency active sonar (including pierside) will use Lookouts for visual observation immediately before and during the event. If a cetacean or sea turtle (pinniped measures are described below) is sighted within 200 yd. (183 m) of the sound source, active transmissions will cease. Active transmission will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on its course and speed, (3) the mitigation zone has been clear from any additional sightings for a period of 30 minutes, or (4) the sound source has transited more than 2,000 yd. (1.8 km) beyond the location of the last sighting.

Activities that involve the use of hull-mounted mid-frequency active sonar (including pierside and shore-based testing) will follow the mitigation measures described above for hull-mounted mid-frequency active sonar training.

For pinnipeds, the Navy proposes a 100 yd. mitigation zone. The pinniped mitigation zone does not apply for pierside sonar maintenance in the vicinity of pinnipeds hauled out on or in the water near man-made structures and vessels.

Effectiveness and Operational Assessments

See the introduction of Section 5.3.2 (Mitigation Zone Procedural Measures) for a general discussion of mitigation zones, how they are implemented, and the potential effects they are designed to reduce. As shown in Table 5.3-2, the predicted maximum range to onset of PTS for low-frequency and hull-mounted mid-frequency active sonar sources is approximately 292 yd. (267 m) for one ping. This range was determined by the high-frequency cetacean functional hearing group. The distance for all other marine mammal functional hearing groups is less than 104 yd. (95 m) for one ping, so the mitigation zone will provide further protection from injury (PTS) for these species. Therefore, implementation of the 200 yd. (183 m) shutdown zone will reduce the potential for exposure to higher levels of energy that would result in injury (PTS) and large threshold shifts that are recoverable (i.e., TTS) when individuals are sighted. Implementation of the 500 yd. (457 m) and 1,000 yd. (914 m) sonar power reductions will further reduce the potential for injury (PTS) and larger threshold shifts that would result in recovery (i.e., TTS) to occur when individual marine mammals are sighted within these zones, especially in cases where the ship and animal are approaching each other.

The mitigation zones the Navy has developed are within a range for which Lookouts can reasonably be expected to maintain situational awareness and visually observe during most conditions. Since the average range to onset of TTS is 4,251 yd. (3,887 m), the entire range to TTS is not reasonably observable. By establishing mitigation zones that can be realistically maintained from ships, Lookouts will be more effective at sighting individual animals. By keeping Lookouts focused within the ranges where exposure to higher levels of energy is possible, the effectiveness at reducing potential impacts to marine mammals and sea turtles will increase. As discussed in Section 5.3.1.2.5 (Effectiveness Assessment for Lookouts), the likelihood of sighting individual animals, particularly sea turtles and some species of small or cryptic marine mammals, decreases at long distances.

The post-sighting wait period is designed to give any animals that are sighted an opportunity to leave the area before the exercise recommences but will only be employed if one of the other conditions has not already been met. A 30-minute wait period more than covers the average dive times of most marine

mammal species but may not be sufficient for some deep-diving marine mammal species or for sea turtles. However, the analysis in Section 3.4.3.1 (Acoustic Stressors) shows that injury to deep-diving marine mammals (e.g., sperm whales and beaked whales) is not expected to occur. Furthermore, any wait period greater than 30 minutes would result in an unacceptable operational impact on readiness. Observation for indicators of marine mammal and sea turtle presence (e.g., concentrations of floating vegetation [kelp paddies]) will further help avoid impacts to marine mammals and sea turtles.

The Navy proposes implementing the recommended measure described above because: (1) it is likely to result in avoidance or reduction of exposure to high levels of energy to marine mammals and sea turtles; and (2) implementation is considered to be acceptable with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.2.1.1.2 High-Frequency and Non-Hull-Mounted Mid-Frequency Active Sonar Recommended Mitigation and Comparison to Current Mitigation

Training

Non-hull-mounted mid-frequency active sonar training activities include the use of aircraft deployed sonobuoys and helicopter dipping sonar. The Navy is proposing to: (1) continue implementing the current mitigation measures for activities currently being executed, such as dipping sonar activities; (2) extend the implementation of its current mitigation to all other activities in this category; and (3) clarify the conditions needed to recommence an activity after a sighting. The recommended measures are provided below.

Mitigation will include visual observation from a vessel or aircraft (with the exception of platforms operating at high altitudes) immediately before and during active transmission within a mitigation zone of 200 yd. (183 m) from the active sonar source. For activities involving helicopter deployed dipping sonar, visual observation will commence 10 minutes before the first deployment of active dipping sonar. Helicopter dipping and sonobuoy deployment will not begin if concentrations of floating vegetation (kelp paddies), are observed in the mitigation zone. If the source can be turned off during the activity, active transmission will cease if a marine mammal is sighted within the mitigation zone. Active transmission will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on its course and speed, (3) the mitigation zone has been clear from any additional sightings for a period of 10 minutes for an aircraft-deployed source, (4) the mitigation zone has been clear from any additional sightings for a period of 30 minutes for a vessel-deployed source, (5) the vessel or aircraft has repositioned itself more than 400 yd. (370 m) away from the location of the last sighting, or (6) the vessel concludes that dolphins are deliberately closing in to ride the vessel's bow wave (and there are no other marine mammal sightings within the mitigation zone).

Testing

Mitigation measures for high-frequency active sonar sources currently exist only for testing activities conducted in the Inland Waters of Puget Sound. These activities include the use of unmanned vehicles, non-explosive torpedoes, and similar systems. The current mitigation measures used for these testing activities are the same as described above in Section 5.3.2.1.1.1 (Low-Frequency and Hull-Mounted Mid-Frequency Active Sonar).

For all high-frequency and non-hull-mounted mid-frequency active sonar testing activities in the Proposed Action, the Navy proposes to employ the mitigation measures described above for training. For pinnipeds, the Navy proposes a 100 yd. (91 m) mitigation zone during testing. The pinniped

mitigation zone does not apply for pierside sonar testing in the vicinity of pinnipeds hauled out on or in the water near man-made structures and vessels.

Effectiveness and Operational Assessments

See the introduction of Section 5.3.2 (Mitigation Zone Procedural Measures) for a general discussion of mitigation zones, how they are implemented, and the potential effects they are designed to reduce. As shown in Table 5.3-2, the predicted maximum range to onset of PTS for high-frequency and non-hull-mounted mid-frequency active sonar sources is less than 55 yd. (50 m) for one ping. This range was the same for all functional hearing groups. The average range to onset of TTS across all functional hearing groups is 226 yd. (207 m) for one ping. Implementation of the 200 yd. (183 m) mitigation zone will reduce the potential for exposure to higher levels of energy that would result in injury (PTS) and larger threshold shifts that would result in recovery (i.e., TTS) when individuals are sighted. Lookouts often visually observe either close aboard a vessel or from directly above the source by aircraft (i.e., helicopters). Exceptions include when sonobuoys are deployed and when sources are deployed from high altitude aircraft. When sonobuoys are used, the sonobuoy field may be dispersed over a large distance. As discussed in Section 5.3.1.2.5 (Effectiveness Assessment for Lookouts), the likelihood of sighting individual animals, particularly small or cryptic marine mammals, decreases at long distances. This measure should be effective at reducing risks to all marine mammals that are available to be observed within the mitigation zone.

The post-sighting wait periods are designed to give any animals that are sighted an opportunity to leave the area before the exercise recommences but will only be employed if one of the other conditions has not already been met. The 30-minute wait period for vessel-deployed sources more than covers the average dive times of most marine mammal species but may not be sufficient for some deep-diving species. However, the analysis in Section 3.4.3.1 (Acoustic Stressors) shows that injury to deep-diving marine mammals (e.g., sperm whales and beaked whales) is not expected to occur, with the exception of *Kogia* species. Furthermore, any wait period greater than 30 minutes for vessel-deployed sources would result in an unacceptable operational impact on readiness. The 10-minute wait period for aircraft-deployed sources is based on fuel restrictions. Any wait period greater than 10 minutes for an aircraft-deployed source would result in an unacceptable operational impact on readiness and safety of personnel. The 10-minute wait period covers a portion of the average marine mammal dive times but may not be sufficient to cover the average dive times of all species. Observation for indicators of marine mammal and sea turtle presence (e.g., concentrations of floating vegetation [kelp paddies]) will further help avoid impacts to marine mammals and sea turtles.

The Navy proposes implementing the recommended measure described above because: (1) it is likely to result in avoidance or reduction of exposure to high levels of energy to marine mammals; and (2) implementation has been analyzed as acceptable with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.2.1.2 Explosives and Impulse Sound

5.3.2.1.2.1 Improved Extended Echo Ranging Sonobuoys

Recommended Mitigation and Comparison to Current Mitigation

Training

The Navy has historically conducted IEER training in the Study Area, and has completed environmental planning documents analyzing this training in the past. Mitigation applied to this event includes the following procedures:

The Navy is proposing to (1) modify the mitigation measures currently implemented for this activity by reducing the marine mammal and sea turtle mitigation zone from 1,000 yd. (914 m) to 600 yd. (549 m), (2) clarify the conditions needed to recommence an activity after a sighting, and (3) adopt the marine mammal and sea turtle mitigation zone size for floating vegetation for ease of implementation. The recommended measures are provided below.

Mitigation will include pre-exercise aerial observation and passive acoustic monitoring, which will begin 30 minutes before the first source/receiver pair detonation and continue throughout the duration of the exercise. The pre-exercise aerial observation will include the time it takes to deploy the sonobuoy pattern (deployment is conducted by aircraft dropping sonobuoys in the water). Improved Extended Echo Ranging sonobuoys will not be deployed if concentrations of floating vegetation (kelp paddies) are observed in the mitigation zone around the intended deployment location. Explosive detonations will cease if a marine mammal or sea turtle is sighted within the mitigation zone. Detonations will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on its course and speed, or (3) the mitigation zone has been clear from any additional sightings for a period of 30 minutes.

Passive acoustic monitoring would be conducted with Navy assets, such as sonobuoys, already participating in the activity. These assets would only detect vocalizing marine mammals within the frequency bands monitored by Navy personnel. Passive acoustic detections would provide only limited range and bearing to detected animals, and therefore cannot provide locations of these animals. Passive acoustic detections would be reported to Lookouts posted in aircraft and on vessels in order to increase vigilance of their visual surveillance.

Testing

The Navy's proposed mitigation measures for testing activities are consistent with Navy training mitigation measures described above.

Effectiveness and Operational Assessments

See the introduction of Section 5.3.2 (Mitigation Zone Procedural Measures) for a general discussion of mitigation zones, how they are implemented, and the potential effects they are designed to reduce. As shown in Table 5.3-2, the predicted maximum range to onset of PTS for Improved Extended Echo Ranging sonobuoys is approximately 235 yd. (215 m). This range was determined by the high-frequency cetacean functional hearing group. The remaining functional hearing groups had a shorter range to onset of PTS, so the mitigation zone will provide further protection for these species. The average range to onset of TTS across all functional hearing groups is 237 yd. (217 m). Implementation of the 600 yd. (549 m) mitigation zone will reduce the potential for exposure to higher levels of energy that would result in injury and larger threshold shifts that would result in recovery (i.e., TTS) when individuals are sighted. The sonobuoy field may be dispersed over a large distance. As discussed in Section 5.3.1.2.5 (Effectiveness Assessment for Lookouts), the likelihood of sighting individual animals, particularly sea turtles and some species of small or cryptic marine mammals, decreases at long distances.

The decrease in mitigation zone size will result in no mitigation for exposure to lower levels of potential onset of TTS; however, it will allow for a more focused survey effort over a smaller survey distance, and will consequently increase the likelihood of avoidance of injury and larger threshold shifts that would result in recovery (i.e., TTS) to marine mammals and sea turtles.

The post-sighting wait period is designed to give any animals that are sighted an opportunity to leave the area before the exercise recommences but will only be employed if one of the other conditions has not already been met. A 30-minute wait period more than covers the average dive times of most marine mammal species but may not be sufficient for some deep-diving marine mammal species or for sea turtles. However, the analysis in Section 3.4.3.1 (Acoustic Stressors) shows that injury to deep-diving marine mammals (e.g., sperm whales and beaked whales) is not expected to occur. Furthermore, any wait period greater than 30 minutes would result in an unacceptable operational impact on readiness. Observation for indicators of marine mammal and sea turtle presence (e.g., concentrations of floating vegetation [kelp paddies]) will further help avoid impacts to marine mammals and sea turtles.

The Navy proposes implementing the recommended measure described above because: (1) it is likely to result in avoidance or reduction of exposure to high levels of energy to marine mammals and sea turtles; and (2) implementation has been analyzed as acceptable with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.2.1.2.2 Explosive Signal Underwater Sound Buoys Using > 0.5–2.5 Pound Net Explosive Weight

Recommended Mitigation and Comparison to Current Mitigation

Mitigation measures do not currently exist for activities using SUS buoys.

Training

The Navy is proposing to add the following recommended measures. Mitigation will include pre-exercise aerial monitoring during deployment within a mitigation zone of 350 yd. (320 m) around an explosive SUS buoy. Explosive SUS buoys will not be deployed if concentrations of floating vegetation (kelp paddies) are observed in the mitigation zone (around the intended deployment location). SUS deployment will cease if a marine mammal or sea turtle is sighted within the mitigation zone. Deployment will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on its course and speed, or (3) the mitigation zone has been clear from any additional sightings for a period of 10 minutes.

Passive acoustic monitoring will also be conducted with Navy assets, such as sonobuoys, already participating in the activity. These assets would only detect vocalizing marine mammals within the frequency bands monitored by Navy personnel. Passive acoustic detections would not provide range or bearing to detected animals, and therefore cannot provide locations of these animals. Passive acoustic detections would be reported to Lookouts posted in aircraft in order to increase vigilance of their visual surveillance.

Testing

The Navy's proposed mitigation measures for testing activities are consistent with Navy training mitigation measures described above.

Effectiveness and Operational Assessments

See the introduction of Section 5.3.2 (Mitigation Zone Procedural Measures) for a general discussion of mitigation zones, how they are implemented, and the potential effects they are designed to reduce. As shown in Table 5.3-2, the predicted maximum range to onset of PTS for explosive SUS buoys using > 0.5–2.5 lb. net explosive weight is approximately 214 yd. (196 m). This range was determined by the high-frequency cetacean functional hearing group. The remaining functional hearing groups had a shorter

range to onset of PTS, so the mitigation zone will provide further protection for these species. The average range to onset of TTS across all functional hearing groups is 178 yd. (163 m). Implementation of the 350 yd. (320 m) mitigation zone will reduce the potential for exposure to higher levels of energy that would result in injury and large threshold shifts that are recoverable (i.e., TTS) when individuals are sighted. As discussed in Section 5.3.1.2.5 (Effectiveness Assessment for Lookouts), the likelihood of sighting individual animals, particularly sea turtles and some species of small or cryptic marine mammals, decreases at long distances.

The post-sighting wait period is designed to give any animals that are sighted an opportunity to leave the area before the exercise recommences but will only be employed if one of the other conditions has not already been met. The 10-minute wait period for this activity, which involves aircraft-deployed sources, is based on fuel restrictions. Any wait period greater than 10 minutes for an aircraft-deployed source would result in an unacceptable operational impact on readiness and safety of personnel. The 10-minute wait period covers a portion of the average marine mammal and sea turtle dive times but may not be sufficient to cover the average dive times of all species. Observation for indicators of marine mammal and sea turtle presence (e.g., concentrations of floating vegetation [kelp paddies]) will further help avoid impacts to marine mammals and sea turtles.

The Navy proposes implementing the recommended measure described above because (1) it is likely to result in avoidance or reduction of exposure to high levels of energy to marine mammals and sea turtles; and (2) implementation has been analyzed as acceptable with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.2.1.2.3 Mine Countermeasure and Neutralization Activities Using Positive Control Firing Devices

Recommended Mitigation and Comparison to Current Mitigation Training

Mine countermeasure and neutralization activities in the Study Area involve the use of diver-placed charges that typically occur close to shore. When these activities are conducted using a positive control firing device, the detonation is controlled by the personnel conducting the activity and is not authorized until the area is clear at the time of detonation.

Currently, the Navy employs the following mitigation zone procedures during mine countermeasure and neutralization activities using positive control firing devices:

- Mitigation Zone – All Mine Warfare and Mine Countermeasures Operations involving the use of explosive charges must include mitigation zones for marine mammals and marbled murrelets to prevent physical and/or acoustic effects to those species.
 - The exclusion zone for marine mammals shall extend in a 700 yd. (640 m) arc radius around the detonation site for all charges sizes from > 0.5-2.5 lb. net explosive weight.
 - The exclusion zone for marbled murrelets shall extend in a 700 yd. (640 m) arc radius around the detonation site for 2.5 lb. net explosive weight training activities; 330 yd. (300 m) radius for a 1.5 lb. charge and 110 yd. (100 m) radius for a 1-ounce charge.
- Pre-Exercise Surveys – For Demolition and Mine Countermeasures Operations, pre-exercise surveys shall be conducted within 30 minutes prior to the commencement of the scheduled explosive event. The survey may be conducted from the surface, by divers, and/or from the air, and personnel shall be alert to the presence of any marine mammal or seabird. Should such an animal be present within the survey area, the explosive event shall not be started until the

animal voluntarily leaves the area. The Navy will ensure the area is clear of marine mammals and seabirds for a full 30 minutes prior to initiating the explosive event. Personnel will record any marine mammal and seabird observations during the exercise as well as measures taken if species are detected within the exclusion zone.

- Post-Exercise Surveys – Surveys within the same radius shall also be conducted within 30 minutes after the completion of the explosive event.

For activities involving positive control diver-placed charges, the Navy is proposing to (1) modify the currently implemented mitigation measures for activities involving > 0.5-2.5 lb. net explosive weight by changing the mitigation zone from 700 yds. (640 m) to 400 yd. (366 m) for marine mammals, (2) clarify the conditions needed to recommence an activity after a sighting, (3) add a requirement to observe for floating vegetation, and (4) defer the determination of a mitigation zone and monitoring procedure for marbled murrelet until consultation with USFWS is complete. The recommended measures for activities involving positive control diver-placed activities are provided below.

The Navy is proposing to use the 400 yd. (366 m) mitigation zones for marine mammals described above during activities involving positive control diver-placed charges. The mitigation zone for the marbled murrelet will be determined in consultation with USFWS. Visual observation will be conducted by two small boats, each with a minimum of one surveyor.

Explosive detonations will cease if a marine mammal is sighted in the water portion of the mitigation zone (i.e., not on shore). Detonations will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on its course and speed, or (3) the mitigation zone has been clear from any additional sightings for a period of 30 minutes.

Although the mitigation zone and monitoring procedure for the marbled murrelet are being determined in consultation with USFWS, the Navy proposes to continue visual monitoring for the marbled murrelet within the mitigation zone. The Navy will report all injured marbled murrelets sighted during the post-detonation observations to the appropriate Navy Region Environmental Director, Navy Pacific Fleet Environmental Office, and local base wildlife biologist.

Testing

The Navy's Proposed Action does not include mine countermeasure and neutralization testing activities.

Effectiveness and Operational Assessments

See the introduction of Section 5.3.2 (Mitigation Zone Procedural Measures) for a general discussion of mitigation zones, how they are implemented, and the potential effects they are designed to reduce. In determining the range to effects shown in Table 5.3-2 for general mine countermeasure and neutralization activities, the high-frequency cetacean functional hearing group, sea turtles, and marbled murrelets were considered. The remaining functional hearing groups had shorter ranges to onset of PTS, so the mitigation zones will provide further protection for these species. Implementing the mitigation zones outlined in Table 5.3-2 will reduce the potential for exposure to higher levels of energy that would result in injury and larger threshold shifts that would result in recovery (i.e., TTS) when individuals are sighted.

As described in Section 5.3.1 (Lookout Procedural Measures), Lookouts positioned in aircraft or small boats may be responsible for tasks in addition to observing the air or surface of the water. For example,

a Lookout for this activity may also be responsible for navigation or assistance with mine countermeasure and neutralization deployment. The decrease in mitigation zone size for activities using diver-placed charges will result in no mitigation for exposure to lower levels of potential onset of TTS; however, it will allow for a more focused survey effort over a smaller area, and will consequently increase the likelihood of avoidance of injury and larger threshold shifts that would result in recovery (i.e., TTS) to marine mammals. Having a Lookout observe a mitigation zone that is too large could potentially increase the safety risk due to an increased level of distraction from normal job duties. Observation of an area beyond what the Navy is proposing to implement would not be likely to result in avoidance or reduction of injury to marine mammals or sea turtles because the effort spent observing those more distant areas would inevitably be minimal.

As described in Section 5.3.1.2.5 (Effectiveness Assessment for Lookouts), the ability of a Lookout to detect an animal can vary greatly based on what observing platform is being used. For large ranges, aerial observation is more effective. In addition, when observing from a small boat, sea turtle and cryptic marine mammal species can be very difficult to detect beyond a few meters. However, this measure should be effective at reducing potential impacts for individuals that are sighted.

Mine neutralization activities involving diver-placed charges occur only in the Inland Waters, primarily close to shore and in shallow water. The range to effects shown in Table 5.3-2 for mine neutralization activities involving diver placed charges were determined by the sea turtle functional hearing group, since this species has the longest range to effects for this activity. All other hearing groups had shorter ranges to onset of PTS, so the mitigation zones will provide further protection for these species. However, mitigation would be implemented for any species observed within the mitigation zone. Implementation of the mitigation zones outlined in Table 5.3-2 will reduce the potential for exposure to higher levels of energy that would result in injury and larger threshold shifts that would result in recovery (i.e., TTS) when individuals are sighted. The decrease in mitigation zone size for activities using diver placed charges will result in no mitigation for exposure to lower levels of potential onset of TTS; however, it will allow for a more focused survey effort over a smaller area, and will consequently increase the likelihood of avoidance of injury and larger threshold shifts that would result in recovery (i.e., TTS) to marine mammals.

During activities using diver placed charges, Lookouts are visually observing from small boats (rigid hull inflatable boats) or helicopters. As discussed above, aerial observation is more effective than observation from a small boat. Since small boats do not have a very elevating observing platform, the distance over which animals can be observed is much shorter. Sea turtles and cryptic marine mammal species would be very difficult to detect further than a few meters away from the boat.

5.3.2.1.2.4 Gunnery Exercises – Small- and Medium-Caliber Using a Surface Target Recommended Mitigation and Comparison to Current Mitigation Training

The Navy is proposing to (1) continue implementing the current mitigation measures for this activity, (2) clarify the conditions needed to recommence an activity after a sighting, and (3) add a requirement to visually observe for kelp paddies.

Mitigation will include visual observation from a vessel or aircraft immediately before and during the exercise within a mitigation zone of 200 yd. (183 m) around the intended impact location. Vessels will observe the mitigation zone from the firing position. When aircraft are firing, the aircrew will maintain visual watch of the mitigation zone during the activity. The exercise will not commence if concentrations

of floating vegetation (kelp paddies) are observed in the mitigation zone. Firing will cease if a marine mammal or sea turtle is sighted within the mitigation zone. Firing will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on its course and speed, (3) the mitigation zone has been clear from any additional sightings for a period of 10 minutes for a firing aircraft, (4) the mitigation zone has been clear from any additional sightings for a period of 30 minutes for a firing ship, or (5) the intended target location has been repositioned more than 400 yd. (370 m) away from the location of the last sighting.

Testing

The Navy's Proposed Action does not include gunnery testing activities.

Effectiveness and Operational Assessments

See the introduction of Section 5.3.2 (Mitigation Zone Procedural Measures) for a general discussion of mitigation zones, how they are implemented, and the potential effects they are designed to reduce. As shown in Table 5.3-2, the predicted maximum range to onset of PTS for small and medium caliber gunnery is approximately 73 yd. (67 m). This range was determined by the high-frequency cetacean functional hearing group. The remaining functional hearing groups had a shorter range to onset of PTS, so the mitigation zone will provide further protection for these species. The average range to onset of TTS across all functional hearing groups is 72 yd. (66 m). Implementation of the 200 yd. (183 m) mitigation zone will reduce the potential for exposure to higher levels of energy that would result in injury and larger threshold shifts that would result in recovery (i.e., TTS) when individuals are sighted.

Small-, and medium-caliber gunnery exercises involve the participating vessel or aircraft firing munitions at a target location that may be up to 4,000 yd. (3.7 km) away, although typically much closer than this. Therefore, it is necessary for the Lookout to be able to visually observe the mitigation zone from this distance. Large vessel or aircraft platforms would provide a more effective observation platform for Lookouts than small boats. However, as discussed in Section 5.3.1.2.5 (Effectiveness Assessment for Lookouts), it is highly unlikely that anything but a whale blow or large pod of dolphins will be seen at distances closer to 4,000 yd. (3.7 km). However, this measure is likely effective at reducing the risk of injury to marine mammals that may be observed from the typical target distances. This measure may be ineffective at reducing the risk of injury to sea turtles at large target distances; however, it does reduce the risk for those individuals that may be observed at closer distances. In addition, it is more likely that sea turtles will be observed when exercises involve aircraft versus vessels.

The post-sighting wait period is designed to give any animals that are sighted an opportunity to leave the area before the exercise recommences but will only be employed if one of the other conditions has not already been met. A 30-minute wait period more than covers the average dive times of most marine mammal species but may not be sufficient for some deep-diving marine mammal species or for sea turtles. However, the analysis in Section 3.4.3.1 (Acoustic Stressors) shows that injury to deep-diving marine mammals (e.g., sperm whales and beaked whales) is not expected to occur. Furthermore, any wait period greater than 30 minutes when vessels are firing would result in an unacceptable operational impact on readiness. The 10-minute wait period when aircraft are firing is based on fuel restrictions. Any wait period greater than 10 minutes when aircraft are firing would result in an unacceptable operational impact on readiness and safety of personnel. The 10-minute wait period covers a portion of the average marine mammal dive times but may not be sufficient to cover the average dive times of all species. Observation for indicators of marine mammal and sea turtle presence (e.g., concentrations of floating vegetation [kelp paddies]) will further help avoid impacts to marine mammals and sea turtles.

The Navy proposes implementing the recommended measure described above because: (1) it is likely to result in avoidance or reduction of exposure to high levels of energy to some marine mammal species, and (2) implementation has been analyzed as acceptable with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.2.1.2.5 Gunnery Exercises – Large-Caliber Explosive Rounds Using a Surface Target Training

There are currently no existing mitigation measures unique to large-caliber explosive gunnery exercises in the Study Area. The Navy is proposing to adopt mitigation measures in place at other Navy training ranges outside of the Study Area.

Testing

The Navy's Proposed Action does not include gunnery testing activities.

Recommended Mitigation and Comparison to Current Mitigation

The Navy is proposing to (1) implement new mitigation zone measures for this activity, (2) describe conditions needed to recommence an activity after a sighting, and (3) implement a requirement to visually observe for kelp paddies. The recommended measures are provided below.

Mitigation will include visual observation from a ship immediately before and during the exercise within a mitigation zone of 600 yd. (549 m) around the intended impact location. Ships will observe the mitigation zone from the firing position. The exercise will not commence if concentrations of floating vegetation (kelp paddies) are observed in the mitigation zone. Firing will cease if a marine mammal or sea turtle is sighted within the mitigation zone. Firing will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on its course and speed, or (3) the mitigation zone has been clear from any additional sightings for a period of 30 minutes.

Effectiveness and Operational Assessments

See the introduction of Section 5.3.2 (Mitigation Zone Procedural Measures) for a general discussion of mitigation zones, how they are implemented, and the potential effects they are designed to reduce. As shown in Table 5.3-2, the predicted maximum range to onset of PTS for large caliber gunnery is approximately 177 yd. (162 m). This range was determined by the high-frequency cetacean functional hearing group. The remaining functional hearing groups had a shorter range to onset of PTS, so the mitigation zone will provide further protection for these species. The average range to onset of TTS across all functional hearing groups is 210 yd. (192 m). Implementation of the 600 yd. (549 m) mitigation zone will reduce the potential for exposure to higher levels of energy that would result in injury and larger threshold shifts that would result in recovery (i.e., TTS) when individuals are sighted. Per the Navy's current reporting requirements, any injured or dead marine mammals or sea turtles will be reported as appropriate.

Large caliber gunnery exercises involve the participating ship firing munitions at a target location from ranges up to 6 nm away. Therefore, it is necessary for the Lookout to be able to visually observe the mitigation zone from this distance. Although the Lookout will observe for all marine mammals or sea turtles in the area, as discussed in Section 5.3.1.2.5 (Effectiveness Assessment for Lookouts), it is highly unlikely that anything but a whale blow or large pod of dolphins will be seen. Although this measure is likely ineffective at reducing the risk of injury to sea turtles and some species of marine mammals, it does reduce the risk for those individuals that may be observed. Observation for indicators of marine

mammal and sea turtle presence (e.g., concentrations of floating vegetation [kelp paddies]) will further help avoid impacts to marine mammals and sea turtles.

The post-sighting wait period is designed to give any animals that are sighted an opportunity to leave the area before the exercise recommences but will only be employed if one of the other conditions has not already been met. A 30-minute wait period more than covers the average dive times of most marine mammal species but may not be sufficient for some deep-diving marine mammal species or for sea turtles. However, the analysis in Section 3.4.3.1 (Acoustic Stressors) shows that injury to deep-diving marine mammals (e.g., sperm whales and beaked whales) is not expected to occur. Requiring additional delay beyond 30 minutes would modify the activity in a way that it would no longer meet its intended objective. Any additional delay would reduce the gun crews' abilities to engage surface targets and practice defensive marksmanship as would be required in a real world combat situation, and would therefore have an unacceptable impact on the realism and effectiveness of the exercise.

The Navy proposes implementing the recommended measure described above because: (1) it is likely to result in avoidance or reduction of exposure to high levels of energy to some marine mammal species; and (2) implementation has been analyzed as acceptable with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.2.1.2.6 Missile Exercises up to 250 Pound Net Explosive Weight Using a Surface Target Recommended Mitigation and Comparison to Current Mitigation

Training

Currently, the Navy employs a mitigation zone of 1,800 yd. (1.6 km) for all missile exercises. Because the Navy is not proposing to use missiles with less than a 251 lb. net explosive weight warhead in the Study Area, separate mitigation procedures for this exercise have not been developed. Should the need arise to conduct training using missiles in this category, the Navy proposes that mitigation procedures be followed as described below for the larger category of missiles (Section 5.3.2.1.2.7, Missile Exercises 251–500 Pound Net Explosive Weight).

5.3.2.1.2.7 Missile Exercises 251–500 Pound Net Explosive Weight (Surface Target) Recommended Mitigation and Comparison to Current Mitigation

Training

Current mitigation measures apply to all missile exercises, regardless of the warhead size. The Navy proposes to add a mitigation zone that applies only to missiles with a net explosive weight of 251–500 lb. The recommended measures are provided below.

When aircraft are involved in the missile firing, mitigation will include visual observation by the aircrew prior to commencement of the activity within a mitigation zone of 2,000 yd. (1.8 km) around the intended impact location. The exercise will not commence if concentrations of floating vegetation (kelp paddies) are observed in the mitigation zone. Firing will cease if a marine mammal or sea turtle is sighted within the mitigation zone. Firing will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on its course and speed, or (3) the mitigation zone has been clear from any additional sightings for a period of 10 minutes or 30 minutes (depending on aircraft type).

Testing

The Navy's Proposed Action does not include missile testing activities.

Effectiveness and Operational Assessments

See the introduction of Section 5.3.2 (Mitigation Zone Procedural Measures) for a general discussion of mitigation zones, how they are implemented, and the potential effects they are designed to reduce. As shown in Table 5.3-2, the predicted maximum range to onset of PTS for a missile exercise (up to 500 lb. net explosive weight [bin E10]) is approximately 955 yd. (873 m). This range was determined by the sea turtle functional hearing group. The marine mammal functional hearing groups had a shorter range to onset of PTS, so the mitigation zone will provide further protection for these species. The average range to onset of TTS across all functional hearing groups is 1,164 yd. (1,065 m). Implementing the 2,000 yd. (1.8 km) mitigation zone will reduce the potential for exposure to higher levels of energy that would result in injury and larger threshold shifts that would result in recovery (i.e., TTS) when individuals are sighted.

Missile exercises involve the aircraft firing munitions at a target location typically up to 15 nm away and infrequently include ranges up to 75 nm away. When an aircraft is firing, the aircraft can travel close to the intended impact area so that it can be visually observed. There is a chance that animals could enter the impact area after the visual observations have been complete and the activity has commenced. Therefore, this measure is not effective at reducing the risk of injury to animals once the activity has begun, but it does reduce the risk for those individuals that may be observed prior to commencement of the activity when aircraft are firing. Observation for indicators of marine mammal and sea turtle presence (e.g., concentrations of floating vegetation [kelp paddies]) will further help avoid impacts to marine mammals and sea turtles.

The post-sighting wait period is designed to give any animals that are sighted an opportunity to leave the area before the exercise recommences but will only be employed if one of the other conditions has not already been met. The 10-minute wait period is for aircraft that have fuel restrictions (e.g., helicopters). Any wait period greater than 10 minutes for these types of aircraft would result in an unacceptable operational impact on readiness and safety of personnel. The 10-minute wait period covers a portion of the average marine mammal dive times but may not be sufficient to cover the average dive times of all species. The 30-minute wait period is for aircraft that are less restricted by fuel capacities (e.g., maritime patrol aircraft). The 30-minute wait period more than covers the average dive times of most marine mammal species but may not be sufficient for some deep-diving marine mammal species or for sea turtles. Any wait period greater than 30 minutes would result in an unacceptable operational impact on readiness for this type of aircraft.

The Navy proposes implementing the recommended measure described above because: (1) it is likely to result in avoidance or reduction of exposure to high levels of energy to marine mammals and sea turtles; and (2) implementation has been analyzed as acceptable with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.2.1.2.8 Bombing Exercises

Recommended Mitigation and Comparison to Current Mitigation Training

Currently, the Navy employs the following mitigation zone procedures during bombing exercises:

- Ordnance shall not be targeted to impact within 1,000 yd. (914 m) of known or observed floating kelp or marine mammals.
- A 1,000 yd. (914 m) radius mitigation zone shall be established around the intended target.

- The exercise will be conducted only if marine mammals are not visible within the mitigation zone.

The Navy is proposing to (1) maintain the existing mitigation zone to be used for non-explosive bombing activities, (2) revise the mitigation zone procedures to account for predicted ranges to impacts to marine species when high explosive bombs are used, (3) clarify the conditions needed to recommence an activity after a sighting, and (4) add a requirement to visually observe for kelp paddies.

Mitigation will include visual observation from the aircraft immediately before the exercise and during target approach within a mitigation zone of 2,500 yd. (2.3 km) around the intended impact location for explosive bombs and 1,000 yd. (914 m) for non-explosive bombs. The exercise will not commence if concentrations of floating vegetation (kelp paddies) are observed in the mitigation zone. Bombing will cease if a marine mammal or sea turtle is sighted within the mitigation zone. Bombing will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on its course and speed, or (3) the mitigation zone has been clear from any additional sightings for a period of 10 minutes.

Testing

The Navy's Proposed Action does not include bomb testing activities.

Effectiveness and Operational Assessments

See the introduction of Section 5.3.2 (Mitigation Zone Procedural Measures) for a general discussion of mitigation zones, how they are implemented, and the potential effects they are designed to reduce. As shown in Table 5.3-2, the predicted maximum range to onset of PTS for bombing exercises is approximately 1,368 yd. (1,251 m). This range was determined by the sea turtle functional hearing group. The marine mammal functional hearing groups had a shorter range to onset of PTS, so the mitigation zone will provide further protection for these species. For example, the maximum range to onset of PTS to mid-frequency of cetaceans is less than 500 yd. (457 m). The average range to onset of TTS across all functional hearing groups is 1,374 yd. (1,256 m). Implementation of the 2,500 yd. (2.3 km) mitigation zone will reduce the potential for exposure to higher levels of energy that would result in injury and larger threshold shifts that would result in recovery (i.e., TTS) when individuals are sighted.

The maximum range to effects on mortality across all functional hearing groups is less than 250 yd. (229 m). Therefore, this measure will be effective at reducing potential mortality to all marine mammals and sea turtles when individuals are sighted. As discussed in Section 5.3.1.2.5 (Effectiveness Assessment for Lookouts), it is highly unlikely that anything but a whale blow or large pod of dolphins will be seen at distances closer to 2,500 yd. (2.3 km) near the perimeter of the mitigation zone. However, this measure is likely effective at reducing the risk of injury to marine mammals and sea turtles that may be observed from the smaller distances within the mitigation zone. Observation for indicators of marine mammal and sea turtle presence (e.g., concentrations of floating vegetation [kelp paddies]) will further help avoid impacts to marine mammals and sea turtles.

As described in Section 5.3.1 (Lookout Procedural Measures), Lookouts positioned in aircraft or vessels may be responsible for tasks in addition to observing the air or surface of the water. For example, a Lookout for this activity may also be responsible for navigation of the aircraft. Having a Lookout observe a mitigation zone that is too large could potentially increase the safety risk due to an increased level of distraction from normal job duties. Similarly, Lookouts posted in aircraft during bombing activities will, by necessity, focus their attention on the water surface below and surrounding the location of bomb

deployment. Due to the nature of this activity (e.g., aircraft maintaining a relatively steady altitude of approximately 1,500 ft. [457 m] and approaching the intended impact location), Lookouts will be able to observe a larger area during bombing activities than other proposed activities that involve the use of Lookouts positioned in aircraft (e.g., Improved Extended Echo Ranging sonobuoy activities). However, observation of an area beyond what the Navy is proposing to implement for bombing activities is not practical and would not likely result in avoidance or reduction of injury to marine mammals or sea turtles because the effort spent observing those more distant areas would inevitably be minimal.

The decrease in mitigation zone size will result in no mitigation for exposure to lower levels of potential onset of TTS; however, it will allow for a more focused survey effort over a smaller survey distance, and will likely consequently increase the likelihood of avoidance of injury and larger threshold shifts that would result in recovery (i.e., TTS) to marine mammals and sea turtles.

The post-sighting wait period is designed to give any animals that are sighted an opportunity to leave the area before the exercise recommences but will only be employed if one of the other conditions has not already been met. The 10-minute wait period for this activity, which involves aircraft-deployed sources, is based on fuel restrictions. Any wait period greater than 10 minutes for an aircraft-deployed source would result in an unacceptable operational impact on readiness and safety of personnel. The 10-minute wait period covers a portion of the average marine mammal and sea turtle dive times but may not be sufficient to cover the average dive times of all species.

The Navy proposes implementing the recommended measure described above because: (1) it is likely to result in avoidance or reduction of exposure to high levels of energy to marine mammals and sea turtles; and (2) implementation has been analyzed as acceptable with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.2.1.2.9 Torpedo (Explosive) Testing

Recommended Mitigation and Comparison to Current Mitigation

The Navy currently has no mitigation zone procedures for torpedo (explosive) testing in the Study Area.

Training

The Navy does not include training with explosive torpedoes in the Proposed Action.

Testing

The Navy is proposing to (1) establish mitigation measures for this activity that include a mitigation zone of 2,100 yd. (1.9 km), (2) establish the conditions needed to recommence an activity after a sighting, and (3) establish a requirement to visually observe for kelp paddies. The recommended measures are provided below.

Mitigation will include visual observation by aircraft immediately before, during, and after the event within a mitigation zone of 2,100 yd. (1.9 km) around the intended impact location. The event will not commence if concentrations of floating vegetation (kelp paddies) are observed in the mitigation zone. Firing will cease if a marine mammal, sea turtle, or aggregation of jellyfish is sighted within the mitigation zone. Firing will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on its course and speed, or (3) the mitigation zone has been clear from any additional sightings for a period of 10 minutes or 30 minutes (depending on aircraft type).

In addition to visual observation, passive acoustic monitoring will be conducted with Navy assets, such as passive ships sonar systems or sonobuoys, already participating in the activity. Passive acoustic observation would be accomplished through the use of remote acoustic sensors or expendable sonobuoys, or via passive acoustic sensors on submarines when they participate in the Proposed Action. These assets would only detect vocalizing marine mammals within the frequency bands monitored by Navy personnel. Passive acoustic detections would not provide range or bearing to detected animals, and therefore cannot provide locations of these animals. Passive acoustic detections would be reported to the Lookout posted in the aircraft in order to increase vigilance of the visual surveillance; and to the person in control of the activity for their consideration in determining when the mitigation zone is determined free of visible marine mammals.

Effectiveness and Operational Assessments

See the introduction of Section 5.3.2 (Mitigation Zone Procedural Measures) for a general discussion of mitigation zones, how they are implemented, and the potential effects they are designed to reduce. As shown in Table 5.3-2, the predicted maximum range to onset of PTS for explosive torpedoes is approximately 885 yd. (809 m). This range was determined by the sea turtle functional hearing group. The marine mammal functional hearing groups had a shorter range to onset of PTS, so the mitigation zone will provide further protection for these species. The average range to onset of TTS across all functional hearing groups is 1,012 yd. (926 m). Implementation of the 2,100 yd. (1.9 km) mitigation zone will reduce the potential for exposure to higher levels of energy that would result in injury and larger threshold shifts that would result in recovery (i.e., TTS) when individuals are sighted.

The maximum range to effects on mortality across all functional hearing groups is less than 670 yd. (610 m). Therefore, this measure will be effective at reducing potential mortality to all marine mammals and sea turtles when individuals are sighted. As discussed in Section 5.3.1.2.5 (Effectiveness Assessment for Lookouts), it is highly unlikely that anything but a whale blow or large pod of dolphins will be seen at distances closer to 2,100 yd. (1.9 km) near the perimeter of the mitigation zone. However, this measure is likely effective at reducing the risk of injury to marine mammals and sea turtles that may be observed from the smaller distances within the mitigation zone.

As described in Section 5.3.1 (Lookout Procedural Measures), Lookouts positioned in aircraft may be responsible for tasks in addition to observing the air or surface of the water. For example, a Lookout for this activity may also be responsible for navigation of the aircraft. Having a Lookout observe a mitigation zone that is too large could potentially increase the safety risk due to an increased level of distraction from normal job duties. Observation of an area beyond what the Navy is proposing to implement for torpedo (explosive) testing activities is not practical and would not likely result in avoidance or reduction of injury to marine mammals or sea turtles because the effort spent observing those more distant areas would inevitably be minimal. Observation for indicators of marine mammal and sea turtle presence (e.g., concentrations of floating vegetation [kelp paddies]) and jellyfish aggregations will further help avoid impacts to marine mammals and sea turtles.

The post-sighting wait period is designed to give any animals that are sighted an opportunity to leave the area before the exercise recommences but will only be employed if one of the other conditions has not already been met. The 10-minute wait period is for aircraft that have fuel restrictions (e.g., helicopters). Any wait period greater than 10 minutes for these types of aircraft would result in an unacceptable operational impact on readiness and safety of personnel. The 10-minute wait period covers a portion of the average marine mammal dive times but may not be sufficient to cover the average dive times of all species. The 30-minute wait period is for aircraft that are less restricted by fuel

capacities (e.g., maritime patrol aircraft). The 30-minute wait period more than covers the average dive times of most marine mammal species but may not be sufficient for some deep-diving marine mammal species or for sea turtles. Any wait period greater than 30 minutes would result in an unacceptable operational impact on readiness for this type of aircraft.

The Navy proposes implementing the recommended measure described above because: (1) it is likely to result in avoidance or reduction of exposure to high levels of energy to marine mammals and sea turtles; and (2) implementation has been analyzed as acceptable with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.2.1.2.10 Sinking Exercises

The Navy has historically conducted sinking exercises in the Study Area and has completed environmental planning documents analyzing up to two sinking exercises per year. Because of this prior analysis, sinking exercises are included under the No Action Alternative, as part of the Navy's baseline of activities. However, sinking exercises are not proposed under Alternative 1 or Alternative 2. Mitigation applied to this activity under the No Action Alternative is described below.

Recommended Mitigation and Comparison to Current Mitigation

The Navy is proposing to (1) modify the mitigation measures currently implemented for this activity by increasing the mitigation zone from 2.0 nm to 2.5 nm, (2) clarify the conditions needed to recommence an activity after a sighting, (3) add a requirement to visually observe for kelp paddies, and (4) adopt the marine mammal and sea turtle mitigation zone size for concentrations of floating vegetation and aggregation of jellyfish for ease of implementation. The recommended measures are provided below.

Mitigation will include visual observation within a mitigation zone of 2.5 nm around the target ship hulk. Sinking exercises will include aerial observation beginning 90 minutes before the first firing, visual observations from vessels throughout the duration of the exercise, and both aerial and vessel observation immediately after any planned or unplanned breaks in weapons firing of longer than 2 hours. Prior to conducting the exercise, the Navy will review remotely sensed sea surface temperature and sea surface height maps to aid in deciding where to release the target ship hulk.

The Navy will also monitor using passive acoustics during the exercise. Passive acoustic monitoring would be conducted with Navy assets, such as passive ships' sonar systems or sonobuoys, already participating in the activity. These assets would only detect vocalizing marine mammals within the frequency bands monitored by Navy personnel. Passive acoustic detections would not provide range or bearing to detected animals and therefore cannot provide locations of these animals. Passive acoustic detections would be reported to Lookouts posted in aircraft and on vessels in order to increase vigilance of their visual surveillance. Lookouts will also increase observation vigilance before the use of torpedoes or unguided ordnance with a net explosive weight of 500 lb. or greater, or if the Beaufort sea state is a 4 or above.

The exercise will not commence if concentrations of floating vegetation (kelp paddies) are observed in the mitigation zone. The exercise will cease if a marine mammal, sea turtle, or aggregation of jellyfish is sighted within the mitigation zone. The exercise will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on a determination of its course and speed, or (3) the mitigation zone has been clear from any additional sightings for a period of 30 minutes. Upon sinking the vessel, the Navy

will conduct post-exercise visual surveillance of the mitigation zone for 2 hours (or until sunset, whichever comes first).

Effectiveness and Operational Assessments

See the introduction of Section 5.3.2 (Mitigation Zone Procedural Measures) for a general discussion of mitigation zones, their implementation, and the potential impacts they are designed to reduce. During a sinking exercise, multiple weapons sources may be used (e.g., projectiles, missiles, bombs, torpedoes), the largest of which is the 2,000 lb. bomb. The recommended mitigation zone is significantly greater than the predicted maximum range to onset of PTS of the largest weapon source and is designed to account for multiple detonations during the activity. As shown in Table 5.3-2, the predicted maximum range to onset of PTS for a bombing exercise is 1,368 yd. (1,251 m). This range was determined by the sea turtle functional hearing group. The marine mammal functional hearing groups had a shorter predicted range to onset of PTS, so the mitigation zone will provide further protection for these species. For example, the maximum range to onset of PTS for mid-frequency cetaceans is less than 500 yd. (457 m). The average range to onset of TTS across all functional hearing groups is 1,374 yd. (1,256 m). Implementation of the 2.5 nm mitigation zone will reduce the potential for exposure to higher levels of energy that would result in injury and larger threshold shifts that would result in recovery (i.e., TTS) when individuals are sighted.

The predicted maximum range to onset mortality across all functional hearing groups is less than 250 yd. (229 m). Therefore, this measure will be effective at reducing potential mortality to all marine mammals and sea turtles when individuals are sighted. As discussed in Section 5.3.1.2.5 (Effectiveness Assessment for Lookouts), it is highly unlikely that anything but a whale blow or large pod of dolphins will be seen at distances closer to 2.5 nm near the perimeter of the mitigation zone. However, this measure is likely effective at reducing the risk of injury to marine mammals and sea turtles that may be observed from the smaller distances within the mitigation zone. Observation for indicators of marine mammal and sea turtle presence (e.g., concentrations of floating vegetation [kelp paddies]) will further help avoid impacts to marine mammals and sea turtles.

As described in Section 5.3.1 (Lookout Procedural Measures), Lookouts positioned in aircraft or vessels may be responsible for tasks in addition to observing the air or the surface of the water. For example, a Lookout for this activity may also be responsible for navigation of the aircraft. Having a Lookout observe a mitigation zone that is too large could potentially increase the safety risk due to an increased level of distraction from normal job duties. Observation of an area beyond what the Navy is proposing to implement for sinking exercises is not practical and would not likely result in avoidance or reduction of injury to marine mammals or sea turtles because the effort spent observing those more distant areas would inevitably be minimal. The decrease in mitigation zone size will result in no mitigation for exposure to lower levels of potential onset of TTS; however, it will allow for a more focused survey effort over a smaller survey distance, and will consequently increase the likelihood of avoidance of injury and larger threshold shifts that would result in recovery (i.e., TTS) to marine mammals and sea turtles. The amount of time it takes for an aircraft to conduct line transects around a detonation point within the currently implemented 2 nm mitigation zone could result in animals entering the mitigation zone at one end while the aircraft completes the survey at the other end of the mitigation zone. Observation for indicators of marine mammal and sea turtle presence (e.g., concentrations of floating vegetation [kelp paddies]) and jellyfish aggregations will further help avoid impacts on marine mammals and sea turtles.

The post-sighting wait period is designed to give any animals that are sighted an opportunity to leave the area before the exercise recommences but will only be employed if one of the other conditions has not already been met. A 30-minute wait period more than covers the average dive times of most marine mammal species but may not be sufficient for some deep-diving marine mammal species or for sea turtles. However, the analysis in Section 3.4.3.2.2 (Impacts from Explosives) shows that injury to deep-diving marine mammals (e.g., sperm whales and beaked whales) is not expected to occur. Requiring additional delay beyond 30 minute would modify the activity such that it would no longer meet its intended objective. Any additional delay would reduce the ship and aircrews' abilities to coordinate attack tactics on a seaborne target as would be required in a real world combat situation, and would therefore have an unacceptable impact on the realism and effectiveness of the exercise. Although activities involving certain types of aircraft (e.g., helicopters) typically employ a 10-minute wait period due to fuel restrictions, the Navy is able to make an exception for this particular activity due to the large variation and rotation of assets that could participate in this type of exercise.

The Navy proposes implementing the recommended measure described above because (1) it is likely to result in avoidance or reduction of exposure to high levels of energy to marine mammals and sea turtles; and (2) implementation has been analyzed as acceptable with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.2.1.2.11 Weapons Firing Noise During Gunnery Exercises – Large-Caliber Recommended Mitigation and Comparison to Current Mitigation

The Navy currently has no mitigation zone procedures for this activity in the Study Area.

Training

The Navy is proposing to adopt measures currently used during Navy gunnery exercises in other ranges outside of the Study Area. For all explosive and non-explosive large-caliber gunnery exercises conducted from a ship, mitigation will include visual observation immediately before and during the exercise within a mitigation zone of 70 yd. (46 m) within 30 degrees on either side of the gun target line on the firing side. The exercise will not commence if concentrations of floating vegetation (kelp paddies) are observed in the mitigation zone. Firing will cease if a marine mammal or sea turtle is sighted within the mitigation zone. Firing will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on its course and speed, (3) the mitigation zone has been clear from any additional sightings for a period of 30 minutes, or (4) the vessel has repositioned itself more than 140 yd. (128 m) away from the location of the last sighting.

Testing

The Navy's Proposed Action does not include gun testing activities.

Effectiveness Assessment

The mitigation zone is designed to reduce the potential for injury from weapons firing noise during large-caliber gunnery exercises conducted from a ship. The majority of the energy that an animal could be exposed to would occur on the firing side of the vessel and would follow in the direction of fire. It is not operationally feasible to have Lookouts stationed on all sides of the vessel to visually observe for marine mammals and sea turtles due to limited resources (e.g., manning restrictions). Since the Lookout is positioned aboard the firing ship and is visually observing nearby the ship (70 yd. [64 m]), this measure

should be effective at reducing the risk to all marine mammals and sea turtles that are available to be observed.

The post-sighting wait period is designed to give any animals that are sighted an opportunity to leave the area before the exercise recommences but will only be employed if one of the other conditions has not already been met. A 30-minute wait period more than covers the average dive times of most marine mammal species but may not be sufficient for some deep-diving marine mammal species or for sea turtles. However, the analysis in Section 3.4.3.1 (Acoustic Stressors) shows that injury to deep-diving marine mammals (e.g., sperm whales and beaked whales) is not expected to occur. Furthermore, any wait period greater than 30 minutes would result in an unacceptable operational impact on readiness.

The Navy proposes implementing the recommended measure described above because (1) it is likely to result in avoidance or reduction of exposure to high levels of energy to marine mammals and sea turtles; and (2) implementation has been analyzed as acceptable with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.2.2 Physical Disturbance and Strike

5.3.2.2.1 Vessels and In-Water Devices

5.3.2.2.1.1 Vessels

Recommended Mitigation and Comparison to Current Mitigation

Training

The Navy's current measures to mitigate potential impacts to marine mammals from vessel and in-water device strikes during training activities are provided below:

- Naval vessels shall maneuver to keep at least 500 yd. (457 m) away from any observed whale in the vessel's path and avoid approaching whales head-on. These requirements do not apply if a vessel's safety is threatened, such as when change of course will create an imminent and serious threat to a person, vessel, or aircraft, and to the extent vessels are restricted in their ability to maneuver. Restricted maneuverability includes, but is not limited to, situations when vessels are engaged in dredging, submerged activities, launching and recovering aircraft or landing craft, minesweeping activities, replenishment while underway and towing activities that severely restrict a vessel's ability to deviate course.
- Vessels will take reasonable steps to alert other vessels in the vicinity of the whale. Given rapid swimming speeds and maneuverability of many dolphin species, naval vessels would maintain normal course and speed on sighting dolphins unless some condition indicated a need for the vessel to maneuver.

The Navy is proposing to continue to use the 500 yd. (457 m) mitigation zone currently established for whales, and to implement a 200 yd. (183 m) mitigation zone for all other marine mammals. Vessels will avoid approaching marine mammals head on and will maneuver to maintain a mitigation zone of 500 yd. (457 m) around observed whales and 200 yd. (183 m) around all other marine mammals (except bow-riding dolphins), providing it is safe to do so. The Navy is clarifying its existing speed protocol: while in transit, Navy vessels shall be alert at all times, use extreme caution, and proceed at a "safe speed" so that the vessel can take proper and effective action to avoid a collision with any sighted object or disturbance, including any marine mammal or sea turtle and can be stopped within a distance appropriate to the prevailing circumstances and conditions.

Mitigation zones include marine mammals hauled-out on islands, rocks, and other non-man made sites. However, it excludes pinnipeds hauled out on man-made navigational and port structures (e.g., piers and security barriers) and vessels (Figure 5-2).

Testing

The Navy's current measures to mitigate potential impacts to marine mammals from vessel and in-water device strikes during testing activities are provided below:

- Range activities shall be conducted in such a way as to ensure marine mammals are not harassed or harmed by human-caused events.
- Visual surveillance shall be accomplished just prior to all in-water exercises. This surveillance shall ensure that no marine mammals are visible within the boundaries of the area within which the test unit is expected to be operating. Surveillance shall include, as a minimum, monitoring from all participating surface craft and, where available, adjacent shore sites.
- The Navy shall postpone activities until cetaceans (whales, dolphins, and porpoises) leave the activity area. When cetaceans have been sighted in an area, all range participants increase vigilance and take reasonable and practicable actions to avoid collisions and activities that may result in close interaction of naval assets and marine mammals. Actions may include changing speed and/or direction and are dictated by environmental and other conditions (e.g., safety, weather).
- Range craft shall not approach within 100 yd. (91 m) of marine mammals and shall be followed to the extent practicable considering human and vessel safety priorities. All participant vessels and aircraft, including helicopters, are expected to comply with this directive.
- Mitigation zones include marine mammals hauled-out on islands, rocks, and other non-man made sites. However, it excludes pinnipeds hauled out on man-made navigational and port structures (e.g., piers and security barriers) and vessels.

The Navy is proposing to incorporate the training mitigation measures described above during testing activities involving surface ships, and for all other testing activities to continue using the mitigation measures currently implemented, revised to exclude pinnipeds during test body retrieval and to include the exception for bow-riding dolphins as described above under Training. During test body retrieval, the activity cannot be relocated away from marine mammals active in the area, or significantly delayed without risking loss of the test body, so the activity must proceed even if pinnipeds are present in the immediate vicinity. However, the retrieval vessel is a range craft and risks to marine mammals are very low.

Effectiveness and Operational Assessments

Since the Lookout is visually observing within a reasonable distance of the vessel (within 100 yd. [91 m] for testing activities and within 500 yd. [457 m] for training activities), this measure should be effective at reducing the risk to marine mammals that are available to be observed. However, as discussed above in Section 5.3.1.2.5 (Effectiveness Assessment for Lookouts), large whales and pods of dolphins are more likely to be seen than other more cryptic species, such as beaked whales.

The Navy proposes implementing the recommended measure described above because: (1) it is likely to result in avoidance or reduction of injury to marine mammals; and (2) implementation has been analyzed as acceptable with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.2.2.1.2 Towed In-Water Devices

Recommended Mitigation and Comparison to Current Mitigation

The Navy currently has no mitigation zone procedures for this activity in the Study Area.

Training

The Navy is proposing to adopt measures currently used in other ranges outside of the Study Area during activities involving towed in-water devices. The Navy will ensure that towed in-water devices being towed from manned platforms avoid coming within a mitigation zone of 250 yd. (230 m) around any observed marine mammal, providing it is safe to do so.

Testing

The Navy's proposed mitigation measures for testing activities from manned platforms are consistent with Navy training mitigation measures described above. During testing in which in-water devices are towed by unmanned platforms, a manned escort vessel will be included and one Lookout will be employed.

Effectiveness and Operational Assessments

Since the Lookout is visually observing within a reasonable distance of the vessel (within 100 yd. [91 m] for testing activities and 250 yd. [230 m] for training activities), this measure should be effective at reducing the risk to marine mammals that are available to be observed. However, as discussed above in Section 5.3.1.2.5 (Effectiveness Assessment for Lookouts), large whales and pods of dolphins are more likely to be seen than other more cryptic species such as beaked whales.

The Navy proposes implementing the recommended measure described above because: (1) it is likely to result in avoidance or reduction of injury to marine mammals; and (2) implementation has been analyzed as acceptable with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.2.2.2 Non-Explosive Practice Munitions

5.3.2.2.2.1 Gunnery Exercises – Small, Medium-, and Large-Caliber Using a Surface Target

Recommended Mitigation and Comparison to Current Mitigation

Training

Currently, the Navy employs the same mitigation measures for non-explosive gunnery exercises as described above in 5.3.2.1.2.5 (Gunnery Exercises – Small-, Medium-, and Large-Caliber Using a Surface Target).

The Navy is proposing to (1) continue using the mitigation measures currently implemented for this activity, and (2) clarify the conditions needed to recommence an activity after a sighting. The recommended measures are provided below.

Mitigation will include visual observation from a vessel or aircraft immediately before and during the exercise within a mitigation zone of 200 yd. (183 m) around the intended impact location. The exercise will not commence if concentrations of floating vegetation (kelp paddies) are observed in the mitigation zone. Firing will cease if a marine mammal or sea turtle is sighted within the mitigation zone. Firing will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on its course and speed, (3) the mitigation zone has been clear from any additional sightings for a period of 10 minutes for a firing aircraft, (4) the mitigation zone has been clear from any additional sightings for a period of

30 minutes for a firing ship, or (5) the intended target location has been repositioned more than 400 yd. (370 m) away from the location of the last sighting.

Testing

The Navy's Proposed Action does not include gunnery testing activities.

Effectiveness and Operational Assessments

The mitigation zone is designed to reduce the potential for direct strike from a non-explosive projectile. Large-caliber gunnery exercises involve the participating ship or aircraft firing munitions at a target location from ranges up to 6 nm away. Small- and medium-caliber gunnery exercises involve the participating vessel or aircraft firing munitions at a target location from up to 2 nm away, although typically closer. Therefore, it is necessary for the Lookout to be able to visually observe the mitigation zone from these distances. Although the Lookout will observe for all marine mammals or sea turtles in the area, as discussed in Section 5.3.1.2.5 (Effectiveness Assessment for Lookouts), it is highly unlikely that anything but a whale blow or large pod of dolphins will be seen. Although this measure is likely ineffective at reducing the risk of injury to sea turtles and some species of marine mammals, it does reduce the risk for those individuals that may be observed.

The post-sighting wait period is designed to give any animals that are sighted an opportunity to leave the area before the exercise recommences but will only be employed if one of the other conditions has not already been met. A 30-minute wait period more than covers the average dive times of most marine mammal species but may not be sufficient for some deep-diving marine mammal species or for sea turtles. However, the analysis in Section 3.4.3.1 (Acoustic Stressors) shows that injury to deep-diving marine mammals (e.g., sperm whales and beaked whales) is not expected to occur. Furthermore, any wait period greater than 30 minutes would result in an unacceptable operational impact on readiness. The 10-minute wait period when aircraft are firing is based on fuel restrictions. Any wait period greater than 10 minutes when aircraft are firing would result in an unacceptable operational impact on readiness and safety of personnel. The 10-minute wait period covers a portion of the average marine mammal dive times but may not be sufficient to cover the average dive times of all species. Observation for indicators of marine mammal and sea turtle presence (e.g., concentrations of floating vegetation [kelp paddies]) will further help avoid impacts to marine mammals and sea turtles.

The Navy proposes implementing the recommended measure described above because: (1) it is likely to result in avoidance or reduction of injury to some species of marine mammals; and (2) implementation has been analyzed as acceptable with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.2.2.2 Bombing Exercises

Recommended Mitigation and Comparison to Current Mitigation

Training

The Navy is proposing to continue using the mitigation measures currently implemented for this activity. The recommended measure includes clarification of a post-sighting activity recommencement criterion.

Mitigation will include visual observation from the aircraft immediately before the exercise and during target approach within a mitigation zone of 1,000 yd. (914 m) around the intended impact location. The exercise will not commence if concentrations of floating vegetation (kelp paddies) are observed in the mitigation zone. Bombing will cease if a marine mammal or sea turtle is sighted within the mitigation zone. Bombing will recommence if any one of the following conditions is met: (1) the animal is observed

exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on its course and speed, or (3) the mitigation zone has been clear from any additional sightings for a period of 10 minutes.

Testing

The Navy's Proposed Action does not include bomb testing activities.

Effectiveness and Operational Assessments

The post-sighting wait period is designed to give any animals that are sighted an opportunity to leave the area before the exercise recommences but will only be employed if one of the other conditions has not already been met. The 10-minute wait period for this activity, which involves aircraft-deployed sources, is based on fuel restrictions. Any wait period greater than 10 minutes for an aircraft-deployed source would result in an unacceptable operational impact on readiness and safety of personnel. The 10-minute wait period covers a portion of the average marine mammal and sea turtle dive times but may not be sufficient to cover the average dive times of all species. Observation for indicators of marine mammal and sea turtle presence (e.g., concentrations of floating vegetation [kelp paddies]) will further help avoid impacts to marine mammals and sea turtles.

The mitigation zone is designed to reduce the potential for direct strike from a non-explosive bomb. The Navy proposes implementing the recommended measure described above because: (1) it is likely to result in avoidance or reduction of injury to marine mammals or sea turtles; and (2) implementation has been analyzed as acceptable with regard to personnel safety, practicality of implementation, impact on effectiveness of the military readiness activity, and Navy policy.

5.3.3 MITIGATION AREAS

The Navy has considered measures to limit activity that might affect special use areas. The Navy currently applies area-specific mitigation measures for the following two areas:

5.3.3.1 Olympic Coast National Marine Sanctuary

While active sonar and ASW activities are authorized within the OCNMS, the Navy uses its Protective Measures Assessment Protocol (PMAP) program to inform all users of active sonar that the OCNMS is within the NWTT Study Area. PMAP informs users that no high explosives are authorized in the OCNMS. The Navy proposes to continue use of PMAP in this manner for awareness and notification.

5.3.3.2 Puget Sound and the Strait of Juan de Fuca

5.3.3.2.1 Mid-Frequency Active Sonar Training

Currently, the Navy is not conducting nor is it proposing to conduct training with mid-frequency active hull-mounted sonar on vessels while underway in Puget Sound and the Strait of Juan de Fuca. The Navy's process since 2003 requires approval prior to operating mid-frequency active hull-mounted sonar in Puget Sound and the Strait of Juan de Fuca.

The Navy will continue the permission and approval process, in place since 2003, through U.S. Pacific Fleet's designated authority for all mid-frequency active hull-mounted sonar on vessels while training underway in Puget Sound and Strait of Juan de Fuca.

Pierside maintenance/testing of sonar systems within Puget Sound and the Strait of Juan de Fuca will also require approval by U.S. Pacific Fleet's designated authority or Systems Command designated

authority as applicable, and must be conducted in accordance with PMAP for ship and submarine active sonar use, to include the use of Lookouts.

Use of active sonar for anti-terrorism/force protection or for safe navigation within the Puget Sound or Strait of Juan de Fuca is always permitted for safety of ship/national security reasons.

5.3.3.2.2 Mine Neutralization Explosive Ordnance Disposal

The Navy conducts Explosive Ordnance Disposal (EOD) Mine Neutralization events in only two designated locations within the Inland Waters of the NWTT Study Area. A process has been in place requiring approval from U.S. Third Fleet prior to conducting EOD underwater detonations. The Navy will continue the permission and approval process through U.S. Third Fleet for in-water explosives training conducted at Hood Canal or Crescent Harbor. This process ensures marine safety and environmental protection.

5.3.3.2.3 Marbled Murrelet Mitigation

The following marbled murrelet mitigation procedural measures exist for testing activities conducted in the Inland Waters:

- During the marbled murrelet nesting season (1 April–15 September) avoid sonar testing, where feasible, during the period from 2 hours before sunrise to 2 hours after sunrise.
- Where practicable (as determined by the Navy) during the summer, conduct long duration (exceeding 30 minutes) countermeasures tests in the Keyport Range Site instead of the Dabob Bay Range Complex Site.
- Where practicable (as determined by the Navy), conduct countermeasure testing activities during the summer rather than the winter.

The Navy is proposing to eliminate the marbled murrelet mitigation measures described above. There is no evidence to support that marbled murrelet hearing is within the frequency ranges of the sound sources used (e.g., sonar and countermeasures) in these tests. Therefore, these mitigation measures would provide no added benefit. The Navy is currently in consultation with USFWS on this and other issues related to potential impacts on the marbled murrelet.

5.3.4 MITIGATION MEASURES CONSIDERED BUT ELIMINATED

A number of mitigation measures were suggested during the public comment periods of previous Navy environmental documents. As a result of the assessment process identified in Section 5.2 (Introduction to Mitigation), the Navy determined that some of the suggested measures would likely be ineffective at reducing environmental impacts, have an unacceptable operational impact based on the effectiveness assessment, or be incompatible with Section 5.2.2 (Overview of Mitigation Approach). The measures that the Navy does not recommend for implementation are discussed in Section 5.3.4.1 (Previously Considered but Eliminated) and Section 5.3.4.2 (Previously Accepted but Now Eliminated).

There is a distinction between effective and feasible observation procedures for data collection and measures employed to prevent impacts or otherwise serve as mitigation. The discussion below is in reference to those procedures meant to serve as mitigation measures.

5.3.4.1 Previously Considered but Eliminated

5.3.4.1.1 Reducing Amount of Training and Testing Activities

Reducing training and testing for the purpose of mitigation would result in an unacceptable impact on readiness for the following reasons:

The requirements to train are designed to provide the experience needed to ensure Sailors are properly prepared for operational success. Training requirements have been developed through many years of iteration and are designed to ensure Sailors achieve the levels of readiness needed to properly respond to the many contingencies that may occur during an actual mission. The Proposed Action does not include training beyond levels required for maintaining satisfactory levels of readiness due to the need to efficiently use limited resources (e.g., fuel, personnel, and time). Therefore, any reduction of training would not allow Sailors to achieve satisfactory levels of readiness needed to accomplish their mission.

The requirements to test systems prior to their implementation in military activities are identified in DoD Directive 5000.1. This directive states that test and evaluation support is to be integrated throughout the defense acquisition process. The Navy rigorously collected data during the developmental stages of this EIS/OEIS to accurately quantify test activities necessary to meet requirements of DoD Directive 5000.1. These testing requirements are designed to determine whether systems perform as expected and are operationally effective, suitable, survivable, and safe for their intended use. Any reduction of testing activities would not allow the Navy to meet its purpose and need to achieve requirements set forth in DoD Directive 5000.1.

5.3.4.1.2 Replacing Training and Testing with Simulated Activities

Replacing training and testing activities with simulated activities for the purpose of mitigation would result in an unacceptable impact on readiness for the following reasons:

As described in Section 2.5.1.4 (Simulated Training and Testing), the Navy currently uses computer simulation for training and testing whenever possible. Computer simulation can provide familiarity and complement live training; however, it cannot provide the fidelity and level of training necessary to prepare naval forces for deployment.

The Navy is required by law to operationally test major platforms, systems, and components of these platforms and systems in realistic combat conditions before full-scale production can occur. Substituting simulation for live training and testing fails to meet the purpose of and need for the Proposed Action and therefore was eliminated from consideration as a mitigation measure.

5.3.4.1.3 Reducing Sonar Source Levels and Total Number of Hours

Active sonar is only used when required by the mission since it has the potential to alert opposing forces to the sonar platform's presence. Passive sonar and all other sensors are used in concert with active sonar to the maximum extent practicable when available and when required by the mission. Reducing active sonar source levels and the total number of active sonar hours used during training and testing activities for the purpose of mitigation would adversely impact the effectiveness of military readiness activities and increase safety risks to personnel for the following reasons:

Sonar operators need to train as they would operate during real combat situations. Operators of sonar equipment are always cognizant of the environmental variables affecting sound propagation. In this regard, sonar equipment power levels are always set consistent with mission requirements. Reducing

sonar source levels for the purpose of mitigation precludes sonar operators from learning to operate the sonar systems with their entire range of capabilities throughout the extremely diverse range of environmental conditions they may encounter. Failure to train with the entire range of capabilities will reduce the effectiveness of the sonar operators should their skills be required during real world events. Not only would they not develop the skills necessary to identify and track submarines at the maximum distances of their systems capabilities, they would not learn how to use their systems' capabilities during the entire range of environmental conditions they may encounter. Likewise, they would not develop the knowledge of how to fully integrate multiple ASW capabilities, including other ships and aircraft into an integrated ASW team.

Failure to train with the entire range of capabilities also compromises training by reducing the ability for a sonar operator to detect, track, and hold an enemy target, mine, or other object, and by reducing the realism of other training scenarios (e.g., navigation training). Particularly during a strike group exercise, sonar operators need to learn to handle real world combat situations (e.g., the ability to manage sonar operations during periods of mutual interference, which can occur when more than one sonar system is operating simultaneously). Training with reduced sonar source levels would ultimately condition Sailors to expect conditions that they would not experience in a real world combat situation, thereby resulting in an unacceptable increased risk to personnel safety and the strike group's ability to achieve mission success. The Navy must test its systems in the same way they would be used for military readiness activities. Reducing sonar source levels during testing would impact the ability to determine whether systems are operationally effective, suitable, survivable, and safe. Ultimately, reducing sonar source levels would reduce training and testing realism. Reducing the total number of sonar hours used during training and testing would prevent the Navy from meeting its military readiness qualification standards.

5.3.4.1.4 Implementing Active Sonar Ramp-Up Procedures during Training

Implementing active sonar ramp-up procedures (slowly increasing the sound in the water to necessary levels) in an attempt to clear the range prior to conduct of activities for the purpose of mitigation during training activities would result in an unacceptable impact on readiness and would not necessarily be effective at reducing potential impacts on marine species for the following reason:

Ramp-up procedures would alert opponents to the participants' presence. This would consequently negatively affect the realism of training because the target submarine could detect the searching unit before the searching unit could detect the target submarine, enabling the target submarine to take evasive measures. This is not representative of a real-world situation and thereby would impact training realism and effectiveness. Training with reduced realism would alter Sailors' abilities to effectively operate in a real world combat situation, thereby resulting in an unacceptable increased risk to personnel safety and the sonar operator's ability to achieve mission success.

Although ramp-up procedures have been used for some testing activities, effectiveness at avoiding or reducing impacts on marine mammals has not been demonstrated. Until evidence suggests that ramp-up procedures are an effective means of avoiding or reducing potential impacts on marine mammals, the Navy is proposing to eliminate the implementation of this measure for testing activities as part of the Proposed Action.

5.3.4.1.5 Reducing Vessel Speed

As a standard operating procedure, Navy personnel are required to use extreme caution and operate at a slow, safe speed consistent with mission and safety. These standard operating procedures are designed to allow a vessel to take proper and effective action to avoid a collision with any sighted object

or disturbance (which may include a marine mammal) and to stop within a distance appropriate to the prevailing circumstances and conditions. Implementing widespread reductions in vessel speed throughout the Study Area for the purpose of mitigation would be impractical with regard to military readiness activities, and result in an unacceptable impact on readiness for the following reasons:

Vessel operators need to be able to react to changing tactical situations and evaluate system capabilities in training and testing as they would in actual combat. Widespread speed restrictions would not allow the Navy to properly test vessel capabilities or train to react to these situations. Training with reduced realism would alter Sailors' abilities to effectively operate in a real world combat situation, thereby resulting in an unacceptable increased risk to personnel safety and the vessel operator's ability to achieve mission success.

5.3.4.1.6 Limiting Access to Training and Testing Locations

Limiting training and testing activities to specific locations for the purpose of mitigation would be impractical with regard to implementation, would adversely impact the effectiveness of military readiness activities, and would increase safety risks to personnel for the following reasons:

As described in Section 2.5.1.1 (Alternative Locations), the ability to use the diverse and multidimensional capabilities of each range complex and testing range results in the Navy's ability to develop and maintain high levels of readiness. Major exercises using integrated warfare components require large areas of the littorals, open ocean, and certain nearshore areas for realistic and safe training. Limiting training and testing (including the use of sonar and other active acoustic sources or explosives) to specific locations (e.g., abyssal waters and surveyed offshore waters), avoiding areas (e.g., embayments or large areas of the littorals and open ocean), or avoiding overflying areas (e.g., the Olympic National Park) would be impractical to implement with regard to the need to conduct activities in proximity to certain facilities and range complexes. These restrictions would also adversely impact the safety of the training and testing activities by requiring activities to take place in more remote areas where safety support may be limited.

Training and testing activities require continuous access to large areas consisting potentially of thousands of square miles of ocean and air space to provide naval personnel the ability to train with and develop competence and confidence in their capabilities and their entire suite of weapons and sensors. Exercises may change mid-stream based on evaluators' assessments of performance and other conditions including weather or mechanical issues. These may preclude use of a permission scheme for access to water space. Threats to national security are constantly evolving and the Navy requires the ability to adapt training to meet these emerging threats as well as develop and test systems to effectively operate in these environments. Restricting access to limited locations would impact the ability of Navy training and testing to evolve as the threat evolves. Operational units already incorporate requirements for safety of personnel including air space and shipping routes. Safety restrictions may include limits on distance from military air fields during carrier flight operations and air traffic corridors for safety of military and civilian aviation. These types of limitations shape how exercise planners develop and implement training scenarios including those involving defense of aircraft carriers from submarines.

Therefore, limiting access to training and testing locations would reduce realism of activities by restricting access to important real world combat situations, such as bathymetric features and varying oceanographic features. As described in Section 5.3.4.1.7 (Avoiding Locations Based on Bathymetry and Environmental Conditions), Sailors must be trained to handle bottom bounce, sound passing through

changing currents, eddies, or across changes in ocean temperature, pressure, or salinity. Training in a few specific locations would alter Sailors' abilities to effectively operate in varying real world combat situations, thereby resulting in an unacceptable increased risk to personnel safety and the ability to achieve mission success.

5.3.4.1.7 Avoiding Locations Based on Bathymetry and Environmental Conditions

Avoiding locations for training and testing activities based on bathymetry (e.g., areas between 500 and 2,000 meters depth) and environmental conditions for the purpose of mitigation would increase safety risks to personnel and result in an unacceptable impact on readiness for the following reasons:

Areas where training and testing activities are scheduled to occur are carefully chosen to provide safety and allow realism of events. As described in Section 2.5.1.1 (Alternative Locations), the varying environmental conditions of the Study Area (e.g., bathymetry and topography) maximize the training realism and testing effectiveness. Limiting training and testing (including the use of sonar and other active acoustic sources or explosives) to avoid steep or complex bathymetric features (e.g., the "Prairie," Juan de Fuca Canyon, Swiftsure Bank, Barkley and Nitinat Canyons, and Heceta Bank) and oceanographic features (e.g., surface fronts and variations in sea surface temperatures) would reduce the realism of the military readiness activity. Systems must be tested in a variety of bathymetric and environmental conditions to ensure functionality and accuracy in a variety of environments. Sonar operators need to train as they would operate during real world combat situations. Because real world combat situations include diverse bathymetric and environmental conditions, Sailors must be trained to handle bottom bounce, sound passing through changing currents, eddies, or across changes in ocean temperature, pressure, or salinity. Training with reduced realism would alter Sailors' abilities to effectively operate in a real world combat situation, thereby resulting in an unacceptable increased risk to personnel safety and the sonar operator's ability to achieve mission success.

5.3.4.1.8 Avoiding or Reducing Active Sonar at Night and During Periods of Low Visibility

Avoiding or reducing active sonar at night and during periods of low visibility for the purpose of mitigation would result in an unacceptable impact on readiness for the following reasons:

The Navy must train in the same manner as it will fight. Anti-submarine warfare can require a significant amount of time to develop the "tactical picture," or an understanding of the battle space (e.g., area searched or unsearched, identifying false contacts, and understanding the water conditions). Reducing or securing power in low-visibility conditions would affect a commander's ability to develop this tactical picture and would not provide the needed training realism. Training differently from what would be needed in an actual combat scenario would decrease training effectiveness, reduce the crew's abilities, and introduce an increased safety risk to personnel.

Mid-frequency active sonar training is required year-round in all environments, including night and low-visibility conditions. Training occurs over many hours or days, which requires large teams of personnel working together in shifts around the clock to work through a scenario. Training at night is vital because environmental differences between day and night affect the detection capabilities of sonar. Temperature layers that move up and down in the water column and ambient noise levels can vary significantly between night and day, which affects sound propagation and could affect how sonar systems are operated. Consequently, personnel must train during all hours of the day to ensure they identify and respond to changing environmental conditions, and not doing so would unacceptably decrease training effectiveness and reduce the crews' abilities. Therefore, the Navy cannot operate only in daylight hours or wait for the weather to clear before training.

The Navy must test its systems in the same way they would be used for military readiness activities. Reducing or securing power in adverse weather conditions or at night would impact the ability to determine whether systems are operationally effective, suitable, survivable, and safe. Additionally, some systems have a nighttime testing requirement. Therefore, Navy personnel cannot operate only in daylight hours or wait for the weather to clear before or during all test events.

5.3.4.1.9 Avoiding or Reducing Active Sonar during Strong Surface Ducts

Avoiding or reducing active sonar during strong surface ducts for the purpose of mitigation would increase safety risks to personnel, be impractical with regard to implementation of military readiness activities, and result in an unacceptable impact on readiness for the following reasons:

The Navy must train in the same manner as it will fight. Anti-submarine warfare can require a significant amount of time to develop the “tactical picture,” or an understanding of the battle space such as area searched or unsearched, identifying false contacts, understanding the water conditions, etc. Surface ducting is a condition when water conditions (e.g., temperature layers, lack of wave action) result in little sound energy penetrating beyond a narrow layer near the surface of the water. Submarines have long been known to exploit the phenomena associated with surface ducting. Therefore, training in surface ducting conditions is a critical component to military readiness because sonar operators need to learn how sonar transmissions are altered due to surface ducting, how submarines may take advantage of them, and how to operate sonar effectively in this environment. Avoiding or reducing active sonar during surface ducting conditions would affect a commander’s ability to develop this tactical picture and would not provide the needed training realism. Diminished realism would reduce a sonar operator’s ability to effectively operate in a real world combat situation, thereby resulting in an unacceptable increased risk to personnel safety and the ability to achieve mission success.

Furthermore, avoiding surface ducting would be impractical to implement because ocean conditions contributing to surface ducting change frequently, and surface ducts can be of varying duration. Surface ducting can also lack uniformity and may or may not extend over a large geographic area, making it difficult to determine where to reduce power and for what periods.

5.3.4.1.10 Avoiding Locations Based on Distances from Isobaths or Shorelines

Avoiding locations for training and testing activities within the Study Area based on wide-scale distances from isobaths or the shoreline for the purpose of mitigation (e.g., avoiding sound exposure levels within the 100-meter isobath) would be impractical with regard to implementation of military readiness activities, result in unacceptable impact on readiness, would not be an effective means of mitigation, and would increase safety risks to personnel for the following reasons:

A measure requiring avoidance of mid-frequency active sonar within 13 nm of the 656 ft. (200 m) isobaths was part of the Rim of the Pacific exercise 2006 authorization by NMFS. This measure, as well as similar measures of like distances, lacks any scientific basis when applied to the context of the Study Area (e.g., bathymetry, sound propagation, and width of channels). There is no scientific analysis indicating this measure is protective and no known basis for these specific metrics. The Rim of the Pacific 2006 exercise mitigation measure precluded active anti-submarine training in the littoral region, which significantly impacted realism and training effectiveness (e.g., protecting ships from submarine threats during amphibious landings). This mitigation procedure had no observable effect on the protection of marine mammals during Rim of the Pacific 2006 exercises, and its value is unclear; however, its adverse effect on realistic training, as with all arbitrary distance from land restrictions, is significant.

Training in shallower water is an essential component to maintaining military readiness. Sound propagates differently in shallower water and operators must learn to train in this environment. Additionally, submarines have become quieter through the use of improved technology and have learned to hide in the higher ambient noise levels of the shallow waters of coastal environments. In real world events, it is highly likely Sailors would be working in, and therefore must train in, these types of areas.

Areas where training and testing activities are scheduled to occur are carefully chosen to provide safety and allow realism of events. The proximity to facilities, range complexes, and testing ranges is essential to the training and testing realism and effectiveness required to train and certify naval forces ready for combat operations. Limiting access to coastal areas would restrict access to certain training and testing locations and would increase transit time for these activities, which would result in an increased risk to personnel safety, particularly for platforms with fuel restrictions (e.g., aircraft) or for certain activities such as mine countermeasures and neutralization activities using diver-placed mines.

The ability to use the diverse and multi-dimensional capabilities of each range complex and testing range results in the Navy's ability to develop and maintain high levels of readiness. Otherwise limiting training and testing (including the use of sonar and other active acoustic sources or explosives) to avoid arbitrary distances from isobaths or the shoreline would adversely impact the effectiveness of the training and testing. This includes avoiding conducting activities within 12 nm from shore, 25 nm from shore, between shore and the 20 m isobath, and 13 nm out from the 656 ft. (200 m) isobath. Operating in shallow water is essential in order to provide realistic training in real world combat conditions with regard to shallow water sound propagation.

However, since the NWTT Offshore Area is 12 nm from shore, which roughly aligns with the 100 m isobath, activities proposed for this area do avoid most of these locations.

5.3.4.1.11 Avoiding Marine Species Habitats and Biologically Important Areas

In general, the Navy considered mitigation measures for marine species habitats and identified areas of biological importance on a case-by-case basis through consultation with NMFS and the USFWS. The Navy deems avoidance of an area potentially effective mitigation and practicable only if (1) the area has been well-documented as important habitat for particular species based on the best available science; (2) the potential impacts of Navy activities spatially and temporally overlap with the areas to be avoided; (3) that overlap is likely to have biologically meaningful effects in the identified area; and (4) avoidance of the area would not result in unacceptable impacts on military readiness.

As described in Section 5.3.4.1.6 (Limiting Access to Training and Testing Locations) and Section 5.3.4.1.7 (Avoiding Locations Based on Bathymetry and Environmental Conditions), the Navy carefully identified areas where proposed training and testing activities would occur by evaluating the extent to which these areas provide for personnel safety and replicate real-world conditions, including varying environmental conditions, to maximize training realism and testing effectiveness. The locations in which the Navy is proposing to continue training and testing activities have all been in use for many decades, and the same types of training and testing events have occurred in these locations over the years. These locations continue to be used because they provide unique environmental training conditions that replicate real-world environments, allow the Navy to avoid interaction with established commercial air traffic routes and commercial vessel shipping lanes, are in proximity to aircraft emergency divert landing fields, and are in proximity to homeports and home bases to minimize fuel use and minimize the time personnel are away from home. Some Navy training and testing activities require coordination with, or

use of, existing fixed support facilities such as instrumented ranges, and therefore cannot be conducted in alternate locations without adversely affecting the ability to meet mission requirements.

Locations in which Navy training and testing activities would occur inevitably overlap with a wide array of marine species habitats, including foraging habitats, reproductive areas, and migration corridors. Limiting activities to avoid all of these habitats would adversely impact the effectiveness of the training or testing activity, create a risk to non-participating aircraft and vessels, result in an unacceptable increased risk to personnel safety, and result in greater fuel expenditure as a result of transiting to locations at greater distances from homeports and home bases, thereby impacting the ability to achieve mission success.

Through the Cetacean Density and Distribution Mapping (CetMap) process, NMFS has recently identified specific areas where certain marine mammal species tend to be found concentrated at particular times of the year while engaging in important behavioral activities (Aquatic Mammals 2015; Calambokidis et al. 2015; Ferguson et al. 2015a, 2015b; Van Parijs 2015). The areas currently identified are not intended to reflect a complete list of areas of biological importance, are not equivalent to habitat or range, and likely represent only a fraction of a species' overall range (Ferguson et al. 2015a). Additionally, the delineation of a mapped boundary does not reflect the day-to-day dynamic nature of marine mammal distributions or of the ocean environment, both of which are subject to perturbation along with other key variables such as prey availability and other environmental factors (e.g., sea surface temperature). Therefore, the Navy has determined that it is most effective to implement mitigation measures whenever and wherever a marine mammal is detected, regardless of the probability that a marine mammal may be in a certain location.

In response to public comments and as part of ongoing discussions with NMFS, the Navy has considered if additional mitigation is warranted, including avoiding training and testing activities in each of the areas that have been identified as biologically important within the NWTT Study Area. These areas include gray whale migration and presence areas as well as humpback and gray whale feeding areas.

Commenters have also suggested that the Navy should not train or test in seasonal blue and humpback whale migration areas. However, no seasonal blue and humpback whale migration areas of importance have been identified in the NWTT Study Area. The Navy conducted an assessment of NWTT training and testing activities in relation to the humpback and gray whale feeding areas that overlap the NWTT Study Area. Based on approximate historically used locations for training and testing in the NWTT Study Area, the Navy anticipates that training proposed in this EIS/OEIS would have very limited spatial overlap with any designated feeding areas for humpback whales in the Offshore portion of the NWTT Study Area. Sound from training activities in the Northern Washington humpback whale feeding area would mostly result from hull-mounted sonar maintenance or systems checks as vessels are transiting to other areas within and outside of the NWTT Study Area. With regard to testing activities, it is possible, though not likely, that acoustic emissions from countermeasure testing could propagate into the Northern Washington humpback whale feeding area. However, all acoustic emissions, whether resulting from training or testing, would be infrequent, transitory, and would occur with a high degree of temporal variability. Given the area's location at the entrance of Strait of San Juan de Fuca, the vast majority of sound and disturbance in the area will be the result of non-Navy vessel activity (see detailed discussion in Section 3.4.3.2.4 [Impacts from Vessel Noise]). It is unlikely that the limited Navy training and testing events would have any biologically meaningful effect on humpback whale feeding behavior in this area. Avoidance of this area by transiting Navy ships is not warranted when balanced against the fact that it would force ships into higher traffic density waters based on commercial shipping density data in that

area. Avoidance could also create safety concerns by forcing the Navy to delay maintenance and systems checks until ships are farther from shore and homeport infrastructure that could have assisted in addressing potential technical issues. Therefore, in light of the unlikely biological benefit to the species and the anticipated adverse impacts on military readiness, the Navy concludes that avoidance of this area is not warranted.

There would be no direct overlap of any Navy active sonar or explosive training activity in the Stonewall and Heceta Bank humpback whale feeding area offshore of Oregon, although occasional shallow water testing with sonobuoys would overlap with this location. The shallower water features in the area affect bottom reflecting, scattering, and absorption of the sound and typically it creates a more challenging environment to test sonobuoys due to other surface sound sources (commercial/recreational boats). These conditions allow aircrews to gain understanding of how noise from other sources will impact underwater signal detection. However, these sonobuoy testing events are infrequent (fewer than 50 per year) and of short-duration (less than a day). It is unlikely that this limited testing of sonobuoys would have any biologically meaningful effect on humpback whale feeding behavior in this area. Therefore, in light of the unlikely biological benefit to the species and the anticipated adverse impacts on military readiness, the Navy concludes that avoidance of this area is not warranted.

The Northern Puget Sound gray whale feeding area includes waters associated within the nearshore confines of the piers of Naval Station Everett, Washington. Infrequent (no more than 13 per year) hull mounted sonar training maintenance and lifecycle testing must occur periodically based on ship availability and logistics while pierside in Everett. Related acoustic emissions would propagate into the Northern Puget Sound gray whale feeding area. A Maritime Homeland Defense/Security Mine Countermeasure exercise could occur once every other year (3 out of 5 years) near or around Naval Station Everett which could have non-hull mounted acoustic emissions that would propagate into the feeding area as well. However, these acoustic emissions would be very infrequent, transitory, and happen with a high degree of temporal variability. Given this area's location in Puget Sound, the vast majority of sound and disturbance in the area will be the result of non-Navy vessel traffic. As such, precluding Navy activity at Naval Station Everett and in Northern Puget Sound would be of little to no biological benefit to the gray whales. Furthermore, given pending overseas deployment needs and individual ship readiness cycles to support those deployments, the time of year when maintenance or testing occurs cannot be proscribed. As for the homeland defense exercise, the location in which it would occur provides realistic conditions necessary to effectively train personnel to protect a major port and the vital assets (ships, cargo) and shipping channels near those ports. This pierside activity cannot be relocated given the ships are homeported in that location. The Navy concludes that seasonal avoidance of the use of acoustic sources within this feeding area would be of little biological benefit to the gray whales and would negatively impact readiness.

Both humpback feeding areas are within densely trafficked and highly established shipping channels and traffic separation zones used by civilian and Navy vessels, which suggests that humpback feeding is somewhat compatible with the heavy ship traffic. Navy vessel movement associated with transit through the southern portion of the Northern Puget Sound gray whale feeding (near Naval Station Everett) and Northern Washington humpback whale feeding area (offshore of Washington) is likely to occur as ships routinely leave and arrive from homeports at Naval Station Everett or Naval Base Kitsap-Bremerton or Naval Base Kitsap-Bangor, and it would be impracticable, if not impossible, for the Navy to avoid transiting this area. There would be limited if any Navy ship transit through the Stonewall and Heceta Bank humpback whale feeding area, as this area is well outside of normal north-south shipping lanes often utilized by Navy vessels, and as such, there would be little to no biological benefit

from adopting avoidance measures for Navy vessels while not restricting other commercial or recreational vessels in this area.

The area of potential gray whale occurrence that extends along the entire U.S. West Coast continental shelf as well as throughout Puget Sound, is impractical to avoid. Neither the Navy nor any other user of the waters in the Study Area could completely avoid these areas. In addition, the separately identified Northern Puget Sound gray whale feeding area includes the waters around the piers of Naval Station Everett. This pierside acoustic activity cannot be relocated given the ships are homeported in that location and the Maritime Homeland Defense/Security Mine Countermeasure exercise that could occur once every other year (3 out of 5 years) near or around Naval Station Everett must be conducted in an area that provides realistic conditions necessary to train personnel to protect ships and cargo and piers to maneuver around. The Navy concludes that avoidance would be of little biological benefit to the gray whales and would negatively impact operational readiness.

In addition to the above analysis, based on the best available science, analyses of Navy's proposed training and testing activities in these areas was presented in Section 3.4.3 (Environmental Consequences) for each of the stressors. The analysis demonstrates that the proposed training and testing activities would not significantly affect the particular behavioral activity for which the areas were identified.

In addition to avoiding biologically important areas, some commenters suggested that the Navy avoid areas where the Navy model predicted high numbers of exposures. As described in the *Determination of Acoustic Effects on Marine Mammals and Sea Turtles for the Northwest Training and Testing Environmental Impact Statement/Overseas Environmental Impact Statement* technical report (Marine Species Modeling Team 2013), modeling locations were developed based on historical data and anticipated future needs. The model does not provide information detailed enough to analyze or compare locations based on potential take levels for each activity; therefore, applying the modeling results to inform development of mitigation areas would not be feasible.

The Navy does not find avoidance of the areas reasonably practicable or necessary at this time. The Navy proposes to monitor use of active sonar within these feeding areas and report that use to NMFS in classified annual reports to inform future adaptive management of activities within the NWTT Study Area. Reporting of active sonar use in the gray whale migration potential presence area within Puget Sound and Inland Waters and the coastal migration areas is not practical because the areas are not limited in size enough to warrant any adaptive management assistance to NMFS. The Navy already provides all sonar use to NMFS in annual reports. As explained in Section 5.3.3.2 (Puget Sound and the Strait of Juan de Fuca), Navy plans to continue the permission scheme for use of active sonar that has been in place since 2003. There has been limited use in this Puget Sound area for testing or maintenance. No training use has occurred and limited training use of mid-frequency active sonar is still anticipated, with the Maritime Homeland Defense/Security Mine Countermeasure Integrated Exercise as the only likely training activity that could use sonar in approximately three events over the course of a 5-year period. Additionally, Navy vessels already adhere to measures as identified in Section 5.3.2.2.1.1 while in transit to avoid marine mammals.

5.3.4.1.12 Avoiding Marine Protected Areas

Avoiding marine protected areas for the purpose of mitigation would increase safety risks to personnel, be impractical with regard to implementation, and would not be warranted based on the discussions

presented in the Chapter 3 (Affected Environment and Environmental Consequences) environmental analyses for biological resources and Section 6.1.2 (Marine Protected Areas).

Areas where training and testing activities are scheduled to occur are carefully chosen to provide safety and allow realism of events. The proximity to facilities, range complexes, and testing ranges is essential to the training and testing realism and effectiveness required to train and certify naval forces ready for combat operations. Limiting access to marine protected areas would restrict access to training and testing locations and would increase transit time, which would result in an increased risk to personnel safety, particularly for platforms with fuel restrictions (e.g., aircraft).

As described in Section 6.1.2 (Marine Protected Areas), due to the nature of many training and testing activities (e.g., requiring deep water), proposed activities are unlikely to occur in the extremely shallow nearshore waters typical of most marine protected areas. Within most marine protected areas, the only activity likely to occur is an aircraft overflight during transit from an airfield to an offshore training or testing location. Exposure of marine protected area resources to aircraft overflights would be brief and is expected to cause only a minor and temporary behavioral reaction due to noise for marine mammals, sea turtles, birds, or fish that may be present in the area. There is potential for birds to be struck by aircraft; however, the Navy implements standard operating procedures that require pilots of Navy aircraft to make every attempt to avoid large flocks of birds in order to reduce the safety risk involved with a potential bird strike. Additional mitigation or avoidance of these marine protection areas would be unnecessary, and limiting passage through the areas would restrict direct access to training and testing locations. Such avoidance would ultimately increase transit time and for platforms with fuel restrictions (e.g., aircraft) would therefore result in an unacceptable increased risk to personnel safety.

For marine protected areas (e.g., gear restricted areas) located further offshore, activities in addition to aircraft overflights may occur. Refer to Section 6.1.2 (Marine Protected Areas) for a more detailed discussion on the activities that are expected to occur within marine protected areas in the Study Area. Ultimately, limiting access to training and testing locations that overlap, are contained within, or are adjacent to marine protected areas would reduce realism of training by restricting access to important real world combat situations, such as bathymetric features and varying oceanographic features. As described in Section 2.5.1.1 (Alternative Locations), the ability to use the diverse and multidimensional capabilities of each range complex and testing range results in the Navy's ability to develop and maintain high levels of readiness. Major exercises using integrated warfare components require large areas of the littorals, Open Ocean, and certain nearshore areas for realistic and safe training. Limiting training and testing to specific locations and avoiding all marine protected areas would be impractical to implement with regard to the need to conduct activities in proximity to certain facilities, range complexes, and testing ranges. The Navy typically conducts activities in proximity to certain facilities, range complexes, and testing ranges in order to reduce travel time and funding required to conduct training away from a unit's home base. Activities involving the use of helicopters typically occur in proximity to shore or refueling stations due to fuel restrictions and personnel safety. Training and testing location limitations would also adversely impact the safety of the training and testing activities by requiring activities to take place in more remote areas where safety support may be limited. Refer to Section 5.3.4.1.6 (Limiting Access to Training and Testing Locations) for further discussion on the impacts of limiting access to training and testing locations on the Navy's ability to maintain military readiness.

5.3.4.1.13 Avoiding the Olympic Coast National Marine Sanctuary

Navy activities have occurred for decades in this area both before and after the OCNMS was designated, and are currently authorized in accordance with Sanctuary regulations. Avoiding the OCNMS for the purpose of mitigation would be incompatible with the purpose and need because it would require closure of the Quinault Range site and loss of access to diverse environmental conditions that are needed to support testing requirements. Also, as stated in Section 6.1.2.1 (Olympic Coast National Marine Sanctuary) of the Final EIS/OEIS, the Navy is in ongoing consultation with the OCNMS regarding the effects of the Proposed Action on Sanctuary resources, but has concluded its activities are not likely to result in the loss, destruction, or adverse changes to the viability of Sanctuary resources.

Areas where training and testing activities are scheduled to occur are carefully chosen to provide safety and allow realism of events. The proximity to facilities, range complexes, and testing ranges is essential to the training and testing realism and effectiveness required to train and certify naval forces ready for combat operations. Avoiding training and testing in the OCNMS would restrict access to training and testing locations and could increase transit time, which would result in an increased risk to personnel safety, particularly for platforms with fuel restrictions (e.g., aircraft).

Ultimately, limiting access to training and testing locations that overlap, are contained within, or are adjacent to the OCNMS would reduce realism of training by restricting access to important real world combat situations, such as bathymetric features and varying oceanographic features. As described in Section 2.5.1.1 (Alternative Locations), the ability to use the diverse and multidimensional capabilities of each range complex and testing range results in the Navy's ability to develop and maintain high levels of readiness. Limiting training and testing to specific locations and avoiding all marine-protected areas would be impractical to implement with regard to the need to conduct activities in proximity to certain facilities, range complexes, and testing ranges. The Navy typically conducts activities in proximity to certain facilities, range complexes, and testing ranges in order to reduce travel time and funding required to conduct training away from a unit's home base. Activities involving the use of helicopters typically occur in proximity to shore or refueling stations due to fuel restrictions and personnel safety. Training and testing location limitations would also adversely impact the safety of the training and testing activities by requiring activities to take place in more remote areas where safety support may be limited. Refer to Section 5.3.4.1.6 (Limiting Access to Training and Testing Locations) for further discussion on the impacts of limiting access to training and testing locations on the Navy's ability to maintain military readiness.

Complete avoidance of the OCNMS for sonar activities is not practical; however, while active sonar and ASW activities are authorized within the OCNMS, the Navy uses its PMAP program to inform all users of active sonar that the OCNMS is within the NWTT Study Area. PMAP informs users that no high explosives are authorized in the OCNMS. The Navy proposes to continue use of PMAP in this manner for awareness and notification.

5.3.4.1.14 Increasing Visual and Passive Acoustic Observations

Increasing visual and passive acoustic observations, including modification of sonobuoys for passive acoustic detection of vocalizing species, for the purpose of mitigation would be impractical with regard to implementation of military readiness activities and result in unacceptable impact on readiness for the following reasons:

The Navy recommended mitigation measures already represent the maximum level of effort (e.g., numbers of Lookouts and passive sonobuoys) that the Navy can commit to observing mitigation zones

given the number of personnel that will be involved and the number and type of assets and resources available. The number of Lookouts that the Navy recommends for each measure often represents the maximum capacity based on limited resources (e.g., space and manning restrictions). For example, some vessels are minimally manned and are therefore physically unable to accommodate more than one Lookout. Furthermore, training and testing activities are carefully planned with regard to personnel duties. Requiring additional Lookouts would require either adding personnel, for which there would be no additional space, or reassigning duties, which would divert Navy personnel from essential tasks required to meet mission objectives.

The Navy will conduct passive acoustic monitoring during several activities with Navy assets, such as sonobuoys, already participating in the activity (e.g., torpedo [explosive] testing and improved extended echo ranging sonobuoys). Refer to Section 5.3.2 (Mitigation Zone Procedural Measures) for additional information on the use of passive acoustics during training and testing activities. The Navy does not have the resources to construct and maintain additional passive acoustic monitoring systems (e.g., modified passive sonobuoys) for each training and testing activity.

5.3.4.1.15 Increasing the Size of Observed Mitigation Zones

Increasing the size of observed mitigation zones for the purpose of mitigation would be impractical with regard to implementation of military readiness activities and result in unacceptable impact on readiness for the following reasons:

The Navy developed activity-specific mitigation zones based on the Navy's acoustic propagation model. In this NWTT analysis, the Navy developed each recommended mitigation zone to avoid or reduce the potential for onset of the lowest level of injury, PTS, out to the predicted maximum range. Mitigating to the predicted maximum range to PTS consequently also mitigates to the predicted maximum range to onset mortality (1 percent mortality), onset slight lung injury, and onset slight gastrointestinal tract injury, since the maximum range to effects for these criteria are shorter than for PTS. Furthermore, in most cases, the predicted maximum range to PTS also covers the predicted average range to TTS. In some instances, the Navy recommends mitigation zones that are larger or smaller than the predicted maximum range to PTS based on the associated effectiveness and operational assessments presented in Section 5.3.2 (Mitigation Zone Procedural Measures).

The Navy recommended mitigation zones represent the maximum area the Navy can effectively observe based on the platform of observation, number of personnel that will be involved, and the number and type of assets and resources available. As mitigation zone sizes increase, the potential for reducing impacts decreases. For instance, if a mitigation zone increases from 1,000 to 4,000 yd. (914 to 3,660 m), the area that must be observed increases sixteen-fold. The Navy recommended mitigation measures balance the need to reduce potential impacts with the ability to provide effective observations throughout a given mitigation zone. Implementation of mitigation zones is most effective when the zone is appropriately sized to be realistically observed. The Navy does not have the resources to maintain additional Lookouts or observer platforms that would be needed to effectively observe mitigation zones of increased size. Further, as explained above, the number of Lookouts that the Navy recommends for each measure often represents the maximum capacity based on limited resources (e.g., space and manning restrictions). For example, some vessels are minimally manned and are therefore physically unable to accommodate more than one Lookout. Training and testing activities are carefully planned with regard to personnel duties. Requiring observation of mitigation zones of increased size would either require adding personnel, for which there would be no additional space or resources, or reassigning duties, which would divert Navy personnel from essential tasks required to meet mission

objectives. For most activities, Lookouts are required to observe for concentrations of detached floating vegetation (*Sargassum* or kelp paddies), which are indicators of potential marine mammal and sea turtle presence, within the mitigation zone to further help reduce the potential for injury to occur.

5.3.4.1.16 Conducting Visual Observations Using Third-Party Observers

With limited exceptions, use of third-party observers (e.g., trained marine species observers) in air or on surface platforms in addition to existing Navy Lookouts for the purposes of mitigation would be impractical with regard to implementation of military readiness activities and result in unacceptable impact on readiness for the following reasons:

Use of third-party observers is not necessary because Navy personnel are extensively trained in spotting items on or near the water surface. Use of Navy Lookouts ensures immediate implementation of mitigation if marine species are sighted. A critical skill set of effective Navy training is communication. Navy Lookouts are trained to act swiftly and decisively to ensure that appropriate actions are taken. Additionally, multiple training and testing events can occur simultaneously and in various regions throughout the Study Area, and can last for days or weeks at a time. The Navy does not have the resources to maintain third-party personnel to accomplish the task for every event.

The use of third-party observers would compromise security for some activities involving active sonar due to the requirement to provide advance notification of specific times and locations of Navy platforms. Reliance on the availability of third-party personnel would impact training and testing flexibility. The presence of other aircraft in the vicinity of naval activities would raise safety concerns for both the commercial observers and naval aircraft. Furthermore, vessels have limited passenger capacity. Training and testing event planning includes careful consideration of this limited capacity in the placement of personnel on ships involved in the event. Inclusion of non-Navy observers onboard these vessels would require that in some cases there would be no additional space for essential Navy personnel required to meet the exercise objectives.

The areas where training events will most likely occur in the Study Area cover more than 120,000 square nautical miles. Contiguous ASW events may cover many hundreds or even thousands of square miles. The number of civilian ships or aircraft required to monitor the area of these events would be considerable. It is, thus, not feasible to survey or monitor the large exercise areas in the time required. In addition, marine mammals may move into or out of an area, if surveyed before an event, or an animal could move into an area after an event took place. Given that there are no adequate controls to account for these or other possibilities, there is little utility to performing extensive before or after event surveys of large exercise areas as a mitigation measure.

Surveying during an event raises safety issues with multiple, slow civilian aircraft operating in the same airspace as military aircraft engaged in combat training activities. In addition, many of the training and testing events take place far from land, limiting both the time available for civilian aircraft to be in the event area and presenting a concern should aircraft mechanical problems arise. Scheduling civilian vessels or aircraft to coincide with training events would impact training effectiveness, since exercise event timetables cannot be precisely fixed and are instead based on the free-flow development of tactical situations. Waiting for civilian aircraft or vessels to complete surveys, refuel, or be on station would slow the progress of the exercise and impact the effectiveness of the military readiness activity.

5.3.4.1.17 Adopting Mitigation Measures of Foreign Navies

Adopting mitigation measures of foreign navies generally for the purpose of mitigation, such as expanding the mitigation zones to match those used by a particular foreign navy, would be impractical with regard to implementation of military readiness activities and result in unacceptable impact on readiness for the following reasons:

Mitigation measures are carefully customized for and agreed upon by each individual navy based on potential impacts of the activities on marine species and the impacts of the mitigation measures on military readiness. The mitigation measures developed for one navy would not necessarily be effective at reducing potential impacts on marine species by all navies. Similarly, mitigation measures that do not cause an unacceptable impact on one navy may cause an unacceptable impact on another. For example, most other navies do not possess an integrated strike group and do not have integrated training requirements. The Navy's training is built around the integrated warfare concept and is based on the Navy's capabilities, the threats faced, the operating environment, and the overall mission. Implementing other navies' mitigation would be incompatible with U.S. Navy requirements. The U.S. Navy's recommended mitigation measures have been carefully designed to reduce potential impacts on marine species while not causing an unacceptable impact on readiness.

5.3.4.1.18 Increasing Reporting Requirements

The Navy has extensive reporting requirements, including exercise, testing, and monitoring reporting designed to verify implementation of mitigation, comply with current permits, and improve future environmental assessments (Section 5.5.3, Reporting). Increasing the requirement to report marine species sightings to augment scientific data collection and to further verify the implementation of mitigation measures is unnecessary and would increase safety risks to personnel, be impractical with regard to implementation of military readiness activities, and result in unacceptable impact on readiness for the following reasons:

Vessels, aircraft, and personnel engaged in training and testing events are intensively employed throughout the duration of training and testing activities. Any additional workload assigned that is unrelated to their primary duty would adversely impact personnel safety and the effectiveness of the military readiness activity they are undertaking. Lookouts are not trained to make accurate species-specific identification and would not be able to provide the detailed information that the scientific community would use. Alternatively, the Navy has an integrated comprehensive monitoring program (Section 5.5, Monitoring and Reporting) that does provide information that is available and useful to the scientific community in annual monitoring reports.

5.3.4.2 Previously Accepted but Now Eliminated

5.3.4.2.1 Implementing Active Sonar Ramp-Up Procedures During Testing

Although some testing activities are not capable of ramping up power levels, some have implemented active sonar ramp-up procedures (slowly increasing the sound in the water to necessary levels) in an attempt to clear the range prior to conduct of activities for the purpose of mitigation. Although ramp-up procedures have been used for some testing activities, the effectiveness at avoiding or reducing impacts on marine mammals has not been demonstrated. Until evidence suggests that ramp-up procedures are an effective means of avoiding or reducing potential impacts on marine mammals, and for reasons discussed in Section 5.3.4.1.4 (Implementing Active Sonar Ramp-Up Procedures during Training), the Navy would not implement this measure for testing activities as part of the Proposed Action.

5.3.4.2.2 Implementing a Mitigation Zone for Missile Exercises with Airborne Targets

Per current mitigation, a mitigation zone of 1,000 yd. (914 m) is observed around the expected expended material field. The Navy is proposing to eliminate the need for a Lookout to maintain a mitigation zone for missile exercises involving airborne targets. Most airborne targets are recoverable aerial drones, and missile impact with the target does not typically occur. Most anti-air missiles used in training are telemetry configured (i.e., they do not have an actual warhead). Impact of a target is unlikely because missiles are designed to detonate (simulated detonation for telemetry missiles) in the vicinity of the target and not as a result of a direct strike on the target. Given the speed of the missile and the target, the high altitudes involved, and the long ranges of missile travel possible, it is not possible to definitively predict or to effectively observe where the missile fragments will fall. The potential expended material fall zone can only be predicted within tens of miles for long range events, which can be in excess of 80 nm from the firing location, and thousands of yards for shorter events, which can occur within several thousand yards from the firing location. Establishment of a mitigation zone for activities involving airborne targets would be ineffective at reducing potential impacts.

Furthermore, the potential risk to any marine mammal or sea turtle from a missile exercise with an airborne target is a direct strike from falling expended material. Based on the extremely low potential for a target strike and associated expended material field to co-occur in space and time with a marine species at or near the surface of the water, the potential for a direct strike is negligible.

5.3.4.2.3 Implementing a Mitigation Zone for Medium- and Large-Caliber Gunnery Exercises with Airborne Targets

Per current mitigation, a mitigation zone is observed in the vicinity of the expected military expended material field. The Navy is proposing to eliminate the need for a Lookout to observe the vicinity of the expected military expended material for medium- and large-caliber gunnery exercises involving airborne targets. The potential expended material fall zone can only be predicted within thousands of yards, which can be up to 7 nm from the firing location. Establishment of a mitigation zone for activities involving airborne targets would be ineffective at reducing potential impacts.

Furthermore, the potential risk to any marine mammal or sea turtle from a gunnery exercise with an airborne target is a direct strike from falling military expended materials. Based on the extremely low potential for an expended material field to co-occur in space and time with a marine species at or near the surface of the water, the potential for a direct strike is negligible.

5.4 MITIGATION SUMMARY

Table 5.4-1 provides a summary of the Navy's proposed mitigation measures. For reference, currently implemented mitigation measures for each activity category are also summarized in the table. The process for developing each of these measures is detailed in Section 5.2.3 (Assessment Method) and involved: (1) an effectiveness assessment to determine if implementation of the measure will likely result in avoidance or reduction of an impact on a resource; and (2) an operational assessment to determine if implementation of the measures will have acceptable operational impacts on the Proposed Action with regard to personnel safety, practicality of implementation, readiness, and Navy policy. Measures are intended to meet applicable regulatory compliance requirements for NEPA, Executive Order 12114, and CEQ guidance. The proposed mitigation measures were also developed consistent with resource-specific environmental requirements, as follows:

- Measures specifying marine mammals, floating vegetation (kelp paddies), large schools of fish, or birds as the protection focus are intended to meet MMPA requirements.
- Measures specifying marine mammals, sea turtles, birds, floating vegetation (kelp paddies), or jellyfish aggregations as the protection focus are intended to meet ESA requirements.
- Measures specifying live hardbottom, artificial reefs, or shipwrecks as the protection focus are intended to meet Essential Fish Habitat requirements of the Magnuson-Stevens Fishery Conservation and Management Act.
- Measures specifying shipwrecks is an additional protection focus intended to meet Abandoned Shipwreck Act and National Historic Preservation Act requirements.

The measures presented in Table 5.4-1 are discussed in greater detail in Section 5.3.1 (Lookout Procedural Measures), Section 5.3.2 (Mitigation Zone Procedural Measures), and Section 5.3.3 (Mitigation Areas). As discussed in Section 5.2.2.2 (Protective Measures Assessment Protocol), the final suite of mitigations resulting from the ongoing planning for this EIS/OEIS, as well as the regulatory consultation and permitting processes will be integrated into the Protective Measures Assessment Protocol for implementation purposes. Section 5.5 (Monitoring and Reporting) describes the monitoring and reporting efforts the Navy will undertake to investigate the effectiveness of implemented mitigation measures and to better understand the impacts of the Proposed Action on marine resources.

Table 5.4-2 compares the current and recommended (proposed) mitigations measures for acoustic (non-impulse and impulse) stressors and for physical disturbance and strike stressors.

Table 5.4-1: Summary of Recommended Mitigation Measures

Activity Category or Mitigation Area	Recommended Lookout Procedural Measure	Recommended Mitigation Zone and Protection Focus	Current Measure and Protection Focus
Specialized Training			
Marine Species Awareness Training (Modules 1 through 4)	<p><u>Training:</u> Applicable personnel will complete the United States Navy Marine Species Awareness Training prior to standing watch or serving as a Lookout.</p> <p><u>Testing:</u> Same as Training</p>	<p><u>Training:</u> The mitigation zones observed by Lookouts are specified for each Mitigation Zone Procedural Measure below.</p> <p><u>Testing:</u> Same as Training</p>	<p><u>Training:</u> Applicable personnel will complete the United States Navy Marine Species Awareness Training prior to standing watch or serving as a Lookout.</p> <p><u>Testing:</u> Same as Training</p>
Acoustic Stressors – Sonar and Other Active Acoustic Sources			
Low-Frequency and Hull-Mounted Mid-Frequency Active Sonar during Anti-Submarine Warfare and Mine Warfare	<p><u>Training:</u> 2 Lookouts (general), 1 Lookout (minimally manned, moored, or anchored)</p> <p><u>Testing:</u> 2 Lookouts (general), 1 Lookout (small boats, minimally manned, moored, anchored, pierside, or shore-based)</p>	<p><u>Training:</u> 1,000 yd. (914 m) and 500 yd. (457 m) power downs and 200 yd. (183 m) shutdown for cetaceans and sea turtles (excludes bow-riding dolphins), 100 yd. (91 m) mitigation zone for pinnipeds (excludes haulout areas).</p> <p><u>Testing:</u> 1,000 yd. (914 m) and 500 yd. (457 m) power downs for sources that can be powered down, 200 yd. (183 m) shutdown for cetaceans, and 100 yd. (91 m) for pinnipeds. (excludes haulout areas)</p>	<p><u>Training:</u> 1,000 yd. (914 m) and 500 yd. (457 m) power downs and 200 yd. (183 m) shutdown for marine mammals and sea turtles.</p> <p><u>Testing:</u> Observation conducted from all participating surface craft and, where available, adjacent shore sites, with a cetacean mitigation zone 1,000 yd. (914 m), 100 yd. (91 m) for pinnipeds from intended track of the test unit.</p>
High-Frequency and Non-Hull-Mounted Mid-Frequency Active Sonar	<p><u>Training:</u> 2 Lookouts (general), 1 Lookout (minimally manned, moored, or anchored)</p> <p><u>Testing:</u> 2 Lookouts (general), 1 Lookout (minimally manned, moored, anchored, and aircraft systems testing).</p>	<p><u>Training:</u> 200 yd. (183 m) for marine mammals and concentrations of floating vegetation.</p> <p><u>Testing:</u> 200 yd. (183 m) for marine mammals and (100 yd. [91 m] for pinnipeds from intended track of the test unit (excludes haulout areas).</p>	<p><u>Training:</u> Non-hull-mounted mid-frequency: 200 yd. (183 m) for marine mammals, floating vegetation and kelp paddies.</p> <p>High-frequency: None</p> <p><u>All Other Testing:</u> Observation conducted from all participating surface craft and, where available, adjacent shore sites, with a cetacean mitigation zone 1,000 yd. (914 m), 100 yd. (91 m) for pinnipeds from intended track of the test unit.</p>

Table 5.4-1: Summary of Recommended Mitigation Measures (continued)

Activity Category or Mitigation Area	Recommended Lookout Procedural Measure	Recommended Mitigation Zone and Protection Focus	Current Measure and Protection Focus
Explosive and Impulse Sound			
Improved Extended Echo Ranging Sonobuoys	<u>Training:</u> 1 Lookout <u>Testing:</u> 1 Lookout	<u>Training:</u> 600 yd. (549 m) for marine mammals, sea turtles, and concentrations of floating vegetation. <u>Testing:</u> Same as Training	<u>Training:</u> 1,000 yd. (914 m) for marine mammals and sea turtles. <u>Testing:</u> Same as Training
Explosive Signal Underwater Sound buoys using >0.5–2.5 lb. NEW	<u>Training:</u> 1 Lookout <u>Testing:</u> 1 Lookout	<u>Training:</u> 350 yd. (320 m) for marine mammals, sea turtles, and concentrations of floating vegetation. <u>Testing:</u> Same as Training	None
Mine Countermeasures and Mine Neutralization using Positive Control Firing Devices	<u>Training:</u> 2 Lookouts (1 each on 2 survey boats) <u>Testing:</u> n/a	<u>Training:</u> 400 yd. (366 m) for > 0.5–2.5 lb. charge for marine mammals. Mitigation zone for marbled murrelet will be determined through the consultation process with USFWS. <u>Testing:</u> n/a	<u>Training:</u> 700 yd. (640 m) for >0.5-2.5 lb. charge for marine mammals, turtles, and marbled murrelet. 330 yd. (300 m) for up to 1.5 lb. charge for marbled murrelet. 110 yd. (100 m) for 1 ounce charge marbled murrelet. <u>Testing:</u> n/a
Gunnery Exercises – Small- or Medium-Caliber using a Surface Target	<u>Training:</u> 1 Lookout <u>Testing:</u> n/a	<u>Training:</u> 200 yd. (183 m) for marine mammals, sea turtles, and concentrations of floating vegetation. <u>Testing:</u> n/a	<u>Training:</u> 200 yd. (183 m) for marine mammals, sea turtles, and floating vegetation. <u>Testing:</u> n/a
Gunnery Exercises – Large-Caliber Explosive Rounds using a Surface Target	<u>Training:</u> 1 Lookout <u>Testing:</u> n/a	<u>Training:</u> 600 yd. (549 m) around target for marine mammals, sea turtles, and concentrations of floating vegetation. <u>Testing:</u> n/a	<u>Training:</u> None. (Current mitigation measures were for all gunnery exercises and included only a 200 yd. [183 m] mitigation zone, which the Navy feels is too small for high explosive gunnery.) <u>Testing:</u> n/a

Table 5.4-1: Summary of Recommended Mitigation Measures (continued)

Activity Category or Mitigation Area	Recommended Lookout Procedural Measure	Recommended Mitigation Zone and Protection Focus	Current Measure and Protection Focus
Missile Exercises (Including Rockets) Up to 250 lb. NEW using a Surface Target ¹	<u>Training:</u> See Missile Exercises up to 500 lb. NEW using a Surface Target. <u>Testing:</u> n/a	<u>Training:</u> See Missile Exercises up to 500 lb. NEW using a Surface Target. <u>Testing:</u> n/a	<u>Training:</u> 1,800 yd. (1.7 km) for marine mammals, sea turtles, floating vegetation and kelp paddies. <u>Testing:</u> n/a
Missile Exercises up to 500 lb. NEW using a Surface Target ¹	<u>Training:</u> 1 Lookout <u>Testing:</u> n/a	<u>Training:</u> 2,000 yd. (1.8 km) for marine mammals, sea turtles, and concentrations of floating vegetation. <u>Testing:</u> n/a	<u>Training:</u> 1,800 yd. (1.7 km) for marine mammals, sea turtles, floating vegetation and kelp paddies. <u>Testing:</u> n/a
Explosive and Non-Explosive Bombing Exercises ¹	<u>Training:</u> 1 Lookout <u>Testing:</u> n/a	<u>Training:</u> Explosive: 2,500 yd. (2.3 km) for marine mammals, sea turtles, and concentrations of floating vegetation. Non-Explosive: 1,000 yd. (914 m) for marine mammals, sea turtles, and concentrations of floating vegetation. <u>Testing:</u> n/a	<u>Training:</u> 1,000 yd. (914 m) for marine mammals, sea turtles, floating vegetation and kelp paddies. <u>Testing:</u> n/a
Torpedo Testing (Explosive) ¹	<u>Training:</u> n/a <u>Testing:</u> Surface ship – 2 Lookouts Aircraft – 1 Lookout	<u>Training:</u> n/a <u>Testing:</u> 2,100 yd. (1.9 km) for marine mammals, sea turtles, and concentrations of floating vegetation.	<u>Training:</u> n/a <u>Testing:</u> None
Sinking Exercises	<u>Training:</u> 2 Lookouts (1 each on an aircraft and a surface vessel) <u>Testing:</u> n/a	<u>Training:</u> 2.5 nm (4.6 km) <u>Testing:</u> n/a	4.5 nm for marine mammals, sea turtles, floating vegetation and jellyfish aggregations.
Weapons Firing Noise During Gunnery Exercises – Large-Caliber	<u>Training:</u> 1 Lookout <u>Testing:</u> n/a	<u>Training:</u> 70 yd. (60 m) within 30 degrees on either side of the gun target line on the firing side for marine mammals, sea turtles, and concentrations of floating vegetation.	<u>Training:</u> None <u>Testing:</u> n/a

Note 1: When high explosives are used, this activity is conducted at least 50 nm from shore and outside OCNMS. Conducting these exercises greater than 50 nm from shore also has the practical effect of affording environmental protections to certain species such as southern resident killer whale, salmonids, and harbor porpoise.

Table 5.4-1: Summary of Recommended Mitigation Measures (continued)

Activity Category or Mitigation Area	Recommended Lookout Procedural Measure	Recommended Mitigation Zone and Protection Focus	Current Measure and Protection Focus
Physical Disturbance and Strike			
Vessel Movements	<u>Training:</u> 1 Lookout <u>Testing:</u> 1 Lookout	<u>Training:</u> 500 yd. (457 m) for whales. 200 yd. (183 m) for all other marine mammals (except bow-riding dolphins). <u>Testing:</u> Range craft shall not approach within 100 yd. (91 m) of cetaceans (bow-riding dolphins excluded, and pinnipeds excluded during test body retrieval).	<u>Training:</u> 500 yd. (457 m) for whales. <u>Testing:</u> Range craft shall not approach within 100 yd. (91 m) of marine mammals.
Towed In-Water Device Use	<u>Training:</u> 1 Lookout <u>Testing:</u> 1 Lookout	<u>Training:</u> 250 yd. (229 m) for marine mammals <u>Testing:</u> Range craft shall not approach within 100 yd. (91 m) of marine mammals.	<u>Training:</u> 250 yd. (229 m) for marine mammals. <u>Testing:</u> Range craft shall not approach within 100 yd. (91 m) of marine mammals.

Notes: ft. = feet, km = kilometer, lb.= pound, m = meter, n/a = not applicable, NEW = net explosive weight, nm = nautical mile, yd.= yard

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Table 5.4-2: Mitigation Identification and Implementation

Mitigation Measure	Benefit	Evaluation Criteria	Implementation	Responsible Command	Date Implemented
<p>Marine Species Awareness Training</p> <p>All personnel standing watch on the bridge and Lookouts will successfully complete the training before standing watch or serving as a Lookout.</p>	<p>To learn the procedures for searching for and recognizing the presence of marine species, including detection cues (e.g., congregating seabirds) so that potentially harmful interactions can be avoided.</p>	<p>Successful completion of training by all personnel standing watch and all personnel serving as Lookouts.</p> <p>Personnel successfully applying skills learned during training.</p>	<p>The multimedia training program has been made available to personnel required to take the training.</p> <p>Personnel have been and will continue to be required to take the training prior to standing watch and serving as Lookouts.</p>	<p>Officer Conducting the Exercise or Test or civilian equivalent</p>	<p>Ongoing</p>
<p>Lookouts</p>					
<p>Use of Four Lookouts for Underwater Detonations</p> <p>Mine countermeasure and neutralization activities using positive control firing devices will include the use of two Lookouts. If applicable, aircrew and divers will report sightings of marine mammals or sea turtles.</p>	<p>Lookouts can visually detect marine species so that potentially harmful impacts to marine mammals and sea turtles from explosives use can be avoided.</p> <p>Lookouts can more quickly and effectively relay sighting information so that corrective action can be taken. Support from aircrew and divers, if they are involved in the activity, will increase the probability of sightings, reducing the potential for impacts.</p>	<p>Annual report documenting NAVSEA testing and marine mammal observation data.</p> <p>Timely reporting of underwater detonations and monitoring results related to bull trout and marbled murrelets.</p>	<p>All Lookouts will receive marine species awareness training and will be positioned on vessels, boats, and aircraft as described in Section 5.3.1.1.1 (Training for Navy Personnel and Civilian Equivalents).</p>	<p>Officer Conducting the Exercise or Test</p>	<p>Ongoing</p>
<p>Use of One or Two Lookouts</p> <p>Vessels using low-frequency active sonar or hull-mounted mid-frequency active sonar associated with ASW activities will have either one or two Lookouts, depending on the activity and size of the vessel.</p> <p>Mine countermeasure and neutralization activities with positive control will use two Lookouts, with one on each support vessel. If applicable, aircrew and divers will also report the presence of marine mammals or sea turtles. One Lookout may be used under certain circumstances specific in Section 5.3.1.2 (Lookouts).</p>	<p>Lookouts can visually detect marine species so that potentially harmful impacts to marine mammals and sea turtles from Navy sonar and explosives use can be avoided.</p> <p>Lookouts can more quickly and effectively relay sighting information so that corrective action can be taken. Support from aircrew and divers, if they are involved in the activity, will increase the probability of sightings, reducing the potential for impacts.</p>				
<p>Use of One Lookout</p> <p>Surface ships and aircraft conducting ASW, ASUW, or MIW activities using HFAS, non-hull-mounted mid-frequency active sonar, helicopter dipping mid-frequency active sonar, anti-swimmer grenades, explosive buoys, surface gunnery activities, surface missile activities, bombing activities, explosive torpedo testing, and activities using non-explosive practice munitions, will have one Lookout.</p>	<p>Lookouts can visually detect marine species so that potentially harmful impacts to marine mammals and sea turtles from Navy sonar, explosives, sonobuoys, gunnery rounds, missiles, explosive torpedoes, pile driving, towed systems, surface vessel propulsion, and non-explosive munitions can be avoided.</p> <p>Lookouts will quickly and effectively relay sighting information so that corrective action(s) can be taken.</p>				

Table 5.4-2: Mitigation Identification and Implementation (continued)

Mitigation Measure	Benefit	Evaluation Criteria	Implementation	Responsible Command	Date Implemented
Mitigation Zones					
<p>Use of a Mitigation Zone</p> <p>A mitigation zone is an area defined by a radius and centered on the location of a sound source or activity. The size of each mitigation zone is specific to a particular training or testing activity (e.g., sonar use or explosive use).</p>	<p>A mitigation zone defines the area in which Lookouts survey for marine mammals and sea turtles.</p> <p>Mitigation zones reduce the potential for injury to marine species.</p>	<p>For those activities where monitoring is required, record observations of marine mammals and sea turtles located outside of the mitigation zone and note any apparent reactions to on-going Navy activities. Observation of acute reactions may be used as an indicator that the radius of the mitigation zone needs to be increased.</p>	<p>Mitigation zones have been and will continue to be implemented as described in Section 5.3.2 (Mitigation Zone Procedural Measures).</p> <p>Lookouts are trained to conduct observations within mitigation zones of different sizes.</p>	<p>Officer Conducting the Exercise or Test</p>	<p>Ongoing</p>
<p>Recognize the Importance of Marine Protected Areas</p> <p>In general, most Armed Forces activities are exempt from the prohibitions of marine protected areas. Nevertheless, the Navy would carry out its training and testing activities in a manner that will avoid, to the maximum extent practical and consistent with training and testing requirements, adverse impacts to National Marine Sanctuary resources.</p>	<p>Avoiding or minimizing impacts while operating in or near marine protected areas could result in improved health of the resources in the areas.</p>	<p>The Navy shall submit an annual report to the National Marine Fisheries Service.</p>	<p>The Navy includes charts in the Protective Measures Assessment Protocol to define marine protected areas.</p> <p>To the greatest extent practical, adverse impacts to these areas will be avoided.</p>	<p>Officer Conducting the Exercise or Test</p>	<p>Ongoing</p>

Notes: ASW = Anti-submarine Warfare, ASUW = Anti-surface Warfare, HFAS = High-Frequency Active Sonar, IEER = Improved Extended Echo Ranging, MIW = Mine Warfare, NAVSEA = Naval Sea Systems Command

5.5 MONITORING AND REPORTING

5.5.1 APPROACH TO MONITORING

The Navy is committed to demonstrating environmental stewardship while executing its National Defense Mission and complying with the suite of Federal environmental laws and regulations. As a complement to the Navy's commitment to avoiding and reducing impacts of the Proposed Action through mitigation, the Navy will undertake monitoring efforts to track compliance with take authorizations, help evaluate the effectiveness of implemented mitigation measures, and gain a better understanding of the effects of the Proposed Action on marine resources. Taken together, mitigation and monitoring comprise the Navy's integrated approach for reducing environmental impacts from the Proposed Action. The Navy's overall monitoring approach will seek to leverage and build on existing research efforts whenever possible.

Consistent with the cooperating agency agreement with NMFS, mitigation and monitoring measures presented in this EIS/OEIS focus on the requirements for protection and management of marine resources. A well-designed monitoring program can provide important feedback for validating assumptions made in analyses and allow for adaptive management of marine resources. Since monitoring will be required for compliance with the final rule issued for the Proposed Action under the MMPA, details of the monitoring program will be developed in coordination with NMFS through the regulatory process. Discussions with resource agencies during the consultation and permitting processes may result in changes to the mitigation as described in this document. Such changes will be reflected in the Final EIS/OEIS, ROD, and consultation documents such as the ESA Biological Opinion.

5.5.1.1 Integrated Comprehensive Monitoring Plan Top-Level Goals

The Integrated Comprehensive Monitoring Program is intended to coordinate monitoring efforts across all regions where the Navy trains and tests and to allocate the most appropriate level and type of effort for each range complex (U.S. Department of the Navy 2010). The current Navy monitoring program is composed of a collection of "range-specific" monitoring plans, each developed individually as part of MMPA and ESA compliance processes as environmental documentation was completed. These individual plans establish specific monitoring requirements for each range complex and are collectively intended to address the Integrated Comprehensive Monitoring Program top-level goals.

A 2010 Navy-sponsored monitoring meeting in Arlington, Virginia, initiated a process to critically evaluate the current Navy monitoring plans and begin development of revisions and updates to both existing region-specific plans as well as the Integrated Comprehensive Monitoring Plan. Discussions at that meeting as well as the following Navy and NMFS annual adaptive management meeting established a way ahead for continued refinement of the Navy's monitoring program. This process included establishing a Scientific Advisory Group of leading marine mammal scientists with the initial task of developing recommendations that would serve as the basis for a Strategic Plan for Navy monitoring. The Strategic Plan is intended to be a primary component of the Integrated Comprehensive Monitoring Program, provide a "vision" for Navy monitoring across geographic regions—serving as guidance for determining how to most efficiently and effectively invest the marine species monitoring resources to address Integrated Comprehensive Monitoring Program top-level goals, and satisfy MMPA Letter of Authorization regulatory requirements.

The objective of the Strategic Plan is to continue the evolution of Navy marine species monitoring towards a single integrated program, incorporating Scientific Advisory Group recommendations, and establishing a more transparent framework for soliciting, evaluation, and implementing monitoring work

across the range complexes. The Strategic Plan must consider a range of factors in addition to the scientific recommendations including logistic, operational, and funding considerations and will be revised regularly as part of the annual adaptive management process.

The Integrated Comprehensive Monitoring Plan establishes top-level goals that have been developed in coordination with NMFS (U.S. Department of the Navy 2010). The following top-level goals will become more specific with regard to identifying potential projects and monitoring field work through the Strategic Plan process as projects are evaluated and initiated in the Study Area.

- An increase in our understanding of the likely occurrence of marine mammals or ESA-listed marine species in the vicinity of the action (i.e., presence, abundance, distribution, and density of species);
- An increase in our understanding of the nature, scope, or context of the likely exposure of marine mammals and ESA-listed species to any of the potential stressor(s) associated with the action (e.g., tonal and impulse sound), through better understanding of one or more of the following: (1) the action and the environment in which it occurs (e.g., sound source characterization, propagation, and ambient noise levels), (2) the affected species (e.g., life history or dive patterns), (3) the likely co-occurrence of marine mammals and ESA-listed marine species with the action (in whole or part) associated with specific adverse effects, or (4) the likely biological or behavioral context of exposure to the stressor for the marine mammal and ESA-listed marine species (e.g., age class of exposed animals or known pupping, calving or feeding areas);
- An increase in our understanding of how individual marine mammals or ESA-listed marine species respond (behaviorally or physiologically) to the specific stressors associated with the action (in specific contexts, where possible, e.g., at what distance or received level);
- An increase in our understanding of how anticipated individual responses, to individual stressors or anticipated combinations of stressors, may impact either: (1) the long-term fitness and survival of an individual; or (2) the population, species, or stock (e.g., through effects on annual rates of recruitment or survival);
- An increase in our understanding of the effectiveness of mitigation and monitoring measures;
- A better understanding and record of the manner in which the authorized entity complies with the Incidental Take Authorization and Incidental Take Statement;
- An increase in the probability of detecting marine mammals (through improved technology or methods), both specifically within the mitigation zone (thus allowing for more effective implementation of the mitigation) and in general, to better achieve the above goals; and
- A reduction in the adverse impact of activities to the least practicable level, as defined in the MMPA.

5.5.1.2 Scientific Advisory Group Recommendations

Navy established the Scientific Advisory Group in 2011 with the initial task of evaluating current Navy monitoring approaches under the Integrated Comprehensive Monitoring Plan and existing MMPA Letters of Authorization and developing objective scientific recommendations that would form the basis for this Strategic Plan. While recommendations were fairly broad and not prescriptive from a range complex perspective, the Scientific Advisory Group did provide specific programmatic recommendations that serve as guiding principles for the continued evolution of the Navy Marine Species Monitoring Program and provide a direction for the Strategic Plan to move this development. Key recommendations include:

- Working within a conceptual framework of knowledge, from basic information on the occurrence of species within each range complex, to more specific matters of exposure, response, and consequences.
- Facilitating collaboration among researchers in each region, with the intent to develop a coherent and synergistic regional monitoring and research effort.
- Striving to move away from a “box-checking” mentality. Monitoring studies should be designed and conducted according to scientific objectives, rather than on merely cataloging effort expended.
- Approach the monitoring program holistically and select projects that offer the best opportunity to advance understanding of the issues, as opposed to establishing range-specific requirements.

5.5.2 ACTIVITY SPECIFIC MONITORING

Mine Countermeasures and Neutralization Training Activities

Following consultation with USFWS, the Navy has implemented the monitoring measures necessary to minimize the impact of the taking on both bull trout and marbled murrelets during Mine Countermeasures and Neutralization Activities.

Bull Trout

In October 2012, in cooperation with USFWS, the Navy completed a post-detonation fish-monitoring plan to be implemented after each EOD detonation in Crescent Harbor. The monitoring plan ensures that mortality of bull trout that may occur from EOD detonations does not exceed the amount anticipated in this incidental take statement (10 adult or subadult bull trout over 5 years).

Marbled Murrelet

In October 2012, the Navy completed a monitoring plan it developed in cooperation with USFWS. The monitoring plan addresses the following objectives:

- Ensures the sound pressure level for each detonation associated with EOD exercises is less than 41 pascal seconds (pa Sec) at 210 m for 2.5 lb charges and 150 m for 1.5 lb charges.
- Measure transmission loss (decay) of underwater sound beyond 210 m and 150 m distances on a mutually agreeable number of detonations.
- Monitor murrelet (or an appropriate surrogate) response to exposure to underwater sound beyond 210 m and 150 m distances.

5.5.3 REPORTING

The Navy is committed to documenting and reporting relevant aspects of training and testing activities in order to document species sightings, reduce environmental impact, and improve future environmental assessments, including the reporting initiatives described below.

5.5.3.1 Exercise and Monitoring Reporting

The Navy will submit annual exercise and monitoring reports to the Office of Protected Resources at NMFS. The exercise report will describe the level of training and testing conducted during the reporting period, and the monitoring report will describe both the nature of the monitoring that has been conducted and the actual results of the monitoring. All of the details regarding the content of the annual reports will be coordinated with NMFS through the permitting process. All unclassified reports submitted to date can be found on the NMFS Office of Protected Resources webpage.

The Navy proposes special reporting within the Navy annual NWTT classified exercise report provided to NMFS. These reports will include:

- The total hours of active sonar used during training and testing occurring in the Humpback Whale Northern Washington feeding area and the Stonewall and Heceta Bank feeding area between May and November.
- The total hours of active sonar used during training and testing occurring in the Gray Whale Northern Puget Sound Feeding Area between March and May.

The Navy proposes this reporting in its annual reports to inform future adaptive management of activities within the NWTT Study Area.

5.5.3.2 Additional Reporting Requirements

5.5.3.2.1 Marine Mammal or Sea Turtle

If there is evidence that a marine mammal or sea turtle may have been stranded, injured or killed by the action, Navy training and testing activities will be immediately suspended and the situation immediately reported by the participating unit to the Officer in Charge of the Exercise, who will follow Navy procedures for reporting the incident to Commander, Pacific Fleet, Commander, Navy Region Northwest, Environmental Director, and the chain-of-command. The situation will also be reported to NMFS.

Navy personnel shall ensure that NMFS is notified immediately (or as soon as clearance procedures allow) if an injured, stranded, or dead marine mammal is found during or shortly after, and in the vicinity of, any Navy training exercise utilizing mid-frequency active sonar, high-frequency active sonar, or underwater explosive detonations. The Navy will provide NMFS with the name of species or description of the animal(s), the condition of the animal(s) (including carcass condition if the animal is dead), location, time of first discovery, observed behaviors (if alive), and photo or video (if available). In the event that an injured, stranded, or dead marine mammal is found by the Navy that is not in the vicinity of, or during or shortly after, mid-frequency active sonar, high-frequency active sonar, or underwater explosive detonations, the Navy will report the same information as listed above as soon as operationally feasible and clearance procedures allow.

General Notification of Ship Strike

In the event of a ship strike by any Navy vessel, at any time or place, the Navy shall do the following:

- Immediately report to NMFS the species identification (if known), location (lat/long) of the animal (or the strike if the animal has disappeared), and whether the animal is alive or dead (or unknown).
- Report to NMFS as soon as operationally feasible the size and length of animal, an estimate of the injury status (e.g., dead, injured but alive, injured and moving, unknown, etc.), vessel class/type and operational status.
- Report to NMFS the vessel length, speed, and heading as soon as feasible.
- Provide NMFS a photo or video, if equipment is available.

5.5.3.2.2 Other ESA-Listed Species

The Navy is in consultation with NMFS and USFWS to determine future monitoring and reporting requirements for other ESA-listed species.

5.5.3.3 Stranding Response Plan

In coordination with NMFS, the Navy will have a stranding response plan. All of the details regarding the content of the stranding response plan will be coordinated with NMFS through the permitting process.

5.5.3.4 Bird Strikes

The Navy will report all damaging and non-damaging bird strikes to the Naval Safety Center through the chain of command.

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